Public Sentiment on Sustainable Finance and Implications for Islamic Banks

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ABSTRACT

This paper attempts to identify the challenges and strategies for implementing sustainable finance in Islamic banking and to analyze public opinion on sustainable finance on the Twitter platform using sentiment analysis. The research methods used in this study are the Analytical Network Process (ANP) method to answer the first research objective and the sentiment analysis method, which can assess public opinion based on emotions and sentiments in a particular text to answer the second research objective. The results of the study identified several challenges and priority strategies for implementing sustainable finance in Islamic banks. They identified the sentiment of words that can be used to design communication strategies to create a positive image for the company because it is associated with sustainable finance. This study may contribute to enhancing the implementation of sustainable finance in Islamic banks and better communicating with the public on this matter.

KEYWORDS
Sustainable finance
Challenges and strategies
Sentiment analysis

Introduction

Climate change has made financial and banking sectors even more vulnerable to environmental and social risks. They have become an integral part of credit, market, operational, and liquidity risks. It is due to the fact that the climate crisis impacts commodities prices, which in turn can have an impact on the capital market. Supply chain disruptions can, therefore, have an impact on corporate operations, liquidity levels, financing credit risk, and the reputation of businesses. Considering this complexity, a number of central banks and financial authorities have taken action to incorporate sustainable policy development into the macroprudential supervision plans of their respective jurisdictions.

World Economic Forum (2021) estimates an investment gap worth USD 3.9 trillion to achieve the Sustainable Development Goals (SDGs) amidst the contemporary climate challenges. To achieve this SDG target by 2030, an investment gap of USD 2.5 trillion currently exists. A key component of the endeavor to make this investment is the banking sector's public policy. However, depending on government funding and charitable donations will not be sufficient to meet these goals. Therefore, raising money for sustainable investment in Indonesia requires the involvement of the private sector as well.

Islamic banking is anticipated to live up to public expectations of concord between profit-making companies and initiatives to increase the good that society receives from the environment and social sectors. Nonetheless, a number of studies demonstrate that Islamic banking is less effective at providing the same services when it develops products that mimic those of traditional banking (El-Gamal, 2006). Furthermore, these instruments have risk characteristics that are similar to traditional banking products, which makes it challenging to achieve the objectives outlined in Sharia law (Qattan, 2006; Abedifar et al., 2015). Hence, Islamic banking must prioritize developing unique products that are consistent with the advancement of sustainable finance.

Furthermore, Islamic banking, that is originally supposed to address the economic and social shortcomings of capitalism and socialism in Muslim-populated countries, is currently losing its genuine spirit. The ignorance of Islamic law is considered the primary reason behind the inability to establish institutions capable of implementing *maqasid* sharia in day-to-day financial operations (Ahmed, 2012). It induces the Islamic banking sector to imitate conventional banking offerings, which hinders Islamic banking's ability to accomplish admirable objectives like income distribution, inclusive financing, lowering social inequality, etc.

Numerous research has demonstrated that Islamic banking does not actually work to combat poverty or promote long-term financial and social well-being (Kamla & Rammal, 2013). For instance, the economic growth in Malaysia is not significantly supported by Islamic banking (Hachicha & Amar, 2015). Similarly, the intermediary function of Islamic banking does not affect economic growth in Indonesia (Khasanah & Wicaksono, 2021).

Unsatisfactory results were found on the influence of Islamic banking on financial inclusion in the Middle East and North Africa, as a clear pattern of discrimination against women based on their gender is observed (Khmous & Besim, 2020). Likewise, there is a clear indication of the failure of the Islamic rural banks in Indonesia to realize the social impact expected by society. Similarly, half of the Islamic banks also experienced the same failure (Hamidi & Worthington, 2021). Another instance from Bangladesh showed that none of the Islamic and conventional banks comply with all green and sustainable finance policies (Julia & Kassim, 2020). In the United Arab Emirates, Shamsudheen and Rosly (2021) concluded that Islamic banking actors did not sufficiently practice ethical standards in their decision-making processes.

Research indicates that Islamic banking is still unable to live up to public expectations in terms of sustainable finance. One common objection is that because Islamic banks typically function in two different banking systems, it is challenging for them to incorporate Islamic ideals into their offerings completely. Even in nations with a majority of Muslims, like Indonesia, Islamic banks have a smaller market share than regular banks, which contributes to their overall inferior efficiency.

This study is important to improve the implementation of sustainable finance in Islamic banks as well as for the banks to better communicate with their stakeholders on this matter. Two main research questions are developed: (1) What are the challenges and strategies faced by Islamic banks in the implementation of sustainable finance? (2) What are words related to sustainable finance that are perceived as positive and negative by the public? To answer those questions, this study uses the Analytic Network Process (ANP) method and sentiment analysis. This study may contribute to enhancing the implementation of sustainable finance in Islamic banks and better communicating with the public on this matter.

This paper is composed of six parts. The first part is an introduction; the second part is a literature review on sustainable finance; the third part is data and methodology; the fourth part is results and analysis; the fifth part is the conclusions, and the sixth part is policy recommendations.

Literature Review

Sustainable Finance

Around the world, people are becoming more aware of and attentive to sustainable finance. More than half of asset owners across the globe are incorporating environmental, social, and governance (ESG) concepts into their investment approaches (FTSE Russel, 2018). Also, the preferences of both corporate and individual investors are shifting toward sustainable financing (Bauer et al., 2018; Dyck et al., 2019).

A significant amount of studies on the topic of green finance emerged especially after the global financial crisis in 2007-2008 (Yu et al., 2021). It reflects the interest of academia that financialization based on speculative financial products has induced the crisis (Sandel, 2013). Although financialization boosts the

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financial sector of the economy as a whole, it has little positive effect on society and instead causes a host of social and environmental issues (Fletcher, 2012).

It draws attention to sustainable finance, which is understood to be the financial sector's effort to reach or improve performance in relation to sustainable development goals (Migliorelli, 2021). It widens the business paradigm from simply pursuing shareholder satisfaction to a wider range of purposes, including improving performance in achieving social, environmental, and economic sustainability (Ziolo et al., 2020).

The idea of sustainable finance was initially developed in the European Union and is now a fundamental component of the continent's institutional framework. According to the European Commission, sustainable finance is a procedure that involves the financial sector's decision-making process, taking the environment, social issues, and governance (ESG) into account in order to result in long-term investments in sustainable economic endeavors (European Commission, 2021). Between 2009 and 2015, there was a shift in the application of sustainable financing from being purely voluntary to being more constrained by law (Ahlström & Monciardini, 2022).

After that, various related financial concepts emerged, such as climate finance, which refers to the adaptation of the financial sector to climate change and mitigation efforts. Then, there is the concept of green finance, which focuses attention on the flow of financial resources that have an impact on the natural environment at large. Next comes SDG finance, which prioritizes achieving social and economic consequences in addition to environmental ones. Meanwhile, sustainable finance refers to a broader financial concept than SDG finance, as illustrated by Migliorelli (2021) in Figure 1.

