

SUKUK DIGITAL ECOLOGY: NETWORK ANALYSIS, SENTIMENT, AND DEMOGRAPHICS IN CONVERSATION ONLINE

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Abstract: This study aims to analyze public perception of sukuk as a sharia financial instrument using social media analysis methods based on social network analysis (SNA). The purpose of this study is to identify the dynamics and important actors in digital discussions surrounding sukuk. The theoretical framework is based on public communication and social network theories to explain how information and opinions spread in the digital world and how the social media ecosystem influences public perceptions of sukuk in the context of Islamic finance. Data was collected from the Talkwalker platform by tracking digital conversations containing the keyword “sukuk” for a certain period of time. The SNA approach was employed to identify key actors, interaction patterns, and information dissemination paths, while natural language processing (NLP)-based sentiment analysis was used to categorize public opinion into neutral, negative, or positive. Additional visualizations were applied to better understand demographic distribution, time trends, and key issues. The results indicate that public discussions about sukuk on social media are highly dynamic and sensitive to current issues. Sentiment shifted from negative to positive during the observation period, with increasing engagement from productive age groups, especially men. Furthermore, findings highlight the relevance of sukuk in Sharia compliance, development, and financial innovation, while also showing that certain digital entities possess significant power to influence public opinion. The results emphasize that public communication strategies related to sukuk require a data-driven and inclusive approach, which contributes to the development of flexible Islamic finance communication. This research is valuable for policymakers, regulators, and market players in understanding the digital public opinion landscape and in formulating adaptive strategies and policies. In conclusion, this study offers a methodological contribution by combining SNA and sentiment analysis, providing an analytical model for technology-based Islamic finance research, and supporting digital financial literacy and policy communication in Islamic economics.

Keywords: Sukuk, Islamic Finance, Social Network Analysis

1. Introduction

As an alternative to sharia-compliant bonds, sukuk has become one of the most popular sharia financial instruments in the global market in recent decades (Supyadillah et al., 2025). Sukuk is also a symbol of the growth of Islamic finance worldwide (Maruf, 2025).

In this digital era, people are increasingly active in using social media to express their opinions, share information, and talk about various issues, including sukuk (Rasmuddin et al., 2024). Conversations about sukuk are no longer limited to academics and financial practitioners, but involve the general public on various online platforms such as Facebook, Twitter, discussion forums, and online news media (Apriantero & Ananda, 2024). This phenomenon shows that public opinion about sukuk has changed greatly and is spread across many digital channels (Akinde et al., 2025).

To understand the digital perception of sukuk in more depth, a method is needed that can observe interactions between users comprehensively (Danila, 2024). A tool for quantitatively analyzing social network structures is social network analysis (SNA) (Apriantero & Ananda, 2024). This includes finding the most significant nodes, information dissemination paths, and connection patterns between user groups. SNA allows us to see what people are talking about, how information is spread, and who plays an important role in shaping public opinion about sukuk (Supyadillah et al., 2025).

However, there are not many studies that specifically use digital data-based techniques such as SNA to analyze public perception of sukuk on social media. Most previous studies have only focused on conventional elements of sukuk policy such as law, economy or policy; however, they have not studied thoroughly how public opinion is formed in the digital world and who are the important actors that influence it. In addition, there are not many studies conducted on the relationship between public sentiment and conversation style on the internet with the success rate of sukuk literacy and adoption. As a result, this study is here to fill this gap by using an organized and data-driven social media analysis methodology.

The use of the Talkwalker platform can greatly assist this analysis, Talkwalker collects and tracks digital conversations in real-time from various sources, including social media, blogs, forums, and online news portals (Apriantero & Ananda, 2024). In addition, its features that track keywords and analyze sentiment allow researchers to accurately determine the tendency of public attitudes towards sukuk issues (Soomro et al., 2025).

Using the social network analysis (SNA) method supported by the Talkwalker platform, this study aims to study the dynamics of conversations about sukuk in the digital space. Specifically, this study aims to identify the main actors that influence public opinion, and to understand public feelings about sukuk. Therefore, the results of this study are expected to provide insight strategic for policy development and public communication aimed at increasing public understanding and participation in sukuk products.

