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GREEN SUKUK AND SUSTAINABLE DEVELOPMENT GOALS: A STRATEGIC TOOL FOR SAUDI VISION 2030 AND THE SDGS

ZIELONE SUKUK I CELE ZRÓWNOWAŻONEGO ROZWOJU: STRATEGICZNE NARZĘDZIE DLA SAUDYJSKIEJ WIZJI 2030 I CELÓW ZRÓWNOWAŻONEGO ROZWOJU

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Abstract

Subject and purpose of work: Islamic green finance represents an innovative financial instrument that integrates Islamic ethical principles with sustainability objectives to address modern environmental and social challenges. This study aims to explore the role of Green Sukuk in advancing sustainable development within Saudi Arabia, particularly in alignment with Vision 2030.

Materials and methods: The study uses a simple analytical method based on reviewing existing studies and reports. It focuses on a case study of the Saudi Electricity Company to understand how Green Sukuk help in moving to a low-carbon economy and support local communities.

Results: The results indicate that Green Sukuk effectively mobilize financial resources to support economic diversification, social development, and environmental sustainability.

Conclusions: The study concludes that Islamic green finance in Saudi Arabia is strategically oriented towards these three pillars, in alignment with both national objectives and the United Nations Sustainable Development Goals (SDGs), offering a valuable model for other countries aiming to integrate ethical finance into their sustainable development strategies.

Key words: Green Sukuk, Sustainable Development Goals, Vision2030, Saudi Arabia

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Streszczenie

Streszczenie: Przedmiot i cel pracy: Islamskie zielone finanse stanowią innowacyjny instrument finansowy, który łączy islamskie zasady etyczne z celami zrównoważonego rozwoju w celu sprostania współczesnym wyzwaniom środowiskowym i społecznym. Niniejsze badanie ma na celu zbadanie roli zielonych sukuków w promowaniu zrównoważonego rozwoju w Arabii Saudyjskiej, szczególnie w kontekście realizacji wizji 2030.

Materiały i metody: W badaniu zastosowano prostą metodę analityczną opartą na przeglądzie istniejących badań i raportów. Skupiono się na studium przypadku Saudi Electricity Company, aby zrozumieć, w jaki sposób zielone sukuk pomagają w przejściu na gospodarkę niskoemisyjną i wspierają lokalne społeczności.

Wyniki: Wyniki wskazują, że zielone sukuk skutecznie mobilizują zasoby finansowe w celu wspierania dywersyfikacji gospodarczej, rozwoju społecznego i zrównoważonego rozwoju środowiska.

Wnioski: W badaniu stwierdzono, że islamskie zielone finanse w Arabii Saudyjskiej są strategicznie ukierunkowane na te trzy filary, zgodnie zarówno z celami krajowymi, jak i celami zrównoważonego rozwoju ONZ (SDG), stanowiąc cenny model dla innych krajów dążących do włączenia etycznych finansów do swoich strategii zrównoważonego rozwoju.

Słowa kluczowe: Zielone Sukuk, cele zrównoważonego rozwoju, Arabia Saudyjska, Wizja 2030

Introduction:

Islamic Green finance is considered as an innovative financial approach that can address modern community problems; The integration of Green Economy and Islamic Finance supports the achievement of SDGs. For example, it channels funds into green energy, biodiversity, and sustainable agriculture. Green Economy conjunction with Islamic Finance can effectively drive to progress towards global sustainability targets (SIRGARE, AL, 2023).

In September 2015, the UN stated that adopting SDGs can make all nations reach a sustainable future. The 17 SDGs raise attention towards prosperity, calling countries to reflect on the preservation of the planet. The Secretary-General on the Global Sustainable Development Report announced that the cost of SDGs implementation over 10 years would cost between USD 50 trillion and USD 70 trillion (2020-2030). It explained that USD 3.5 trillion is mobilised per year; 1.6 trillion represents revenues of public sources, and 1.9 trillion comes from private sources (Riaño, Barchiche, 2020).

