TAWAZUN: Journal of Sharia Economic Law
P-ISSN: 2655-9021, E-ISSN: 2502-8316
Volume 9, Nomor 1, Juni 2026
http://journal.iainkudus.ac.id/index.php/tawazun/index

Digital Transformation and Institutional Governance in Sharia Investment Markets: A Computational Perspective on Emerging Financial Ecosystems

Renovalia Satya Firmaningtyas[1], Muhamad Subhi Apriantoro[2]
[1,2]Universitas Muhammadiyah Surakarta
*Corresponding author. Email: i000230013@student.ums.ac.id

Abstract
The rapid growth of the Islamic finance industry and the increasing use of digital platforms have encouraged the emergence of virtual academic events discussing Sharia investment. Webinars, online seminars, and panel discussions generate large volumes of unstructured digital data that can serve as valuable sources for understanding contemporary Sharia investment discourse. However, the utilization of such data in academic research remains limited. Therefore, this study aims to analyze the discourse on Sharia investment emerging from virtual academic events through a netnographic approach. The study employs netnography supported by text mining techniques to explore dominant themes and discussion patterns related to Sharia investment in digital environments. Data were purposively collected from six virtual academic events conducted between 2020 and 2025, involving nine Sharia investment experts from five countries. The dataset consists of 23,386 words obtained through automated speech-to-text transcription and manually verified for accuracy. The findings reveal that Sharia compliance, investment governance, business ethics, and digitalization are the dominant themes, reflecting the growing relevance of Sharia investment in the digital era.

Keywords: *Shariah Investment, Sharia Compliance, Digital transformation*

Abstrak
Pertumbuhan pesat industri keuangan syariah serta meningkatnya penggunaan platform digital telah mendorong munculnya berbagai acara akademik virtual yang membahas investasi syariah. Webinar, seminar daring, dan diskusi panel menghasilkan sejumlah besar data digital tidak terstruktur yang dapat menjadi sumber penting untuk memahami wacana investasi syariah kontemporer. Namun, pemanfaatan data tersebut dalam penelitian akademik masih relatif terbatas. Oleh karena itu, penelitian ini bertujuan untuk menganalisis wacana investasi syariah yang muncul dalam acara akademik virtual melalui pendekatan netnografi. Penelitian ini menggunakan metode netnografi yang didukung teknik text mining untuk mengeksplorasi tema-tema dominan dan pola diskusi terkait investasi syariah di lingkungan digital. Data dikumpulkan secara purposive dari enam acara akademik virtual yang diselenggarakan pada periode 2020–2025 dengan melibatkan sembilan pakar investasi syariah dari lima negara. Dataset penelitian terdiri atas 23.386 kata yang diperoleh melalui transkripsi otomatis speech-to-text dan diverifikasi secara manual untuk memastikan akurasi. Hasil penelitian menunjukkan bahwa kepatuhan syariah, tata kelola investasi, etika bisnis, dan digitalisasi merupakan tema-tema dominan yang mencerminkan semakin pentingnya investasi syariah di era digital.

Kata Kunci: Investasi Syariah, Kepatuhan Syariah, Transformasi Digital

INTRODUCTION

Over the five years, the Islamic finance industry has experienced significant growth, particularly in Sharia- compliant investments (Alijon Qizi, 2022). Instruments – these include sharia stocks, sukuk, sharia mutual funds, and property investments that operate in accordance with the principles of anti-usury*, gharar, and maysir* (Amanda Simanjuntak et al., 2023). Digital information not only opens new opportunities for investors but also creates space for academics to understand the development of Islamic investment from social and academic perspectives (Angelina Isnaini et al., 2023). Sharia securities companies, consultants, business owners, and other parties (Kaplan & Haenlein, 2010) have utilized information from the virtual world (e.g., social media) for business purposes.

In scientific works, social media and digital platforms have become relevant sources of research, including digital ethnography and investment behavior (Chandra Bhooshan Singh et al., 2024), and financial literacy (Jalal Ahamed & Professor, 2020). Several Islamic securities companies have held virtual events on social media, helping generate information about Islamic investment from around the world. However, despite progress in research systematically examining how Sharia investment adapts to rapid digitalization and addresses contemporary global challenges, this research remains limited.