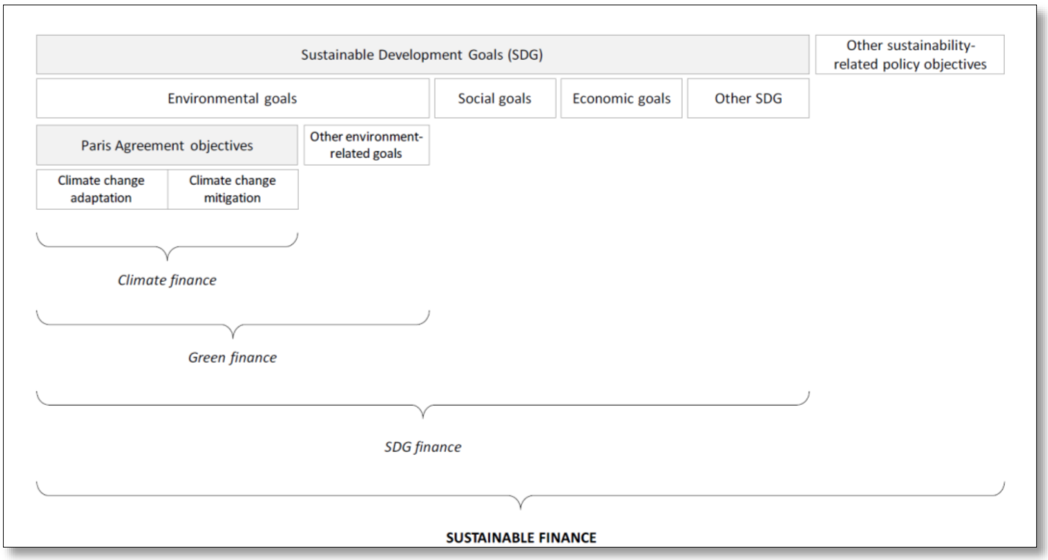

Figure 1. Sustainable Finance Concept (Migliorelli, 2021)

Apart from the contentious aspects of sustainable finance, several research additionally demonstrate that the endeavors of diverse financial institutions to tackle sustainable finance concerns are intrinsically linked to their endeavors to enhance their corporate reputation and fortify their client connections. For instance, investment bankers and asset managers use sustainable finance for their business and investment instruments to give a positive impression to their company's reputation (Strauß, 2021). Further, the linkage of a corporation with sustainability-related subjects is positively correlated with both its profitability and reputation (Khojastehpour & Johns, 2014). It shows that apart from carrying out substantively sustainable financial practices, financial institutions like banks must convey their company's image as one that is close to sustainable finance.

Institutional Analysis of Sustainable Finance in Indonesia

The first document that defines sustainable finance in financial governance in Indonesia is the 2015-2019 Roadmap for Sustainable Finance in Indonesia, published by Otoritas Jasa Keuangan (2014). This document defines sustainable finance as "overall support from the financial services industry for sustainable growth resulting from the harmony between economic, social, and environmental interests." This document also contains a strategic work plan that includes strengthening the supply of environmentally friendly funding, increasing demand for environmentally friendly financial products, and increasing supervision and coordination of the implementation of sustainable finance.

This step is then followed by issuing the Financial Services Authority Regulation Number 51/POJK 03/2017 concerning the Implementation of Sustainable Finance for Financial Services Institutions, Issuers, and Public Companies. This regulation requires financial service institutions, including commercial banks and Islamic banks, to prepare a Sustainable Finance Action Plan and report their achievements in the form of a Sustainability Report every year. The Sustainable Finance Action Plan includes product development, internal organizational capacity building, organizational adjustments, risk management, governance, and/or operational procedures. In addition, financial service institutions are also required to allocate a portion of their Social and Environmental Responsibility funds to support sustainable finance implementation activities.

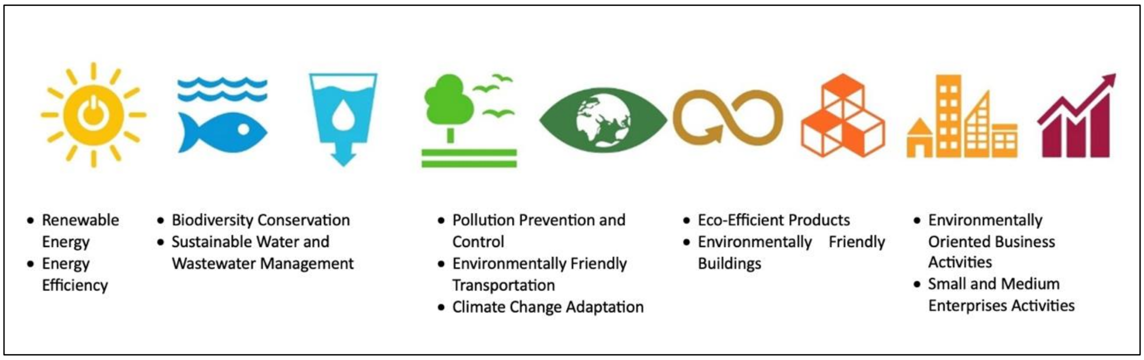

Figure 2. Sustainable Business Activities (Otoritas Jasa Keuangan, 2018)

In 2018, OJK issued Technical Guidelines for Financial Services Authority Regulation Number 51 /POJK.03/2017, which contains twelve categories of Sustainable Business Activities (Otoritas Jasa Keuangan, 2018). The development of a Green Taxonomy is based on the Indonesian Business Field Standard Classification (KBLI) compiled by the Central Bureau of Statistics (BPS). It has five levels of activity classification, and the document provides definitions of three categories for each classification, namely the Green, Yellow, and Red Categories. The document explains the category of sustainable business activities, and since then, financial institutions have started to issue sustainability reports.

The preparation of this document involved the Integrated Financial Services Sector Policy Group, Ministry of Environment and Forestry, Ministry of Industry, Ministry of Maritime Affairs and Fisheries, Ministry of Energy and Mineral Resources, Ministry of Transportation, Ministry of Agriculture, Ministry of Tourism and Creative Economy and Ministry of Public Works and Public Housing.

By publishing the Indonesian Green Taxonomy paper, OJK has made a substantial contribution to the implementation of sustainable finance. The necessity for the financial sector to standardize green definitions and standards led to the creation of this Green Taxonomy document. It is envisaged that the financial services industry will possess a common, fundamental comprehension of how green operations are classified. Additionally, government agencies and regulators can utilize this document as a monitoring tool to keep an eye on and promote increased funding allocations to meet national environmental priority targets. There are two types of monitoring: required and voluntary. Regulators are supposed to receive regular and consistent

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disclosures through the mandated method. The financial services industry can then choose the extent and frequency of reporting, thanks to the optional approach. Additionally, this agreement aims to prevent greenwashing and establish reporting guidelines for the financial services industry.