In the last decade, the world has realised the importance of green culture, which has not only influenced the environment, but has also introduced a finance mechanism for the green-friendly projects through what is known as Green Sukuk. The term sukuk is an alternative for the western word 'bond'; it refers to revenue-generating businesses through Sharia-harmonic risk-sharing returns. Therefore, it is expected to play a key role in advancing sustainability, opening up new economic opportunities, reinforcing institutional collaboration, enhancing risk management practices, and supporting policymakers in identifying and addressing the barriers to effective issuance. For instance, Malaysia implemented green sukuk in 2017 and issued ten more in 2020 to achieve its 2030 goal of \$2 trillion. In the same vein, Saudi Arabia and the United Arab Emirates issued sukuk in 2019 (Liu and Lai, 2021; Rahman et al., 2022).

The analytical approach was employed in this study to discuss the role of Islamic Green Finance in achieving the SDGs Vision in 2030 in Saudi Arabia. It also shed light on Saudi Arabia's goals of diversifying its economy and improving its competitive edge through the Vision 2030 Initiative. In particular, the research assesses the current development of green sukuk initiatives, examines the financial sustainability mechanisms adopted in Saudi Arabia, analyzes the opportunities and constraints related to sukuk issuance, and reviews the operational model employed by the Saudi Electricity Company. This case study enriches the existing financial literature by addressing key gaps, such as the lack of a clear legal and regulatory framework, limited awareness among stakeholders, and the absence of standard tools to evaluate the environmental and social impact of funded projects, and it provides a practical foundation for the research and underscores the pressing need for more in-depth investigations in this domain. Accordingly, the study addresses the following research questions:

1. How can green sukuk support the attainment of specific SDGs as Islamic financial tools?
2. What are the measurable impacts of green sukuk on environmental and social outcomes?
3. What challenges must be overcome to enhance the use of green sukuk in sustainable development?

By examining these questions, this study aims to contribute with valuable insights into the discussion of green sukuk as Islamic financial tool to advance global sustainability goals. At the end of the paper, researchers provide recommendations for future research and policy development.

The paper is structured as follows:

Section 1 presents the literature review and the theoretical framework.

Section 2 describes the research methodology and provides an overview of the case study focused on the Saudi Electricity Company (SEC).

Section 4 examines the key challenges associated with issuing green sukuk in Saudi Arabia.

section 5 provides and discusses the research findings.

Section 6 conclusion and offering recommendations for future research and policy.

1. Literature Review

The use of Islamic finance aligns with Islamic principles and suggests financial solutions. Pericoli (2020) explains the importance of Islamic financial practices and tools that promote global financial aspirations and managing resources for sustainable development. He explains that these principles support ethical considerations that ensure fairness and equality. In other words, these principles are underlined guides of *maqasid al-Shariah* that clearly stated the protection of *maal'* (money), property, and *nasl'* (progeny). Al-Sharia prioritises humans who are regarded as protectors of all homo sapiens on earth. Islamic finance, in its essence, can bring about new funding sources, such as value propositions that are not fully leveraged by green finance. Incorporating Islamic finance, green finance and sukuk can strengthen this value (WorldBank, 2019).

According to the existing literature, green sukuk is the bulk of Islamic finance. It is a trendy green funding tool that supports the green economy with the aim of achieving SDGs (Abdullah Nayan, 2020; Khairunnisa Hidayat, 2023). Green sukuk has been described as a new form of Islamic bond that finances eco-friendly and Sharia-compliant initiatives. According to Rohman (2017), it is an innovation of traditional sukuk that uses funds to support halal and sustainable products. It can also be used in different ways as tools in Islamic finance, such as ethical investment and *tabarru'* (charity funds). Green sukuk tools can also develop sustainable and fair investment policies which increase the flow of funds in sectors that need finance for green projects (Belouafi, Chachi, 2014).

Ayus and Asmiyati (2024) revealed that sukuk as an instrument in Islamic finance can increase economic and business activities that relatively influence climate change. Therefore, sukuk can anticipate post-SDGs, reduce extreme poverty and improve human equality. For example, Malaysia has secured financial and social stability relying on inherited Shariah principles. In Indonesia, the government and the United Nations collaborated to use green sukuk for green projects, which showed the effects of this instrument (Fitrah, Soemitra, 2022). However, the Paris Agreement 2023 has raised concerns about the challenges of meeting the implementation of green finance with climate change mitigation requirements in Malaysia. Although the Malaysian government ensured the success of green finance initiatives, there were challenges that limited their effectiveness. Further points discussed in the Paris Agreement highlighted that to increase green finance income by 2025 and to achieve SDGs, nations need to integrate green practices in industries (small or medium-sized businesses). The agreement has also suggested that Malaysia can modify its regulatory frameworks to create green finance through synchronizing public financial incentives, raising awareness of green finance in different sectors, aligning the environmental SDGs with public sector financial decisions, and increasing green technology investments (Hafsyah Idris et al., 2024).