2. Method

During the period from 3 to 9 May 2025, the Talkwalker platform was used to conduct social network analysis to gain a comprehensive understanding of public perception towards sukuk. The platform tracks and categorizes online discussions based on the keyword "Sukuk", tracking public opinion focused on the geographical region of Indonesia and speaking Indonesian. The types of media analyzed included Twitter, Facebook and blogs reflecting various digital communication channels. The sentiment analysis algorithm used by Talkwalker to group public opinion into positive, negative categories, the results showed 28.5% of public opinion was positive and 27.8% was negative. In addition, the system found popular hashtags

such as #finance, #market, and #billion, and found that the population aged 18 to 64 years dominated online conversations during the monitoring period. The results of this analysis provide an in-depth picture of the dynamics of public opinion and the direction of perception towards sukuk in the digital space (Apriantoro & Ananda, 2024). This analysis can provide a deep understanding of the influence, shifts in public opinion, and dynamics of discussions in the digital realm that have influenced and how public conversations about sukuk are discussed, from financial benefits to sharia principles and how sukuk contribute to national socio-economic development (Apriantoro et al., 2022, 2023)

The sentiment analysis method for sukuk issues uses a natural language processing (NLP) approach, which consists of several important steps. First, tokenization is used to divide user text into smaller linguistic parts. In the next step, syntactic analysis is performed to gain an understanding of the structure and relationships between words in sentences. After that, semantic analysis is performed to understand the meaning of words and sentences in the context of conversations about sukuk. The data processing flow is shown in Figure 1.

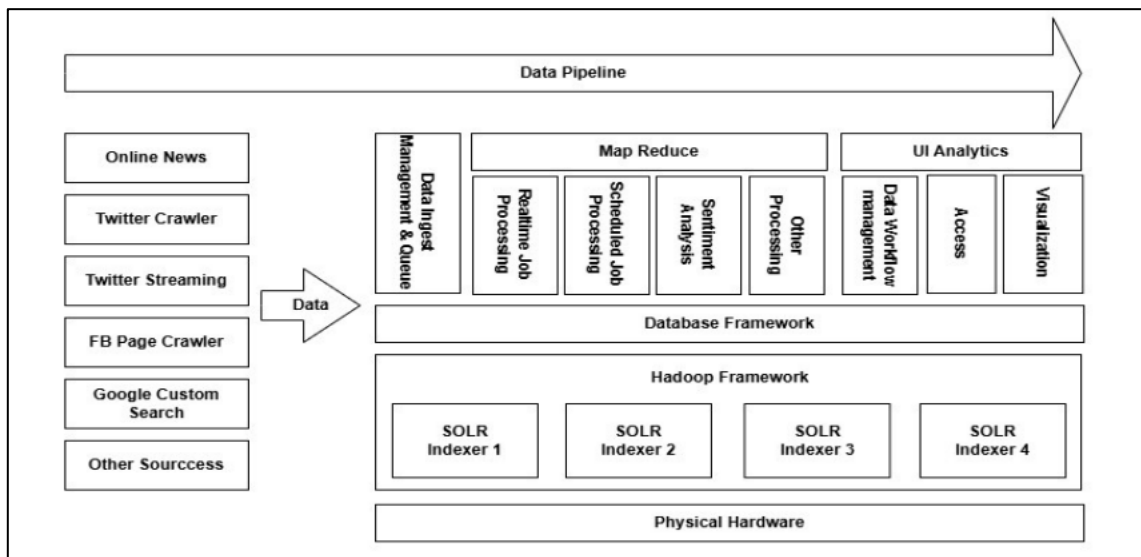


Figure 1: Big Data Processing Architecture from Various Sources

The use of sentiment classification algorithms is a very important part of this process. This algorithm categorizes public opinion about public sukuk as positive, negative or neutral. This method provides a strategic picture of the perception of the wider community towards sukuk by analyzing thousands of online discussions.

This method not only helps to measure public opinion but can also help regulators, market players and policy makers to create better Islamic financial literacy strategies and educational campaigns. Public perception of sukuk as an inclusive and sustainable Islamic financial instrument can be changed by considering the growing public sentiment (Swami, 2021).

3. Results And Discussion

Using Social Network Analysis (SNA) techniques to examine sukuk topics on social media platforms, the Talkwalker tool has produced results that provide an indepth look at online discussions about this Islamic financial instrument. Talking about specific elements of sukuk, such as Shariah compliance, its role in infrastructure development, and the impact of sustainable finance, can help uncover spontaneously emerging topics. This suggests that the community is actively engaged in considering strategic and relevant economic and financial issues.