In line with this, through Bank Indonesia Regulation Number 23/13/PBI/2021 concerning Macroprudential Inclusive Financing Ratios for Conventional Commercial Banks, Sharia Commercial Banks and Sharia Business Units in 2021. It aims to increase access to inclusive financing for SMEs and Low-Income Individuals. It is anticipated that this will enhance the financial industry's adoption of sustainable financing practices.

The Indonesian government has also started a number of initiatives to lessen the effects of climate change. To close the financing gap for environmental programs, the government formed the Environmental Fund Management Agency in 2019 under the Ministry of Finance. Since 2018, Indonesia has also possessed disaster risk financing and insurance to lessen the hazards associated with climate change. Furthermore, since 2016, the government has marked climate-related projects (also known as climate budget tagging) with support from the UNDP in order to track and assess the execution of climate adaptation measures (UNDP, 2021). In its Intended Nationally Determined Contribution (INDC), the Indonesian government has also prioritized a number of climate resilience initiatives.

The private sector also supports the implementation of sustainable finance through the establishment of the Indonesian Sustainable Finance Initiative (*Inisiatif Keuangan Berkelanjutan Indonesia*, IKBI). IKBI was founded by eight national banks in 2018: Bank Mandiri, BRI, BNI, BCA, Bank BJB, Artha Graha, Bank Muamalat, and BRI Syariah, together with The World Wildlife Fund (WWF) (Sulaiman, 2018). With the addition of Bank Syariah Mandiri, HSBC Indonesia, CIMB Niaga, OCBC NISP Indonesia, and Maybank Indonesia, IKBI's members now consist of 14 banks (Intan, 2019). The focus of this forum is to attain sustainable development goals target and lower greenhouse gas emissions through product innovation, human resource program development, and experience sharing.

In addition, Indonesia is represented by eight banks in the Sustainable Banking Assessment Report published by WWF. This report examines and compares the performance of integrated social and environmental aspects on the performance of banks around the world. There are 48 banks in 11 countries that have been assessed using this valuation method. In 2020, Indonesian banks like BCA, Bank Mandiri, Bank Muamalat Indonesia, BNI, Bank Panin, BJB, Bank Permata, and BRI were included in the report (WWF, 2020).

According to institutional analysis findings about the evolution of sustainable finance implementation, regulations have dominated the introduction of sustainable finance in Indonesia since 2014. Subsequently, the banking industry demonstrated its active participation by having eight Indonesian banks included in the 2017 Sustainable Banking Assessment and by forming IKBI in 2018. In contrast to conventional banks, Islamic banks have not made as much headway in the nation's development of sustainable financing. Only BCA had an increased GRI disclosure score among IKBI first movers (Kartikahadi, 2020). The lack of incentives or benefits is a hindrance to the implementation of sustainable finance (Susilawati, 2020). Further, Sukardi (2016) argues the importance of product innovation by Islamic banking in supporting sustainable development.

Sentiment Analysis for Finance Research

One of the emotion theories that was mainly created in psychology and philosophy is the cognitive emotion theory (Reisenzein, 2020). Such emotional expressions come from direct experience or from teleological direction turbulences (Reisenzein, 2020). According to the cognitive emotion theory, emotions, e.g., "joy", "sadness", "fear", "anger", and many others, are determined either independently or in conjunction with noncognitive mental processes (Reisenzein, 2020). In current discussions, machine learning has been used to assess these feelings in order to explain a phenomenon (Hassan et al., 2022), including those related to financial issues, e.g., happiness emotions and cryptocurrency prices (Naeem et al., 2020), public sentiment for predicting cryptocurrency (Kraaijeveld & De Smedt, 2020), and others.

Sentiment lexicons are one of at least three key machine-learning tools for assessing text's emotional content (Silge & Robinson, 2021). These lexicons are AFINN from Nielsen (2011), Bing from Liu and Hu (2004), and NRC from Mohammad and Turney (2010). The NRC Lexicon divides words that answer "yes" or "no" into eight categories, i.e., anger, anticipation, disgust, fear, joy, grief, surprise, and trust (Hassan et al., 2022). It also divides words into two sentiment categories, i.e., negative and positive (Hassan et al., 2022). Words are classified as either positive or negative in the Bing lexicon (Silge & Robinson, 2021). Meanwhile, words are given a score by The AFINN that ranges from -5 to 5, in which the negative values indicate negative sentiment, whereas the positive reflects the opposite (Hassan et al., 2022). In this study, sentiment analysis aims to understand public opinions towards sustainable finance issues and compares them with the findings from ANP.

Research Method

This study utilizes both primary and secondary data. Primary data was collected through a survey instrument distributed to key stakeholders in the sustainable finance landscape. These stakeholders encompass regulators (Bank Indonesia and Otoritas Jasa Keuangan), Islamic banking practitioners, representatives from the Coordinating Ministry for Economic Affairs of the Republic of Indonesia, BAZNAS RI, KNEKS, and academicians. The primary data serves to identify priority strategies and the most impactful challenges hindering the implementation of sustainable finance within Islamic banks.

On the other hand, secondary data was obtained indirectly from various credible sources, including academic publications, regulations issued by financial authorities, publications by financial institutions, and news reports. This data allows the study to analyze developments in sustainable finance from the perspective of public sentiment. To specifically capture public opinion on sustainable finance, the research employed web scraping techniques. By leveraging Twitter's application programming interfaces (APIs) accessible at https://developer.twitter.com/, the study collected a dataset of 2,054 tweets containing 38,707 words associated with the search term "sustainable finance".

This research employs a two-pronged methodological approach to address the challenges, priority strategies, and public sentiment for implementing sustainable finance in Islamic banking. The first method leverages the Analytical Network Process (ANP). A targeted survey instrument was distributed to key stakeholders, including regulators (Bank Indonesia and Otoritas Jasa Keuangan), Islamic banking practitioners, representatives from relevant government agencies (Coordinating Ministry for Economic Affairs, BAZNAS RI, and KNEKS), and academics. This primary data collection aimed to identify the key challenges faced by sustainable finance actors and potential strategies for successful implementation within Islamic banks.

Three research stages were conducted to answer these research objectives. First is model construction. The model is constructed based on a theoretical and empirical literature review, as well as through in-depth interviews, to examine information more deeply and get to the root of the problem. The primary data (qualitative data) obtained from the first stage was used to construct the ANP model on the super decisions software and was also used as the basis for making a pair comparison questionnaire. This pair questionnaire was generated by super decisions software, and it was then distributed back to the respondents. Second is the model quantification. The model quantification stage employs questions from the ANP questionnaire in the form of pairwise comparisons between cluster elements to determine which of the two has the greater influence (more dominant) and how large the difference is on a numerical scale of 1-9. The primary data obtained from the distribution of the second questionnaire is then re-inputted into the super decision software, which processes it to generate a super-matrix output. The third is analysis. An assessment was carried out by calculating the geometric mean to determine the most influential challenges and priority strategies in implementing sustainable finance at Islamic banks.