What lessons can be learned from experts' discussions on Sharia investment over the past few years? To date, studies analyzing expert discussions at Islamic investment events on platforms such as YouTube and Zoom remain rare. To address this knowledge gap, this paper examines YouTube and Zoom videos that convey scientific insights into Sharia investment in the virtual realm. The remainder of this work is organized as follows.

LITERATURE REVIEW

The growth of the Islamic finance industry, particularly in Indonesia, has been rapid, driven by the emergence of sukuk, Islamic mutual funds, Islamic stocks, and Islamic-based fintech (Amelia & Wibowo, 2020). However, Sharia-compliant investments remain low compared to conventional instruments. This shows that there's a gap between the huge potential of Indonesia's Muslim population and the reality of people's participation in sharia investment (Syams & Fahmi, 2019).The potential of Sharia investment has been discussed extensively in virtual events, such as webinars. However, there are still a few studies on Sharia investment using big data analytics. Therefore, this study uses social media analytics (specifically YouTube and Zoom video analytics) to extract knowledge from expert discussions on Sharia investment at virtual events.

Social media has become one of the main spaces for interaction in modern society (Krzysztof Rejman & Porada, 2022). Islamic securities companies use platforms such as YouTube to disseminate educational content, promote products, and provide analysis on investment opportunities and risks (Abdillah et al., 2022). The rapid flow of information on social media generates large amounts of rich, unstructured data.

Big data encompasses various dimensions, including volume, variety, velocity, veracity, variability, and value (Gandomi & Haider, 2015). Data volume refers to the size of data; big data encompasses several terabytes and petabytes (Gandomi & Haider, 2015). Data variations include structured, semi-structured, and unstructured data. Structured data is data that has a rigid data model and schema, neatly organized in a clear table and column format (such as spreadsheets or relational databases), whereas unstructured data is data that does have a fixed format (such as text, audio, video, and image). Data velocity indicates how quickly Sharia investment information is produced and disseminated, for example, through trending topics on halal investment that go viral on social media. Data veracity explains that not all public opinion can be trusted, but it still provides insight for Islamic financial institutions (Fakhrunnas, 2018). Data complexity refers to the variation in information flow across platforms (Riesener et al., 2019).

Meanwhile, data value emerges when raw information is processed into input for Sharia investment development. The use of big data enables companies to improve efficiency and effectiveness in investment decision-making, as well as utilize predictive analytics to forecast more accurate outcomes. There are at least five types of big data analytics, namely text analytics, video analytics, social media analytics, audio analytics, and predictive analytics (Rawat & Yadav, 2021). Social media can be used to analyze investor sentiment in the context of sharia investment, video analysis can be used to review halal investment education content on YouTube, and predictive analytics can be used to anticipate sharia market trends (Amelia & Wibowo, 2020).

This paper uses the netnography method to examine Sharia investment on YouTube and Zoom. This study aims to explore how social interactions on YouTube and Zoom influence users' views and behaviors regarding Sharia investment. This study is expected to provide insights into the dynamics of online communities and their impact on users' perceptions of Sharia investment (Dewi et al., 2024).

The use of unstructured digital data from platforms such as YouTube and Zoom is increasingly recognized in modern academic research. Previous studies have shown that video content, comments, and online interactions can be important sources of data for understanding social phenomena and public behavior (Möller et al., 2019). For example, several webinars on sharia mutual funds and sharia stocks, and discussions about sukuk, uploaded to YouTube, show how people use digital spaces to gain knowledge about sharia investment. However, academic research on sharia investment has thus far focused more on regulations, instrument performance, and investor behavior, but has not specifically examined public perception based on digital data (Mujahidah, 2023). This limitation indicates a knowledge gap: the failure to use unstructured digital data from YouTube and Zoom to explore the public's literacy, perceptions, and sentiments towards Sharia investment.

Word clouds serve as powerful visualization tools that enhance text analysis capabilities (Kabir et al., 2018). Word clouds can help more effectively understand patterns and trends in text data (Kim, 2023). Word clouds enable the identification of key elements in large datasets, thereby enhancing insights from text analysis (Rubimeirati et al., 2023). This approach is increasingly relevant in the era of digital Islamic finance, where fintech platforms and digital investment services generate large volumes of textual data that can be analyzed to understand trends in Islamic investment discourse (Dawood et al., 2022). Therefore, this study addresses the following research question that what are the words most frequently used by experts in Islamic investment events uploaded on YouTube and recorded on Zoom.