3.1. Key Metrics

There is variation in the level of conversation about sukuk changes from one hour to the next. The amount and intensity of discussion about sukuk varies over time.

Sometimes, it shows a significant increase and sometimes it decreases to zero.or nearly zero. This may indicate changes in government policy, the launch of new sukuk, or other market conditions that affect public interest in Islamic financial instruments. Figure 2 shows the results over time.

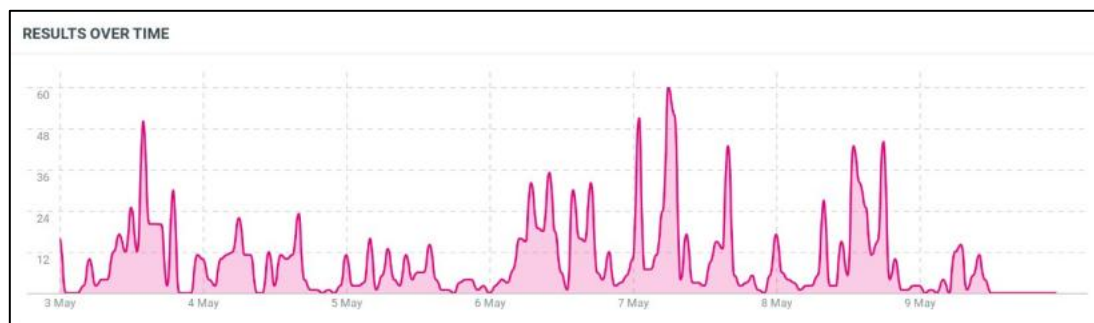


Figure 2: Data trend graph over time

Figure 2 shows significant changes in the results from May 3 to 9. Some of the most notable peaks in activity occurred on May 4, May 7, and May 8, when the results reached their peak values. The highest peak occurred on May 7, which indicates a significant increase that is worth noting. This could indicate that the spike was caused by a specific action, interaction, or event.

Meanwhile, there were some quiet times with low results, especially in the early part of May 5 and the late part of May 9. This may have been due to a delay in activity or a lack of data at that time. During this period, there was a constant change in dynamics, as shown by these fluctuations. Therefore, it is important to further investigate the source of these spikes. These can come from internal sources, such as changes to the system, or from external sources, such as public response to a particular issue.

Including additional data or extending the time span of analysis can help gain a better understanding of these patterns and trends and identify the components responsible for the formation of the patterns and their consequences.

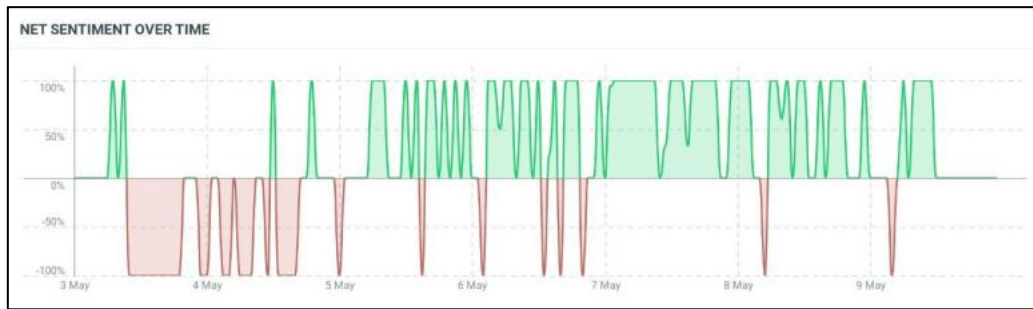


Figure 3: Comparison graph between positive and negative sentiment

A net sentiment data review conducted between May 3 and May 9, 2025, shows a major shift in public opinion about sukuk on social media. In the early days, from May 3 to May 4, negative sentiment dominated with values dropping drastically to 100%, as indicated by the consistent and intense red area indicating negative public reaction to the issue circulating at that time.

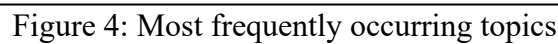
However, from May 5 to May 8, there was a fairly steady shift towards more positive sentiment. During this period, the green area above the zero line dominated the graph, indicating that public perception of sukuk was improving. However, there were some brief dips towards the negative, indicating that perceptions were still not completely stable.