Another qualitative case study was conducted in Malaysia to explore the key drivers behind green sukuk issuance, aiming to fill the empirical gap in understanding what motivates institutions to issue such instruments (Abdullah and Keshminder, 2020). Based on interviews with green sukuk issuers, the study identified three main drivers: competitiveness, legitimation, and ecological responsibility. These factors reflect both strategic and ethical motivations that align with Islamic finance principles and

sustainability goals. The authors argue that effective policy support, legislative incentives, and awareness initiatives are essential to boost the global green sukuk market. While context-specific, the study offers valuable insights for policymakers and scholars in the field of Islamic sustainable finance.

Furthermore, Saad, Mohamed, and Yusri et al. (2025) investigated the role of green sukuk in promoting renewable energy consumption as a means to achieve sustainable growth in Malaysia. Using quantitative data from 2000 to 2023, the study examined the relationship between sukuk issuance and macroeconomic indicators, particularly focusing on renewable energy. Grounded in Ecological Modernization and Social Responsibility Investment theories, the study found a significant positive link between green sukuk and economic growth. It concluded that green sukuk can close the financing gap in clean energy projects while supporting both economic and environmental goals. The authors recommended improving regulations, boosting private sector involvement, and adopting technological innovations to enhance renewable energy adoption.

In Pakistan, Nehal (2023) conducted a study to examine how green sukuk were used to develop sustainable energy projects, such as PSO biodiesel initiative. Sarfaraz found that the government can cancel interest-based debts, and invest in public projects in flexible and halal ways. He added that there is a need for awareness on how green sukuk can be invested on environmental assets using renewable energies. This study showed that Pakistan's case aligns with both the Sharia law mandate for the planet conservation, and the Paris agreement call for green practices.

On the other hand, several recent studies have employed bibliometric approaches to analyze the intersection between Islamic finance and sustainability. Dervi (2021) who combined statistical and bibliometric methods to study sustainable business models and social-environmental projects. His work covered publications from 1981 to 2019 and included an updated review of 130 papers from 2020 to 2021. Additionally, he proposed Islamic finance tools such as *Musharakah* and *Ijarah* as ethical solutions for funding waste management in low-income countries like Pakistan, suggesting that regulators could adopt such models to promote Sharia-compliant investment options.

Another contribution comes from Lanzara (2021) who explored 21 years of literature to assess how the Sustainable Development Goals (SDGs) have influenced research in Islamic finance. Through a bibliometric and qualitative approach, the study mapped the main themes and trends, showing how Islamic finance is increasingly linked to social development and sustainability discussions.

Further contributing to the bibliometric literature, Paltrinieri et al. (2023) utilized advanced tools such as *HistCite* and *VOSviewer* to conduct citation and content analysis on 80 studies published between 1950 and 2018. Their research identified three major thematic clusters: the evolution and expansion of sukuk markets, theoretical frameworks underpinning sukuk instruments, and the influence of sukuk on stock market behavior. Moreover, the study highlighted key co-authorship networks and research collaborations, providing a valuable roadmap for future scholarly engagement.

Similarly, Rahman et al. (2020) carried out a structured bibliometric review of the literature on Socially Responsible Investment (SRI) sukuk from 1970 to mid-2019. The study organized the literature into three main categories: the features of SRI sukuk, their competitive position, and the key drivers behind their issuance. The authors noted that although some international cooperation exists – particularly between Malaysia, Australia, and the United States – the overall number of studies is still limited, highlighting a need for more in-depth research in this area.

In a bibliometric analysis by Qosim et al. (2023), the authors systematically examined eight years of academic output related to green sukuk in global stock exchange markets, with a special emphasis on Indonesia's experience as a pioneering issuer. The study utilized metadata from both Scopus and the Web of Science (SCI) databases, employing tools such as *VOSviewer* and *Biblioshiny* to map frequently occurring terms, citation trends, and keyword co-occurrences. The findings indicated that the concepts of "energy," "sustainable," and "green financing" dominate the discourse, highlighting the centrality of renewable energy projects – particularly hydropower and wind energy – as viable underlying assets for green sukuk. Additionally, the authors pointed to Indonesia's issuance of USD 1.25 billion in sovereign green sukuk in 2018 as a landmark event that positioned the country as a regional leader in Islamic green

finance. Notably, the study identified regulatory uncertainty, greenwashing risks, and market illiquidity as persistent challenges hampering wider adoption. To address these issues, Qosim et al. (2023) advocate for enhanced government regulations, broader investor education, and international standardization mechanisms. The study serves as a valuable reference point for understanding the evolution of green sukuk within the framework of sustainable development goals (SDGs) and offers a data-driven roadmap for future research directions.