Hierarchical analysis methods are essential for understanding complex relationships within data sets (Shetty & Singh, 2021). This analysis can help identify underlying patterns and structures in the data and provide deeper insights into the interactions among elements in the data set (Dinh et al., 2025). Latent Dirichlet Allocation (LDA) is a generative probabilistic model for discrete data that helps build topics from data (Blei et al., 2001). That LDA models each discrete data element as a finite mixture of latent themes. Each topic is modeled as a mixture of countless main topic probabilities (Heinrich, 2009). Based on this LDA, this study attempts to answer that what topics can be learned from discussions among experts on Sharia investment. Various real and abstract phenomena can be modeled using diagrams, which are mathematical structures consisting of nodes (points) and edges (lines) that are interconnected (Bondy & Murty, 1976). This representation is widely used to describe physical networks, such as highways, electrical circuits, or organic molecules, as well as abstract relationships, such as ecosystems, social relations, databases, and computer program control flows (Muharam et al., 2023). The main focus in the diagram is on whether or not there is a connection between nodes, not on the physical shape of the connecting lines (Schmalstieg, 2018).

In addition, nodes and edges in the diagram can be assigned additional attributes, such as direction, color, or weight, as needed for the analysis. This allows for the creation of various types of diagrams, such as directed diagrams for modeling one-way road networks or multi-sided diagrams for representing atomic bonds in organic molecules(Gross L. Jonathan et al., 2000). Recent studies also highlight the growing role of digital technology in expanding the Islamic financial ecosystem. Digital Islamic finance platforms, including fintech and online investment systems, have become important instruments for increasing financial inclusion and facilitating access to sharia-compliant financial services. A comparative study between Malaysia and Jordan shows that the integration of digital technology in Islamic finance can strengthen financial access, transparency, and participation in the Islamic financial system (Sakhri & Bouchenine, 2025). These developments indicate that the relationships between actors, technologies, and financial practices within the Islamic investment ecosystem can be effectively examined using network-based analytical approaches.

METHODOLOGY

This study employed a qualitative approach through text mining to explore themes and patterns in discussions on shariah investment. Text mining was selected because it enables researchers to extract information form large volumes of unstructured textual data and generate meaningful insights. (Demšar et al., 2013). Data were collected using purposive sampling from six shariah investment events, consisting of five zoom discussions uploaded to YouTube and one live YouTube broadcast. Video recordings with a total duration of approximately 190 minutes were automatically transcribed using a mobile-based speech-to-text application and subsequently verified manually to ensure transcription accuracy. The final dataset consisted of 41 text documents containing approximately 23,386 words. Data analysis was conducted using Orange Data Mining software. The analysis included text preprocessing, word frequency analysis, word cloud visualization, hierarchical clustering, topic modeling using Latent Dirichlet Allocation (LDA), and network analysis.

DISCUSSION

The word cloud visualization was used to identify the most frequently occurring terms in the dataset consisting of 23,386 words derived from discussions by nine Sharia investment experts. The results reveal that several keywords, including investment, Islamic, sharia, investors, halal, compliant, and market, appear with the highest frequency, indicating that expert discussions primarily focus on Sharia compliance, investor participation, and the development of Islamic investment practices within the financial market. The prominence of these terms suggests that contemporary discourse on Sharia investment is strongly oriented toward adherence to Islamic principles, the expansion of halal financial instruments, and the dynamics of the Islamic capital market. Overall, the word cloud highlights the central concepts that shape expert discussions on Sharia investment across the sampled virtual academic events.

In addition to document networks, a word network analysis was conducted to identify associations among frequently used terms. The analysis used the 50 most frequent words extracted from the corpus of 23,386 words, producing 50 nodes and 1,802 connections. The term "sharia investment" appears as the largest node, indicating its central role in the discussions. Other closely related terms include halal, Islamic, company, "technology, market, fund, compliant, and business. These connections demonstrate that expert discussions on Sharia investment strongly relate to compliance principles, market dynamics, and technological developments within the Islamic financial ecosystem. The word network therefore the thematic findings identified through word grouping and topic modelling.