The peak of positive sentiment appeared to occur on May 6 and 7, where the graph showed consistency in a positive tone without significant disruption from negative sentiment. However, on May 9, sentiment activity declined and the graph began to return to neutral conditions, indicating a decrease in the intensity of public discussion or a stabilization of perceptions of the sukuk issue in the last days of monitoring.

Overall, these data show that public perception of sukuk during the period of 3–9 May 2025 experienced dynamic changes, from predominantly negative at the beginning to tending towards positive in the middle of the period, with a stable tendency approaching neutral at the end. These changes are likely influenced by current issues, media publications, or policies that have a direct impact on public opinion in the digital space.


3.2. Main Theme

This image can be seen through the visualization of the main theme in Figure 4.



3.3. Demographics

GENDER



The infographic displays two gender categories with their respective percentages and symbols. On the left, the female category is represented by a purple circle with a cross inside, showing 30.9%. On the right, the male category is represented by a teal circle with an arrow inside, showing 69.1%.

Gender	Percentage
Female	30.9%
Male	69.1%

The figure above shows that men are involved in sukuk 69.1%, while women are only 30.9%. This shows the existence of gender differences in Islamic financial literacy and participation in sukuk. Limited access to information, social norms that consider men as financial decision

makers, different risk preferences and the burden of dual roles are all factors that affect women's involvement. To address these issues, a fairer and more equal Islamic finance must be built. through inclusive approaches such as financial education targeting women, community training, and the development of gender-friendly investment products.

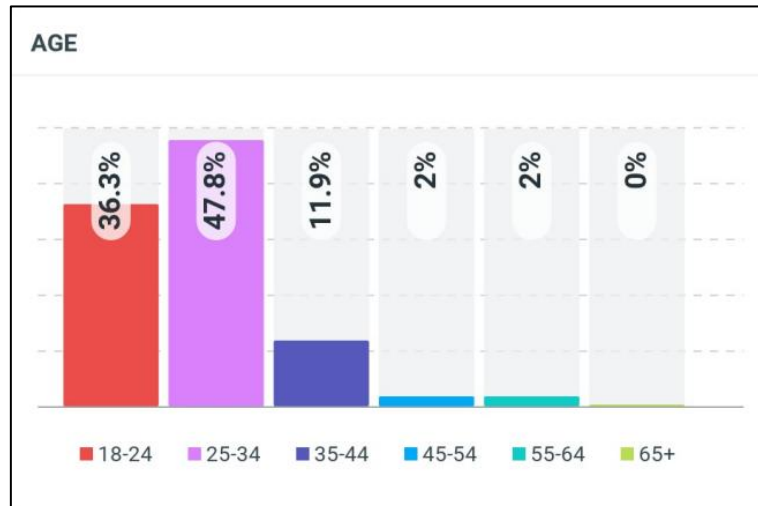


Figure 6: Visualization of respondent age distribution

The age distribution of the respondent or user groups is shown in the bar chart above. The 25 to 34 age group has the highest participation rate at 47.8%. The 18 to 24 age group follows with 36.3%. The majority of users or respondents come from the younger age group, especially the productive age between 18 and 34 years. The 35 to 44 age group has a percentage of 11.9% while the 45 to 54 and 55 to 64 age groups each have a percentage of 2%. The 65 and above age group is completely unrepresented in this data with only 2%.