In another study that was done in Indonesia, the objective was to explore the role of green Islamic sukuk in promoting environmental sustainability in Indonesia, which is one of the leading countries in the field of Islamic finance. The study employed a descriptive-analytical methodology to describe and analyze the key concepts, procedures, and challenges related to the issuance and implementation of green sukuk. The findings revealed that green sukuk have played a significant role in financing environmentally sustainable projects, attracting foreign investment, and supporting Indonesia's commitment to the Sustainable Development Goals. However, the study also identified several obstacles, such as limited awareness among financial institutions, insufficient government support, and the need for a clearer legal and regulatory framework. The study concludes by recommending improved transparency, development of standardized criteria for green projects, and stronger financial incentives to enhance the effectiveness and expansion of green Islamic sukuk in Indonesia (Hamouda, Bouhssane, 2025).

Further studies such as Abdullah and Nayan (2020) highlighted that warranted contracts for green sukuk issuance and environmental green projects. These researchers noted that the Securities Commission (SC) guidelines drawing on green sukuk products helped in the conservation of environmental assets: natural resources and energy. The SC also emphasised the wise use of renewable energies to mitigate climate change (i.e., to reduce greenhouse gases). This study explained that such contracts aligned with sustainable and responsible investment of green sukuk. Then, researchers argue that green sukuk can be arranged with several project contracts that it funds.

In a comprehensive study conducted by Diaz-Rainey et al. (2023) on green finance in Asia focused on the role of government policies or regulations and how many policy levers exist around green finance and stimulating the redeployment of private capital away from fossil fuels and towards 'clean' alternatives. These include: feed-in-tariffs and subsidies for renewables, shadow carbon prices, moratoriums on new coal generation, green bond standards, export finance policies and guidelines, sustainable finance road maps and related reporting requirements, and green monetary policy tools overseen by central banks. And they conclude that the interplay between the state and markets via policy is therefore critical to shift capital towards green finance.

Morea and Poggi (2017) , examined a comparative study of the use of a sustainable investment model by the wind energy sector in Italy. They evaluated the sector profitability and bankability with criteria of Net Present Value (NPV), Internal Rate of Return (IRR), WACC, Annual Debt Service Cover Ratio (ADSCR) and Annual Loan Life Cover Ratio (ALLCR). The findings showed that the NPV level is negative and the ADSCR and ALLCR indicators are beyond the assumed range. Furthermore, the study deduced that recovery investment can be successful only when costs are reduced through building wind farms. Further analyses on green sukuk were carried out to explain the role of recovery investment in conventional bank interest models with conventional bank loans. The results revealed that investment recovery yields negative returns. While in Islamic finance, investment recovery produced better bankability indicators, as it reduced the gap in profitable and bankable projects. Therefore, the financing model was introduced as an Islamic financial instrument, which is known as the green sukuk. Green sukuk is specified as an Islamic financial instrument with its commissions.

One recent comparative study by Syed and Adnan (2024) examined the relationship between sukuk, green sukuk, Islamic equities, and Islamic green markets during uncertain times such as climate change, COVID-19, and the Russia-Ukraine war. The results showed that in the short term, green sukuk and green equities transmit risk, while Islamic equities receive it. In the long term, the roles are reversed. The study also found that green sukuk can help reduce risk in investment portfolios, making them useful tools for ethical investors and helping policymakers build a more stable and sustainable financial system.