The experts surveyed in this study emphasized that sharia compliance is the main foundation of Islamic investment. The word network shows a significant relationship between sharia investment and compliance, indicating that discussions surrounding Islamic investment frequently revolve around governance, regulatory adherence, and the legitimacy of financial instruments. In this context, the use of text mining enables a digital discourse analysis that helps identify dominant narratives and conceptual relationships shaping the governance framework of the Islamic investment ecosystem.

Based on the views of Mufti Faraz Adam and Khalfan Abdullah, sharia investment compliance requires a comprehensive process that includes screening halal business sectors, evaluating financial ratios to ensure there is no usury or prohibited activities, and ongoing supervision by the Sharia Supervisory Board. These stages collectively form an essential foundation for the structure and legitimacy of every sharia-based investment product and financial instrument. Compliance with halal business activities and accuracy in sharia-based financial accounting are important elements in ensuring good investment governance. These mechanisms help maintain the integrity of sharia financial instruments by preventing usury (*riba*), excessive uncertainty (*gharar*), and non-halal activities that could potentially harm society.

The existence of various approaches to implementing compliance in global investment instruments provides opportunities for stakeholders in Islamic finance to learn from one another and develop stronger compliance standards. This study finds that the infrastructure for sharia investment compliance becomes robust when the ecosystem incorporates three main elements: business activity screening, financial ratio evaluation, and continuous supervision by sharia authorities. In particular, Mufti Faraz Adam's emphasis on ensuring that funds flow to sectors that are beneficial and free from usury, gambling, and excessive uncertainty, along with Khalfan Abdullah's explanation of financial ratio limits and the role of the Sharia Council, serve as important references for illustrating ideal practices in sharia investment compliance.

Crucial issues related to compliance governance in sharia investment have also been discussed in several previous studies. Non-compliance with core business screening and financial ratio standards often raises doubts among Muslim investors regarding the legitimacy of sharia investment instruments (Ho, 2015). In this context, strong sharia supervision and transparency in the screening process are essential to maintaining public trust. These findings reinforce that institutional integrity and the quality of the sharia audit process are fundamental pillars of good sharia investment governance.

Differences in regulatory standards and approaches among Islamic financial institutions in applying compliance criteria across countries also explain the challenges in achieving a consistent governance framework. Several researchers have therefore developed sharia-compliance research models to measure the performance of investment instruments (Saiti & Ahmad, 2017), including business activity screening models, sharia financial ratio assessment models, and sustainable sharia audit models. These measurements strengthen the governance structure while ensuring that each investment instrument remains within the appropriate sharia corridor.

Network analysis was applied to explore relationships among expert discussions and key terms related to Sharia investment. Using Orange Data Mining, a document network was generated consisting of nine documents and 36 connections. That illustrates the level of similarity among the experts' discussions based on their statements. Larger nodes indicate higher proximity centrality, reflecting stronger connections in the content of the discussions. The analysis shows that Muhammad Naufal Yunas, Muhammad Imran Ashraf, and Khalfan Abdullah have the highest centrality values, suggesting that their discussions are closely related to the dominant themes within the dataset.

These findings align with the view that Shariah investment has great potential as an ethical financing instrument that not only provides economic value but also promotes social sustainability principles by avoiding usury, market manipulation, short selling, and transactions involving *gharar* and *maysir*

(Irfan, 2015). Principles of Islamic law emphasizing justice, benefit, and compliance with Shariah can be applied in Shariah investment strategies, ensuring that investments not only pursue financial returns but also contribute to social welfare, fairness, and ethical wealth redistribution in accordance with Shariah principles (Apriantoro et al., 2023). Within this framework, the integration of Islamic law principles constitutes an essential foundation for strengthening both the business and Shariah investment ecosystems. Principles of Islamic law emphasizing justice, benefit, and compliance with Shariah can be applied in Shariah investment strategies, ensuring that investments not only pursue financial returns but also contribute to social welfare, fairness, and ethical wealth redistribution in accordance with Shariah principles (Apriantoro et al., 2023). Within this framework, the integration of Islamic law principles constitutes an essential foundation for strengthening both the business and Shariah investment ecosystems.