Furthermore, the second research method used in this research is sentiment analysis, which can assess public opinion based on emotions and sentiments in a particular text (Liu, 2012). The implementation of this method consists of web scraping, data cleaning, data analysis, and visualization stages. The results of this sentiment analysis can be used by Islamic banks to increase the company's positive exposure in the eyes of consumers regarding sustainable finance. Sentiment analysis can reveal public opinion on sustainable finance, and thus, it has practical implications for comparing such public opinion with the findings from ANP.

Results and Discussion

To analyze the challenges and priority strategies for implementing sustainable finance in Islamic banks, questionnaires were distributed to respondents selected through purposive sampling based on knowledge, experience, and competence on the topic, which represents the entire population. Therefore, the respondents in this study consisted of the following individuals: two people working at the OJK with more than ten years of experience and one person working at the Bank Indonesia with more than five years of experience. One person is a sharia banking practitioner with 20 years of experience. One person is working at the Coordinating Ministry for Economic Affairs of the Republic of Indonesia with more than six years of experience, one person is working at BAZNAZ RI with more than six years of experience, and one person is working at KNEKS with five years of experience year. The following presents the results of the primary data processing from the questionnaire distributed to the respondents to identify and analyze the challenges and priority strategies for implementing sustainable finance in Islamic banks.

Challenges and Strategies for Implementing Sustainable Finance in Islamic Banks

After distributing questionnaires to the respondents, primary data was collected concerning the challenges and strategies associated with the implementation of sustainable finance in Islamic banks. The primary data obtained from the distribution of the second questionnaire is then re-inputted into the super decision software, which processes it to generate a super-matrix output. Furthermore, the analysis was carried out by calculating the geometric mean to determine the most influential challenges and priority strategies in implementing sustainable finance at Islamic Banks.

Based on the data processing, as shown in Figure 3, the combined average values for internal and external challenges have nearly equal priority, with internal challenges at 20% and external challenges at 22%. Furthermore, the internal and external strategies for implementing sustainable finance in Islamic banks hold the same priority percentage of 29%. This indicates that internal and external challenges exert an equal influence on the implementation of sustainable finance in Islamic banks, as do internal and external strategies.

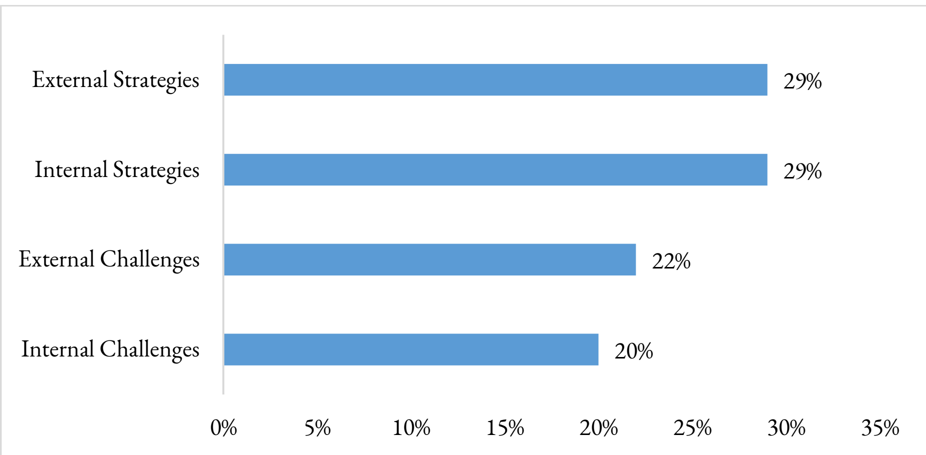

Figure 3. Internal and External Challenges

Internal Challenges

The distribution of questionnaires to respondents revealed eight internal challenges faced by Islamic banks in implementing sustainable finance, as shown in Figure 4. The primary challenge faced by Islamic banks in implementing sustainable finance, with a combined average value calculation of 21%, is a lack of quality human resources for sharia banks, resulting in a lack of product innovation, particularly in terms of sustainable finance. Product innovation is crucial for Islamic banks to meet the evolving complexities of market demands and enhance their competitiveness within the financial industry. However, without a qualified HR workforce possessing a deep understanding of sustainable finance principles, Islamic banks may struggle to design products that adhere to the tenets of a green economy, responsible investment, and environmental sustainability.

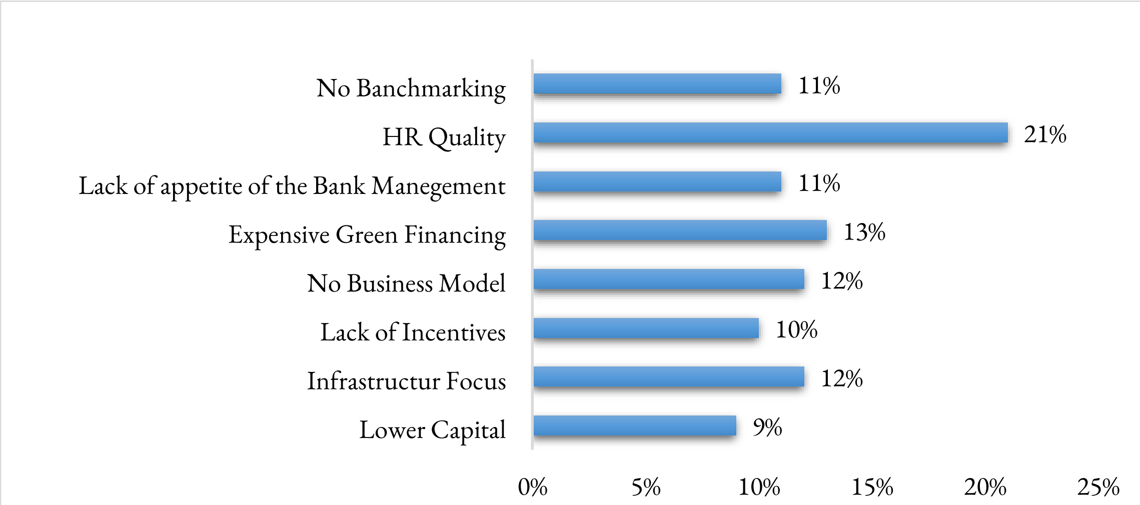

Figure 4. Internal Challenges

Furthermore, the second challenge in implementing sustainable finance in Islamic banks with a combined average value of 13% is the need for specific financing in the green sector, which tends to be expensive. One crucial aspect in advancing sustainable financial practices is the allocation of adequate funds for projects that promote environmentally friendly and sustainable economic growth. However, financing for the green sector often requires large initial investments and carries higher risks, which in turn can make financing costs more expensive. This expensive financing requirement can be a significant challenge for Islamic banks, especially considering sharia financial principles that encourage the avoidance of usury and transactions that involve risks that are not sharia compliant. This condition can make Islamic banks more careful in exposing themselves to projects that may have a higher risk profile, including projects in the green sector.