In a study conducted by Siddiquee (2019), he investigated the pivotal role of green sukuk investment in promoting renewable energy (RE) consumption as a strategic pathway to achieving sustainable development goals (SDGs). Using data from 2000 to 2023, the research examined the relationship between sukuk issuance and key macroeconomic variables such as market risks, economic stability, and financial health, with a focus on RE consumption. Grounded in the Ecological Modernization Theory and Social Responsibility Investment Theory, the study highlighted green sukuk as an innovative financing tool that supports both economic growth and environmental sustainability. The findings emphasize the need for strong regulatory frameworks, private sector participation, and technological innovation to accelerate RE adoption. The study concludes that green sukuk can close financing gaps in renewable energy projects, reduce climate-related risks, and enhance economic resilience, while contributing valuable insights and recommendations for policymakers, investors, and stakeholders in the Islamic finance ecosystem (Siddiquee, 2019).

2. Sustainable Development Goals

The 2030 Agenda for sustainable development was established on September 25th, 2015, in New York. It was the day when world leaders set on a new course by creating a strategic plan that achieves the 17 Sustainable Development Goals (SDGs). The first SDGs meeting in Paris at COP21 came shortly after the UN September Summit. SDG13 called on all world governments to mitigate climate change caused by human activities. The Paris Climate Agreement was endorsed with delegates of the participating governments, establishing the primary goal to reduce the rise of global temperature to significantly less than 2°C (Jeffrey D. Sachs, 2015). The SDGs encompass 17 goals encouraged for global development; these goals addressed different world's issues, such as reducing poverty and inequality, and excessive consumption and production. Hence, entrusted poverty reduction could improve life quality, healthcare, well-being, sanitation, quality education, marine and forest ecosystems conservation, and improve access to clean drinking water (Fitrah, Soemitra, 2022).

The 2030 Agenda encompasses all of the SDGs, a political declaration, 17 comprehensive objectives, 169 targets, and other different strategies. This framework acts upon the Millennium Development Goals (MDGs) to create a strategic plan that achieves global sustainable development. The 2030 vision is rooted in the principles of the UN Charter and the Universal Declaration of Human Rights, which are set to develop Sustainable Growth, reduce poverty, hunger, fear, and violence. The agenda focused on upholding human rights and the rule of law to achieve inclusive and sustainable economic growth in using natural resources. The agenda includes 17 objectives, known as SDGs (Yu et al., 2020).

3. Green Sukuk Concept

Sukuk is a term that is rooted in Islam, following the guidance of Allah, shown in Surah al-Anbiya (*The Qur'an* 105): "The earth will be inherited by my righteous servants". And in Surah Al-Araf, (*The Qur'an* 85): "Do not cause corruption in the land after it has been set in order: this is better for you, if you are believers." The origins of Sukuk can be traced back to the classical Islamic period (700-1300 AD) during which trade and other commercial activities brought financial obligations, which were held in conformity with verse (*The Qur'an* 2:282) of Surah Albaqarah which encourages fixing writing contracts. During the classical Islamic period, a sakk referred to a singular form of sukuk, literally meaning 'deed' or 'instrument'. It was used to describe any document representing financial liability.

Sukuk is interpreted based on Islamic shariah. It has a widespread use among Islamic and non-Islamic nations (Noman, Pervin, Alam, 2021, pp: 2). Its market is free from Riba and gharar, doubt, speculation, and destructive and immoral behaviour. As discussed above, green sukuk derives from the traditional sukuk concept; this innovative approach aligns the sukuk market with sustainable development objectives addressed in the global agenda. The main objective of green sukuk is to solve environmental issues highlighted in the Sharia's principles (Santoso, 2020); thus, green sukuk uses the Sharia principles, and

receives funds from company investors who look to develop halal and eco-friendly products (Rohman, 2017).

A study conducted by Fitrah and Soemitra (2022) demonstrated that green sukuk is based on maqasid Al-sharia in five aspects: protecting religion, soul, mind, offspring, and property. Therefore, green sukuk has a key role in environmental projects, such as bio-gas generators, wind farms, solar energy, inland/marine waste management, ecosystem management efficiency, energy-efficient buildings, and other similar businesses; all these projects aim to mitigate climate change issues.

3.1. Features of Green sukuk:

Green sukuk is identified with several characteristics.

- It denotes the ownership of the holder or owner of common shares in income-generating assets, whether they are items, benefits, services, a combination of them, or moral rights, and not a debt due by their source.
- The prospectus states its legal nominal value. according to Sales and Salam, sukuk are non-negotiable; however, Mudaraba, Musharaka, and Ijarah are negotiable. The deed cannot be divided against the company, and if it is transferred to two or more people, one person must represent them all. The right to profit and the ability to suffer loss mean that the instrument owner shares in the profit according to the prospectus criteria, and the debtor is held liable in proportion to his sukuk (Shalhoob, 2023).