This study applies LDA to identify topics from 23,386 words in the sample texts. The analysis generated ten topics representing different discussions related to Sharia investment. That presents the topic modeling results obtained using Orange Data Mining. The results indicate that several topics share similar keyword patterns, particularly topics 1, 4, 5, and 10, as well as topics 2, 7, 8, and 9, suggesting overlapping discussions among these themes. In contrast, topic 3 appears relatively distinct from the others. The topic with the highest marginal probability is considered the most representative theme in the dataset, indicating the dominant discussion within the sample related to Sharia investment.

The visualization highlights the relative importance of each topic within the dataset. Among them, topic 5 appears as the most prominent, indicated by the largest node and distinct color, suggesting that it has the highest MDS value and represents one of the most significant themes in the discussion of Sharia investment. Among the identified topics, topic 4 shows the highest proportion in the dataset, indicating that it represents the most dominant theme in the discussions. This suggests that topic 4 reflects a shared perspective across the nine experts included in the sample.

Another strategic issue in the development of Sharia investment is digital transformation. Significant increase in the use of Sharia equity crowdfunding. This use case demonstrates how technology can open up access for MSMEs, lot-based agriculture, renewable energy, and social projects. Digital technology is considered important for strengthening transparency, accelerating the sharia screening process, and expanding the global investor network. In some cases, the mechanism of Sharia ordinary shares and the use of modern technology have been proven to increase investor confidence in the funding process. This development confirms that digitization through crowdfunding platforms, sukuk marketplaces, and the adoption of new technologies plays a strategic role in strengthening the governance, accessibility, and accountability of sharia investments and businesses in the digital economy era (Subhi Apriantoro & Herviana, 2023).

From a theoretical perspective, the use of digital discourse analysis through text mining contributes to the understanding of how governance and compliance narratives are constructed within the Islamic investment ecosystem. By mapping the relationships between key concepts discussed by experts, this approach reveals the dominant themes shaping the development of sharia investment governance. Consequently, digital discourse analysis not only supports empirical findings but also offers a methodological contribution for studying the evolution of Islamic financial ecosystems in the digital era.

Several challenges in strengthening the Islamic investment ecosystem within the context of modern business were also highlighted in a webinar featuring speakers Muhammad Bagus Teguh Perwira and Wan Dezriq. In the webinar, Muhammad Bagus Teguh Perwira noted that the growth of Shariah investment still faces fundamental problems related to low investor literacy, particularly during the so-called "financial migration" period, as well as the need to strengthen regulations and enhance Shariah compliance discipline through Shariah board supervision and refinement of the Shariah online trading system (SOTS). These findings align with the view that Shariah investment has great potential as an ethical financing instrument that not only provides economic value but also promotes social sustainability principles by avoiding usury, market manipulation, short selling, and transactions involving *gharar* and *maysir* (Irfan, 2015). Principles of Islamic law emphasizing justice, benefit, and compliance with Shariah can be applied in Shariah investment strategies, ensuring that investments not only pursue financial returns but also contribute to social welfare, fairness, and ethical wealth redistribution in accordance with Shariah principles (Apriantoro et al., 2023). Within this framework, the integration of Islamic law principles constitutes an essential foundation for strengthening both the business and Shariah investment ecosystems.

CONCLUSION

This study examines key lessons from Islamic investment webinars by analyzing 23,386 words extracted from speech-to-text transcripts of six Islamic investment webinars conducted between 2021 and 2025, featuring nine experts. The data were analyzed using Orange Data Mining through word cloud visualization, hierarchical clustering, multidimensional scaling (MDS)-based topic modeling, and graph and network analysis. The findings reveal strong connections among key terms such as *sharia*, *investment*, *halal*, *Islamic*, *business*, and *compliance*, indicating that expert discussions primarily focused on adherence to Islamic principles through investment screening, compliance monitoring, and investor education. Issues related to the prohibition of *riba* (usury), *gharar* (excessive uncertainty), and manipulative capital market practices were also identified as fundamental elements in maintaining the integrity of Islamic investments.

The study further highlights the growing role of technology in the Islamic investment ecosystem, particularly through sharia equity crowdfunding, digital investment platforms, and technology-enabled access to halal business financing. The novelty of this research lies in its use of unstructured digital data derived from webinar transcripts to analyze Islamic investment discourse, unlike previous studies that mainly relied on financial reports, surveys, or regulatory documents. By applying machine learning-based text mining techniques, the study contributes methodologically to the analysis of Islamic finance discourse in digital environments while also providing practical insights for stakeholders regarding contemporary issues in the Islamic investment ecosystem, including screening discipline, business compliance, Islamic capital market mechanisms, and technology-driven financial innovations.