The next challenge faced by sharia banks with a value of 12% each is that there is no appropriate business model, and sharia banks are still focused on strengthening infrastructure and consolidation. The right business model is very important in the context of implementing sustainable finance because it allows Islamic banks to identify sustainable business opportunities and develop strategies that are in accordance with the principles of the green economy and sustainable finance. In addition, Islamic banks may also tend to focus more on strengthening infrastructure and consolidation in response to a dynamic business environment and increasingly fierce competition. However, strengthening infrastructure and consolidation does not always conflict with implementing sustainable finance. On the other hand, Islamic banks can take advantage of the process of consolidating and modernizing their infrastructure to introduce innovations that support sustainable financial practices.

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The next challenge is the lack or absence of implementation benchmarks in other sharia banks in terms of sustainable finance and the lack of interest from bank management in implementing sustainable finance practices with a combined average value of 11% for each. The lack of benchmarks in implementing sustainable finance can make it difficult for Islamic banks to evaluate their performance. Without a clear reference, Islamic banks may face difficulties in identifying areas where they can make improvements and develop effective strategies to improve their performance in sustainable finance. Furthermore, another challenge faced by Islamic banks is the lack of interest from bank management in implementing sustainable finance practices. Although awareness of the importance of sustainable finance is increasing, Islamic bank management may still not be completely convinced to adopt a sustainable approach in their operations.

The next challenge faced by Islamic banks in implementing sustainable finance with a combined average value of 10% is that there are no sufficiently attractive incentives for Islamic banks to implement sustainable financial practices. The limited incentives can demotivate the Islamic Bank to allocate its resources to sustainable product and service development. Therefore, supportive regulatory and policy measures are needed to create a conducive environment for Islamic banks to participate in sustainable finance, such as tax incentives or subsidized loan programs. Furthermore, the final challenge faced by Islamic banks, with a combined average value of 9%, is the funding limitation of Islamic banks compared to conventional banks.

External Challenges

Seven external challenges to adopting sustainable finance in Islamic banks have been gathered from the research, as illustrated in Figure 5. The external challenge faced by sharia banks in implementing sustainable finance in sharia banks with a combined average value of 20% is the need for adequate underlying assets that are agreed upon by all parties as the basis for a sustainable finance project. In this context, Underlying Assets refer to assets that form the basis or collateral of a financial transaction, such as sustainable infrastructure projects, green investments, or other financial products that promote environmental and social sustainability. The existence of adequate Underlying Assets agreed upon by all parties is the key to maintaining the success and sustainability of sustainable financial projects. However, Islamic banks often face challenges in finding assets that comply with sharia principles, meet sustainability criteria, and are accepted by all stakeholders involved in the project.

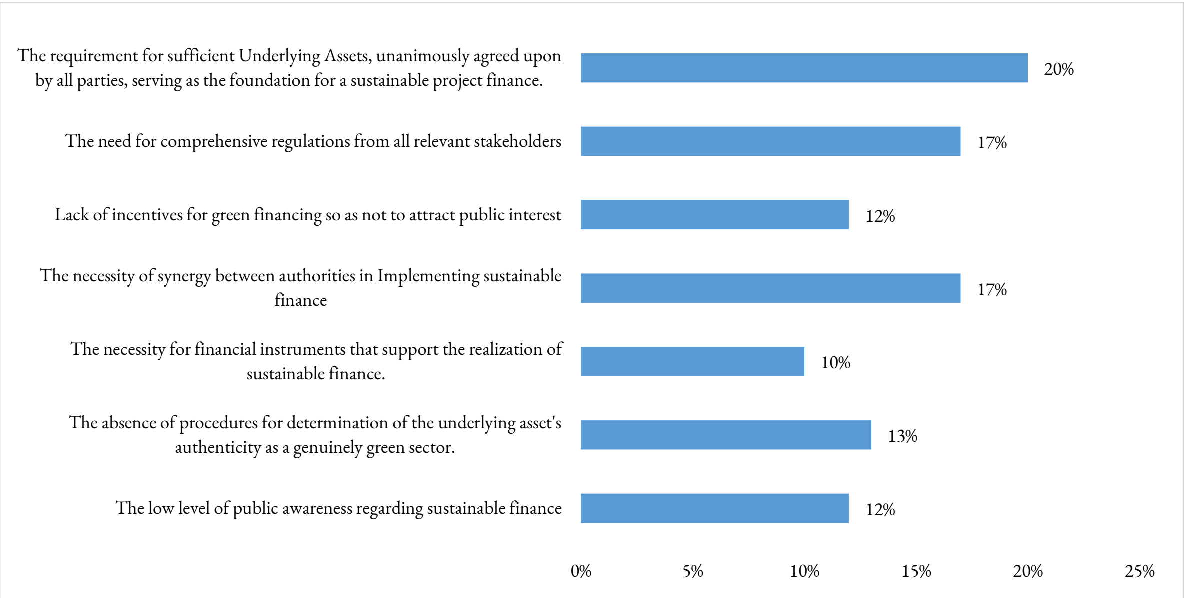

Figure 5. External Challenges

The second external challenge, with a combined average value of 17%, is comprehensive regulations from all relevant policy stakeholders, as well as the synergy between authorities and institutions in implementing sustainable finance in Islamic banks. Comprehensive regulations are very important to create a financial environment that is conducive to the development and growth of sustainable financial practices in Islamic banks. Without clear and supportive regulations, Islamic banks may experience difficulties in establishing consistent guidelines and ensuring compliance with Islamic and sustainable finance principles. Apart from that, synergy between authorities and institutions is also key in implementing sustainable finance in Islamic banks. Active involvement of various stakeholders, such as government, financial institutions, academics, and civil society, is needed to create a holistic and effective regulatory framework. This synergy can strengthen inter-institutional coordination and support better information exchange, thereby enabling the formation of policies that are more appropriate and responsive to market dynamics and sustainability challenges.