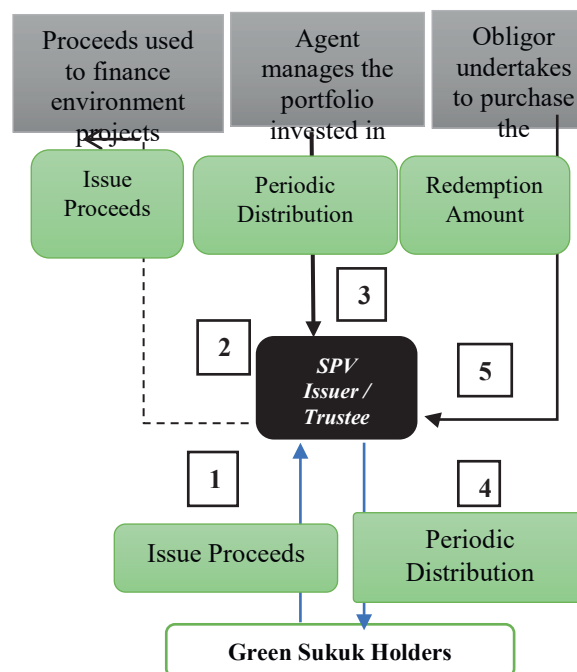


Figure 1. Green Sukuk Structure

Source: Figure adopted from (Alam et al., 2016).

Green sukuk structure secures future cash flows from ring-fenced assets and other specific criteria attached (See Figure 1). The funds generated from Sukuk issuances are primarily allocated to green Shariah compliant projects. After the expenses of the Special Purpose Vehicle (SPV) are deducted, profits from the portfolio are checked by sukuk holders. The obligor commits to purchase the portfolio at maturity from the SPV; its price is influenced by the sum of aggregate nominal amount of trust certificate and accrued unpaid periodic distribution. Six assets can be utilized for green sukuk, as defined by Climate Bond Standards certification, include solar parks, biogas plants, windfarms, ambitious plans to promote energy efficiency, renewable transmission and infrastructure, and electric vehicles and light rail (Alam, Duygun, Ariss, 2016).

3.2. Backgrounds for Developing Green Sukuk: Standards and Guidelines

Countries' experiences with green sukuk have shown that standards and guidelines in the green bond market are equally contributed by both the private and public sectors. The MDBs, and multilateral institutions, non-profits, and national governments have worked together for years to develop guidelines and standards that support green finance, which are divided into different types:

1) Climate Bonds Standard (CBS) is a specific framework developed by Climate Bonds Initiative (CBI), i.e., this standard offers certification for green bonds, including sukuk, ensuring that projects align with climate objectives.

2) The Green Bond Principles (GBP) derived from the International Capital Market Association (ICMA). i.e., its guidelines include transparency, disclosure and integrity in sukuk.

3) The SRI Sukuk Standards (SC), (ASEAN) and Green Bond Standards (ASEAN GBS) specified by the ASEAN Capital Markets Forum (ACMF) have shaped the issuance of green bonds and sukuk globally (UKIFC, 2022, p. 8).

Various Islamic financial jurisdictions have tailored their regulatory frameworks and action plans to align with the sustainable development agenda, particularly focusing on green and sustainable investments. For instance, Indonesia's Financial Services Authority (OJK) introduced a Sustainable Finance Roadmap in 2014, which established a dedicated task force for sustainable finance. In 2017, it released its Sustainable Finance Umbrella Policy, which initiated the development of a sustainable finance ecosystem and engaged the financial sector in supporting the government's climate initiatives. Additionally, the OJK introduced regulations for green bonds in 2017 to promote the creation of environmentally friendly capital market products.

Similarly, the Malaysian government has prioritized green financing and investment incentives in its 2021-2025 roadmap, promoting renewable energy and advancing sustainability. To further these objectives, the Securities Commission Malaysia (SC Malaysia) launched the Sustainable and Responsible Investment (SRI) Roadmap for the Malaysian Capital Market in 2019, aiming to establish a supportive SRI ecosystem and define the role of the capital market in Malaysia's sustainable development efforts.