REFERENCES

Abdillah, L., Mukti, Y., Puspita, D., & Suhartini, S. (2022). Indonesian sharia fintech services and social media usage. *Bulletin of Social Informatics Theory and Application*, *5*(2), 97–106. https://doi.org/10.31763/businta.v5i2.456

Adhitama, R., Kusumaningrum, R., & Gernowo, R. (2017). Topic labeling towards news document collection based on Latent Dirichlet Allocation and ontology. *Proceedings - 2017 1st International Conference on Informatics and Computational Sciences, ICICoS 2017*, *2018-January*. https://doi.org/10.1109/ICICOS.2017.8276370

Alijon Qizi, A. Z. (2022). International Islamic Financial Market. *European International Journal of Multidisciplinary Research and Management Studies*, *02*(05), 27–30. https://doi.org/10.55640/eijmrms-02-05-07

Amanda Simanjuntak, D., Safitri, K., Rani Rahayu, D., Salsabila Nainggolan, N., & Amelia, R. (2023). *Current Advanced Research on Sharia Finance and Economic Worldwide (Cashflow)*.

Amelia, R., & Wibowo, D. (2020). *Analysis of Public Interest in Sharia Investing Through Financial Technology Companies*.

Angelina Isnaini, Rachmanda Arsyil Majid, & Nabilatul Mardliyyah. (2023). The Use of Social Media in Improving Investment Literacy in Islamic Mutual Funds. *Journal of Islamic Economy and Community Engagement*, *4*(2), 104–111. https://doi.org/10.14421/jiecem.2023.4.2.1926

Apriantoro, M. S., Saputra, V., Makin, R., & Maarif, M. N. (2023). *Islamic Law Perspective On the Bajo Indigenous People's Marriage Traditon in Adonara Villege*. *14*(1).

Blei, D. M., Ng, A. Y., & Jordan, M. I. (2001). *Latent Dirichlet Allocation*.

Bondy, J. A., & Murty, U. S. R. (1976). *Graph Theory with Applications*.

Chandra Bhooshan Singh, Nistha Sharma, & Mariyam Ahmed. (2024). Psychological Determinants of Investment Decisions: Analyzing Financial Behavior in Personal Investments. *Involvement International Journal of Business*, *1*(4), 258–268. https://doi.org/10.62569/iijb.v1i4.46

Dawood, H., Al Zadjali, D. F., Al Rawahi, M., Karim, D. S., & Hazik, D. M. (2022). Business trends & challenges in Islamic FinTech: A systematic literature review. In *F1000Research* (Vol. 11). https://doi.org/10.12688/f1000research.109400.1

Demšar, J., Curk, T., Erjavec, A., Gorup, Č., Hočevar, T., Milutinovič, M., Možina, M., Polajnar, M., Toplak, M., Starič, A., Štajdohar, M., Umek, L., Žagar, L., Žbontar, J., Žitnik, M., & Zupan, B. (2013). Orange: Data mining toolbox in python. *Journal of Machine Learning Research*, *14*.

Dewi, C. S., Daffa Juliansyah, M., Anakoda, V. I., & Parikesit, B. (2024). The Role of Social Cognitive Perspective on Investment Intentions in Sharia Stocks in Indonesia Article Info ABSTRACT. *The Eastasouth Management and Business*, *3*(01), 31–40. https://doi.org/10.58812/esmb.v3i01

Dinh, T., Hauchi, W., Lisik, D., Koren, M., Tran, D., Yu, P. S., & Torres-Sospedra, J. (2025). *Data clustering: an essential technique in data science*. http://arxiv.org/abs/2412.18760

Fakhrunnas, F. (2018). *Fatwa on the Islamic Law Transaction and Its Role in the Islamic Finance Ecosystem*. *4*(1), 42–53.

Gandomi, A., & Haider, M. (2015). Beyond the hype: Big data concepts, methods, and analytics. *International Journal of Information Management*, *35*(2), 137–144. https://doi.org/10.1016/j.ijinfomgt.2014.10.007

Gross L. Jonathan, Yellen Jay, & Anderson Mark. (2000). *Graph Theory and Its Applications*.