Internal Strategies

After discussing several challenges in implementing sustainable finance in Islamic banks, we will then explain the internal and external strategies. From the research that has been carried out, eight internal strategies for implementing sustainable finance in Islamic banks have been collected in accordance with the order of priority, as shown in Figure 6**.**

Based on the results of data processing in ANP software, the priority internal strategies faced by Islamic banks in implementing sustainable finance are calculated by calculating the average value of 18%, namely the formulation of risk management concepts and increasing capacity building in Sharia Banks. The importance of formulating a risk management concept cannot be ignored in the context of implementing sustainable finance. Effective risk management is very important to ensure that Islamic banks can identify, evaluate, and manage risks related to sustainable financial practices well. Apart from that, increasing capacity building in Islamic banks is also an important internal strategy in implementing sustainable finance. Capacity building involves efforts to increase the knowledge, skills, and capacity of human resources in Islamic banks in terms of sustainable finance.

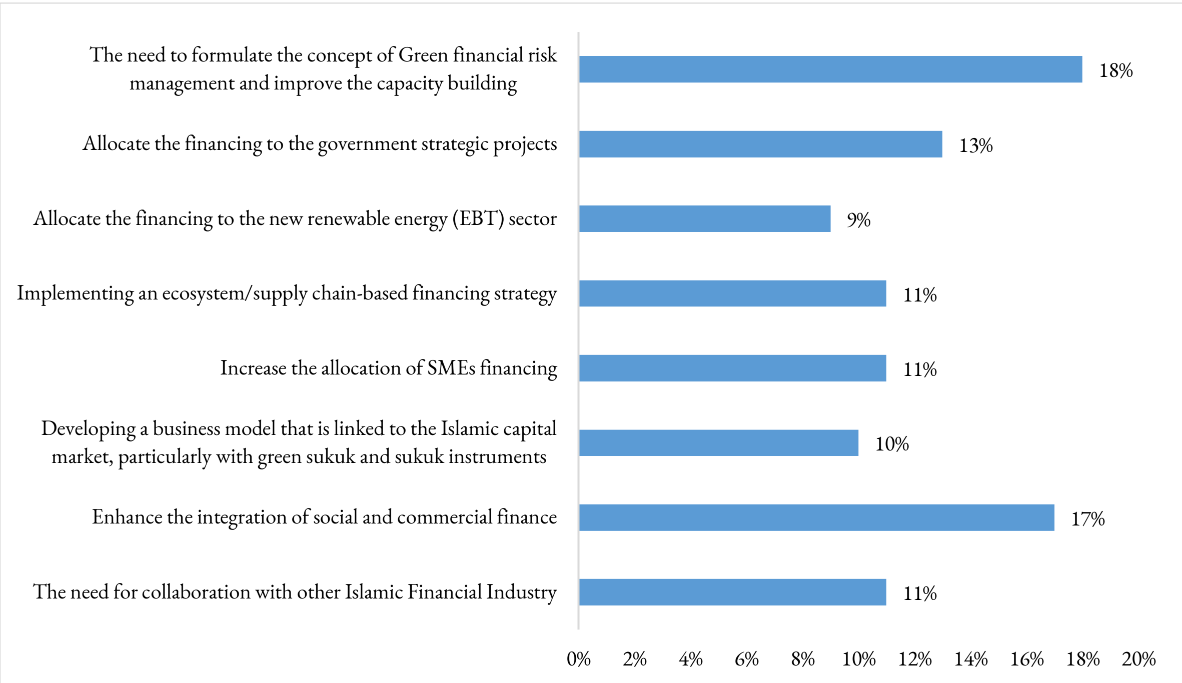

Figure 6. Internal Strategies

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The next internal strategy, with a combined average value of 17%, is the necessity to develop the integration of social and commercial finance. This integration creates a framework in which Islamic banks can combine the principles of social finance, which aim to promote social and environmental welfare, with the profit-driven principles of commercial finance. By developing this integration, Islamic banks can find the right balance between achieving financial and social goals, thereby creating a wider positive impact on society.

Furthermore, the third priority strategy, with a combined average value of 13%, is the need to channel financing to strategic government projects that support sustainable finance. The government has a crucial role in encouraging sustainable development through investment in infrastructure, renewable energy, and other environmental initiatives. By channeling financing to these projects, Islamic banks not only support the government's sustainable development agenda but also help strengthen their position in the overall sustainable finance ecosystem.

The next strategy, with a combined average value of 11% each, is implementing an ecosystem/supply chain-based financing strategy, increasing the portion of MSME financing, and integrating or collaborating with other sharia financial industries. This ecosystem/supply chain-based financing involves financing projects that are connected to a particular ecosystem or supply chain. For example, Islamic banks can provide financing to manufacturers, distributors, and retailers involved in the production and distribution of environmentally friendly or sustainable goods. By supporting ecosystem-based financing, Islamic banks not only help develop sustainable industries but also create opportunities to increase efficiency, reduce waste, and reduce the negative environmental impact of business activities.

Furthermore, MSME financing has great potential to spur inclusive and sustainable economic growth. By increasing MSMEs' access to financing that complies with sharia and sustainable finance principles, Islamic banks can help strengthen the MSMEs sector as a whole and increase their contribution to sustainable economic development.

Lastly, an important strategy is to integrate or collaborate with other sharia financial industries. Collaboration between Islamic financial institutions can bring many benefits, including increasing access to Islamic financial products and services, increasing the scale of operations, and expanding market reach. By collaborating with other Islamic financial institutions, Islamic banks can strengthen their position in the industry, expand the services they offer, and create greater synergies in supporting sustainable financial practices. Furthermore, the last two strategies that need to be carried out by sharia banks, with a combined average value of 10% and 9%, respectively, are developing a business model that is linked to the sharia capital market, especially with sukuk and green sukuk instruments and channeling financing to the renewable energy sector.

External Strategies

Furthermore, according to the findings of the study, there are some external strategies for implementing sustainable finance in Islamic banks, as shown in Figure 7. The first strategy, with a combined average value of 33%, is increasing public awareness about sustainable finance. This can be done through outreach to the community or increasing public literacy, including Islamic bank customers.

The second most important external strategy, with a combined average value of 25%, is the formation of a multi-stakeholder task force. This collaborative framework would involve government bodies, financial institutions, academics, and civil society organizations. The task force's primary objectives would be to coordinate efforts that promote sustainable financial practices, facilitate the exchange of information and experiences, and identify broader collaboration opportunities that support sustainable economic development.

Furthermore, the third strategy, with a combined average value of 24%, is the need for comprehensive regulations from all policy stakeholders. This comprehensive regulation is needed to create a clear and supportive framework for sustainable financial practices. Strong regulations can help strengthen incentives for Islamic banks to adopt sustainable financial practices, as well as ensure compliance and accountability in their implementation.

The final strategy, with a combined average score of 18%, is incentives. These incentives can encompass fiscal incentives, tax incentives, or other financial incentives designed to encourage Islamic banks to take concrete steps in implementing sustainable financial practices. By providing the right incentives, the government can motivate Islamic banks to be more active in supporting sustainable economic development and promoting inclusive growth.