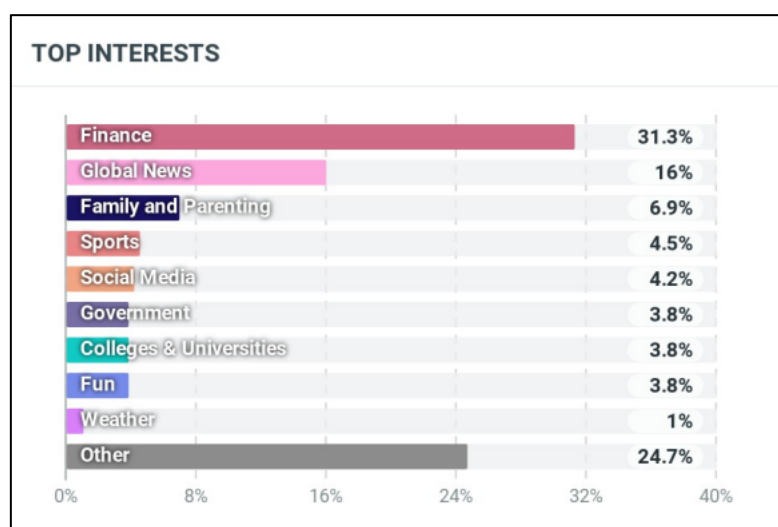


Figure 7: Visualization of respondent age distribution

The figure above shows how the main interests of the user group or respondents are divided according to topic categories. With a percentage of 31.3%, the Finance category received the highest interest. This shows that the main focus is on financial issues. Global news came in second with 16%, followed by Family and Parenting with 6.9%. Global news also received attention at 16%. The number of other interests was smaller. Sports contributed 4.5%, Social Media 4.2%, Government, Colleges and Universities each received 3.8% and Weather only attracted 1% of users. Meanwhile, Other contributed 24.7%, indicating user interest in things that are not included in the main categories mentioned earlier.

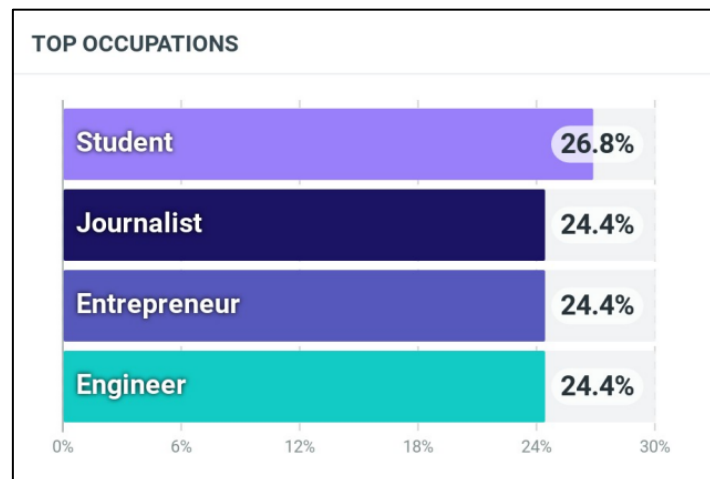


Figure 8: Distribution of top jobs

The figure shows a horizontal bar graph titled “Top Jobs” showing the top four jobs along with the percentage representation of each. *Student* has the highest percentage of jobs at 26.8%. However, three additional jobs, “Journalist” (journalist), “Entrepreneur” (entrepreneur) and “Insinyur” (engineer), each have a percentage of 24.4 percent. The percentage values for each category are shown with different colored bars and the percentage values are clearly displayed on the right end of each bar. This graph shows that, although students/ dominate, the other three jobs have an equal distribution.

3.4 Practical Implications

This study identified three strategic recommendations for sukuk stakeholders. First, regarding digital communication strategies, new methods such as creating micro-content based on short videos on TikTok and Instagram Reels that provide practical explanations of sukuk investment mechanisms are needed, as are collaborations with well-known influencers to increase engagement. Second, to address gender inequality, women's participation is only 30.9%, necessitating specific initiatives such as a "Sukuk Literate Women" webinar network featuring inspiring female speakers. Furthermore, the development of thematic sukuk products that support the empowerment of women-owned MSMEs based on Sharia principles is necessary. Third, relevant institutions such as the Financial Services Authority (OJK) and the National Sukuk Commission (KNEKS) must develop an artificial intelligence-based early warning system capable of detecting real-time sentiment changes and have a rapid response team ready to provide clarification via digital platforms within three hours when critical issues related to Sharia compliance or investment security arise (Figure 3).

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5. Conclusion

The study shows that public conversations about sukuk on social media are very active and volatile, with sentiments changing from negative to positive during the observation. The majority of conversations occurred among the productive age group of 18 to 34 years, indicating that the younger generation could be the main target in the sukuk communication approach. However, the data shows gender disparity, with female participation only 30.9%, far below male participation at 69.1%. This indicates that there is a gap in literacy and access to digital-based Islamic finance. With increasing public awareness of the role of sukuk in national development, the main topics of public conversations include sharia compliance, development financing, and economic innovation. These results confirm that in order to improve public understanding and participation in sukuk and increase their participation, inclusive and data-driven communication methods must be used.

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