Heinrich, G. (2009). *A Generic Approach to Topic Models*.

Ho, C. S. F. (2015). International comparison of Shari'ah compliance screening standards. *International Journal of Islamic and Middle Eastern Finance and Management*, *8*(2). https://doi.org/10.1108/IMEFM-07-2014-0065

Jalal Ahamed, A., & Professor, A. (2020). *Chapter-1 FINANCIAL LITERACY*.

Kabir, A. I., Karim, R., Newaz, S., & Hossain, M. I. (2018). The Power of Social Media Analytics: Text Analytics Based on Sentiment Analysis and Word Clouds on R. *Informatica Economica*, *22*(1/2018), 25–38. https://doi.org/10.12948/issn14531305/22.1.2018.03

Kaplan, A. M., & Haenlein, M. (2010). Users of the world, unite! The challenges and opportunities of Social Media. *Business Horizons*, *53*(1), 59–68. https://doi.org/10.1016/j.bushor.2009.09.003

Kim, J. (2023). *Word Cloud Techniques for Data Analysis*.

Krzysztof Rejman, A.-J., & Porada, M. (2022). Social Media - A New Era of Communication. In *Humanities and Social Sciences 2022 Research Journal* (Vol. 29, Number 2).

Möller, A. M., Kühne, R., Baumgartner, S. E., & Peter, J. (2019). Exploring User Responses to Entertainment and Political Videos: An Automated Content Analysis of YouTube. *Social Science Computer Review*, *37*(4), 510–528. https://doi.org/10.1177/0894439318779336

Muharam, R. S., Rusli, B., Nurasa, H., & Muhtar, E. A. (2023). Seven clusters of data visualization articles in Scopus using social network analysis. *International Journal of Data and Network Science*, *7*(3). https://doi.org/10.5267/j.ijdns.2023.4.005

Mujahidah, A. S. (2023). *A Sentiment Analysis on Short Selling: An Islamic Perspective*. https://journals.smartinsight.id/index.php/TAE

Rawat, R., & Yadav, R. (2021). Big Data: Big data analysis, issues and challenges and technologies. *IOP Conference Series: Materials Science and Engineering*, *1022*(1). https://doi.org/10.1088/1757-899X/1022/1/012014

Riesener, M., Dölle, C., Koch, J., & Schuh, G. (2019). Information requirements for a data-based analysis of product and service complexity. *Procedia CIRP*, *83*, 279–284. https://doi.org/10.1016/j.procir.2019.04.079

Rubimeirati, Muis Abdul, & Muhammad Figur. (2023). *Pelatihan Text Mining Menggunakan Bahasa Pemrograman Python*.

Saiti, B., & Ahmad, K. (2017). Fundamentals, universe creation and appraisal of major Shari'ah-compliant stocks screening methodologies. *Al-Shajarah*, (Special Issue:Islamic banking and Finance).

Sakhri, M., & Bouchenine, L. (2025). Digital Islamic Finance: A Gateway to Financial Inclusion - A Comparative Study Between Malaysia and Jordan-. *Dirassat Journal Economic Issue*, *16*(1). https://doi.org/10.34118/djei.v16i1.4125

Schmalstieg, D. (2018). Erratum: (IEEE Transactions on Visualization and Computer Graphics (2016)). In *IEEE Transactions on Visualization and Computer Graphics* (Vol. 24, Number 7). https://doi.org/10.1109/TVCG.2018.2823798

Shetty, P., & Singh, S. (2021). Hierarchical Clustering: A Survey. *International Journal of Applied Research*, *7*(4), 178–181. https://doi.org/10.22271/allresearch.2021.v7.i4c.8484

Subhi Apriantoro, M., & Herviana, J. (2023). Universitas Muhammadiyah Surakarta Sharia Financial Literacy: Research Trends and Directions for Future Inquiry. *JISEL Journal of Islamic Economic Laws VI*, *6*(2), 2023. https://journals.ums.ac.id/index.php/jisel/index

Syams, A., & Fahmi, R. (2019). Potential of Sharia Financial Institutions in Supporting Indonesia's Economic Growth. *Journal of Islamic Economic Law*, *3*(1).