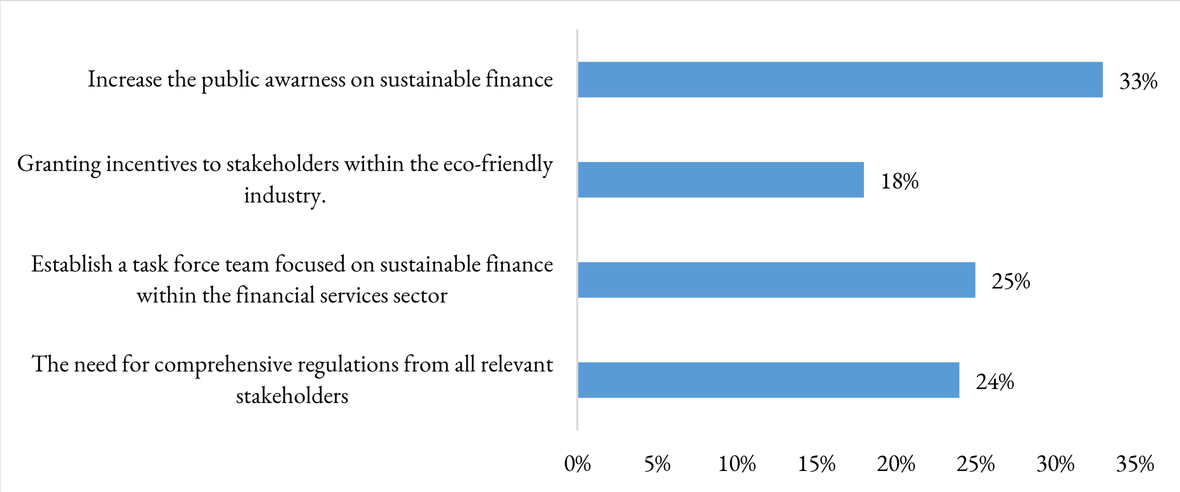

Figure 7. External Strategies

Sentiment Analysis on Sustainable Finance

The term sustainable finance has consistently become an increasingly popular search topic for the last ten years in the Google search field, both in searching websites, images, news, and videos on YouTube around the world. The figure below shows that this increase has become increasingly significant after 2018. This is the result of several previous events, such as the signing of The Paris Agreement in December 2015, which became effective in November 2016. The agreement binds 196 countries to keep global warming below 2 degrees Celsius compared to the period before the industrial revolution (United Nations, 2015). Then, the European Commission formed the High-Level Group on Sustainable Finance at the end of 2016, which was able to complete its final report in January 2018. This document is very important to increase the contribution of the financial sector to inclusive and sustainable growth and strengthen financial stability by incorporating ESG aspects (European Commission, 2018).

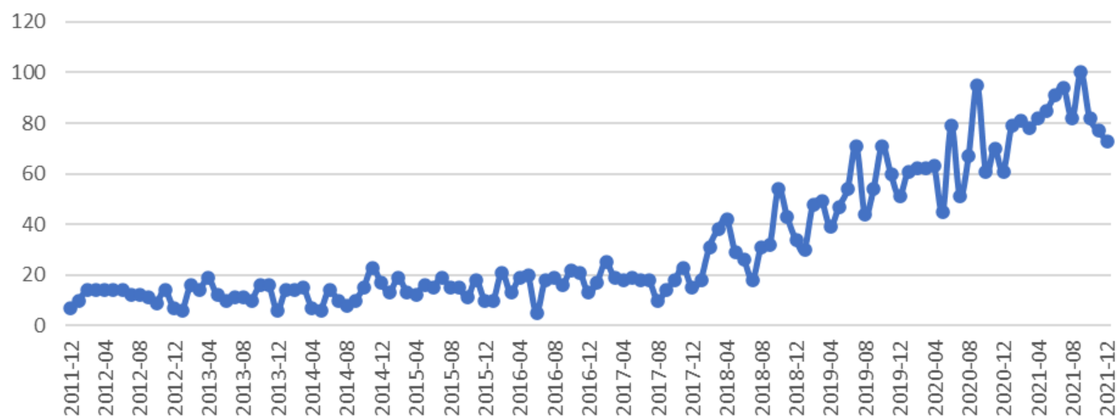

Figure 8. The Search Trend of "sustainable finance" (https://trend.google.com)

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The term sustainable finance has become increasingly popular after President Trump decided that the United States was withdrawing from the Paris Agreement in June 2017 (Chakraborty, 2017). Then, in 2019, the UNEP Finance Initiative (2019) issued the principles of responsible banking (The Principles for Responsible Banking). Then, the United States, under the leadership of Joe Biden, decided to re-ratify the Paris Agreement in February 2021 (Peltier & Sengupta, 2021).

These events generated a very significant amount of conversation accompanied by various types of views, feelings, and emotions that can be captured and analyzed using sentiment analysis. By using web scrapping techniques and utilizing Twitter Application Programming Interfaces (APIs) on https://developer.twitter.com/, a total of 2,054 tweets and 38,707 words associated with "sustainable finance" were obtained as search keywords. The results of the search are visualized in word cloud form in Figure 9. The word with the larger size in the figure shows the frequency of occurrence of the word in the sample obtained.

Figure 9. Word Cloud Analysis on "Sustainable Finance"

Figure 10 specifically describes the top 20 words from the sample, where words such as 'sustainable', 'finance', 'amp', 'green', 'esg', and others substantially explain sample data tweets related to sustainable finance. Furthermore, sentiment analysis can categorize these words into groups of words with negative and positive sentiments. Specifically, this study uses sentiment analysis based on the NRC lexicon of Mohammad and Turney (2010) to identify eight types of emotions (anger, anticipation, disgust, fear, joy, sadness, surprise, and belief) and two sentiments (negative and positive) being from Liu and Hu (2004) to analyze negative and positive words (Hassan et al., 2022).

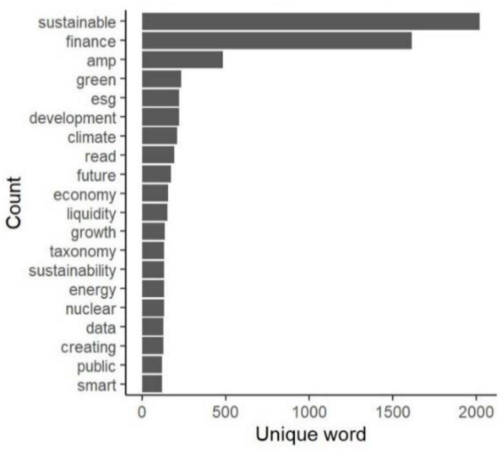

Figure 10. Top Words Related to Sustainable Finance

In general, sentiment analysis uses Bing from Liu and Hu (2004) found that the majority of words in the sample belonged to the positive sentiment group compared to the negative sentiment group, as visualized in Figure 11. The word "sustainable" is the most dominant, with more than 2,000 occurrences, followed by other words such as "sustainability", "support", "vibrant", "accessible", and others. The top five words in the negative sentiment group include "volatility", "risk", "critical", "issue", and "crisis". Furthermore, the figure confirms this finding that the distribution of sentiment related to "sustainable finance" tends to be dominant with words with positive sentiment. It seems that about 80% of the sentiment is on the right side of the chart.

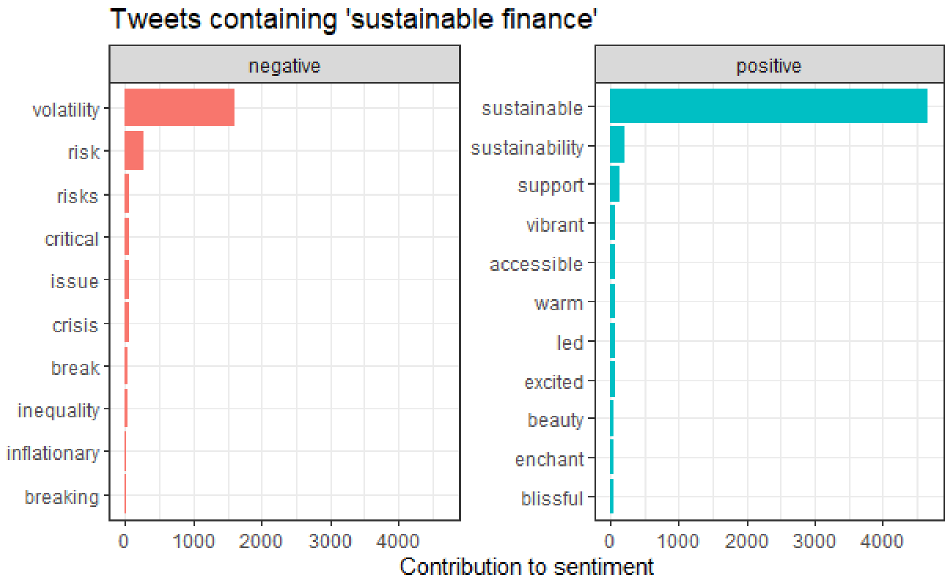

Figure 11. Words Grouping Based on Sentiments

Furthermore, sentiment analysis using the NRC lexicon of Mohammad and Turney (2010) specifically analyzes the sample based on eight types of emotions and two types of sentiments. The image confirms analysis using Bing from Liu and Hu (2004), where the Tweet sample identified has a lot of positive words compared to negative words, see Figure 12. Further, Figure 13 also shows more emotion of trust and positivity than any other emotion in a Tweet related to #sustainablefinance.

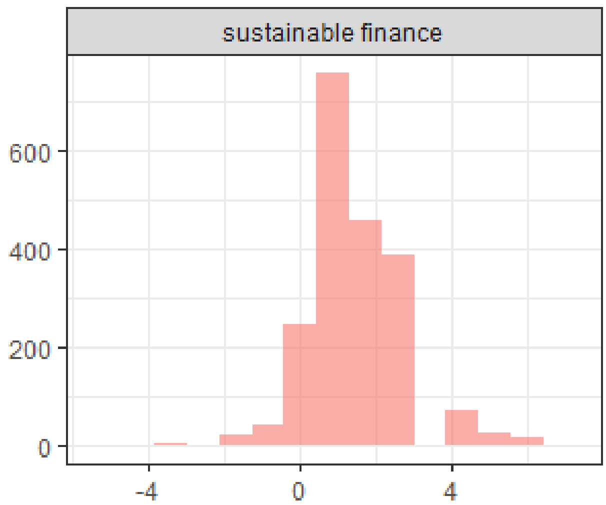

Figure 12. Sentiment Distributions of Sustainable Finance

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With the various results and findings from the sentiment analysis above, Islamic banking can use these words to design communication strategies for the public on digital platforms such as websites and social media in order to improve corporate image, especially because it is more closely associated with sustainable finance. The government, in this case the OJK and Bank Indonesia, can also take advantage of this to campaign for sustainable finance for the public.

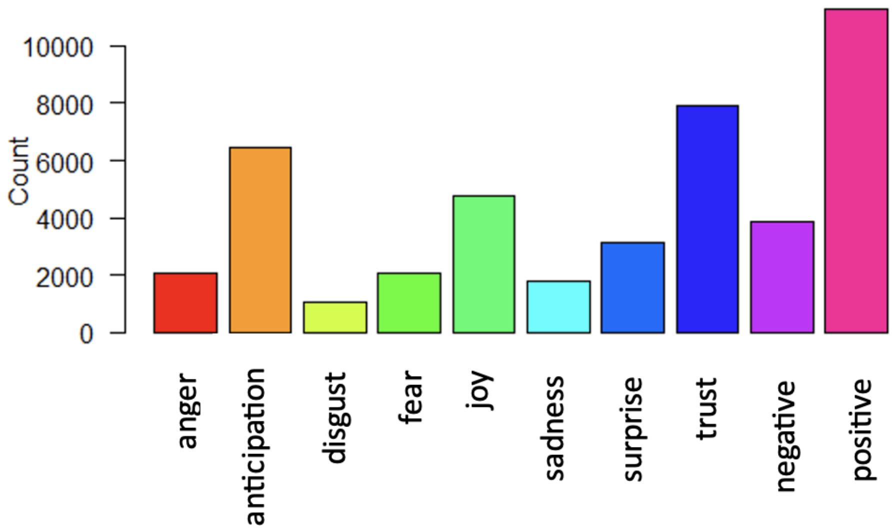

Figure 13. NRC Sentiment Score of Sustainable Finance

Conclusion

This study aims to analyze the challenges and priority strategies for implementing sustainable finance in Islamic banking using the Analytical Network Process (ANP) method and analyze public opinion on the Twitter platform regarding sustainable finance using sentiment analysis. From the ANP analysis conducted, eight internal challenges and seven external challenges were identified in the implementation of sustainable finance in Islamic banks based on their order of priority. Furthermore, eight internal strategies and four external strategies were also identified based on their priority order. The results of the sentiment analysis in this study identified that public opinion tends to be positive towards sustainable finance. In addition, words that have negative and positive sentiments have been identified, which can be used to design a communication strategy to produce a positive image for the company because it is associated with sustainable finance.

This research can recommend several points. First, OJK and BI can encourage the creation of a sound and competitive financial system by providing rewards and punishments for banks in implementing sustainable finance. Second, the government needs to support efforts to increase human resource capacity in implementing sustainable finance. Third, the government and banks can utilize the results of this research in implementing sustainable finance in Islamic banks by referring to the results of the analysis of strategies and priority challenges for implementing sustainable finance in Islamic banks. Furthermore, the government and banks can also take advantage of sentiment analysis in this study to campaign for sustainable finance in society and improve the image of their respective companies.

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