Most green and sustainability sukuk adhere to one of the International Capital Market Association (ICMA) principles: The Green Bond Principles (GBP), the Sustainability-Linked Bond Principles (SLBP), or the Sustainability Bond Guidelines (SBG). Nearly half of the GBP-compliant green sukuk are also classified as 'ASEAN Green Bonds'. These principles encourage issuers to obtain external reviews, providing essential information for investors. Furthermore, Second Party Opinions (SPOs) are the predominant form of external review used by green and sustainability sukuk issuers, accounting for 91% of issuances. According to 46% of survey respondents, they are viewed as the most effective tool for evaluating ESG credentials.

The growth of the ESG sukuk ecosystem is also supported by several global initiatives. Notably, the High-Level Working Group (HLWG), launched during COP26 in 2021, is a three-year project focused on developing and promoting green and sustainability sukuk as effective instruments to attract the necessary investments for sustainable development (UKIFC, 2022, p. 10).

3.3. Green Sukuk Market Analysis

In recent years, the world has realized the importance of a healthy environment in reducing natural disasters. Consequently, green bonds were introduced in 2007, followed by the issuance of green sukuk in 2017. Malaysia took the lead in issuing green sukuk and issued ten green sukuk in 2020. Subsequently, Indonesia took the initiative to issue five green sukuk in 2018. Additionally, Saudi Arabia issued two green sukuk, and the United Arab Emirates also issued two green sukuk in 2019 (Suriani et al., 2024).

Table 1. Green and Sustainability Sukuk Issuance USD BILLION 2017– Q3 2024

Years	2017	2018	2019	2020	2021	2022	2023	Q1 ; 2024
Green sukuk	0.4	1.4	3.5	2.5	1.7	3.4	7.8	0.2
Sustainability sukuk	0.02	0.1	0.04	1.7	4.6	6.0	5.5	3.7
Sustainability -linked sukuk	0	0	0	0.6	0.2	0.04	0.1	0.02
Social sukuk	0	0	0	0	0	0	0	0
Total Issuances	0.4	1.5	3.6	4.8	6.5	9.4	13.4	4.0

Source: Author's elaboration based on LSEG Data and Analytics.

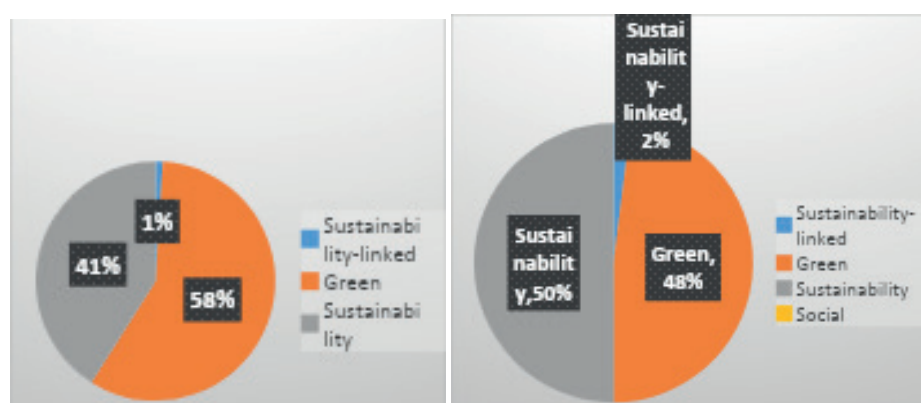


Figure 2. Sustainable sukuk issuance by ESG type (% of value of sukuk issued) issuance – 2023; Cumulative issuance as of Q2024

Source: LSEG Data and Analytics.

Figure 2 illustrates that green sukuk issuance experienced a revival in line with a renewed commitment to the 2030 green targets, with a doubling of sukuk in 2019. Throughout the pandemic, the issuance of these sukuk maintained its upward trend, achieving record levels in both 2020 and 2021. The pandemic also altered market dynamics, resulting in a notable increase in sustainability sukuk alongside the broader Environmental, Social, and Governance (ESG) bond market. This surge was notably driven by the Islamic Development Bank (IsDB), which raised \$4 billion earmarked for alleviating the health and economic challenges posed by COVID-19 and facilitating global recovery.

By 2023, green sukuk issuance rebounded, comprising 55.8% of the total value of issued ESG sukuk. In comparison, these sukuk accounted for 36.3% and 28.6% of ESG sukuk issuance in 2022 and 2021, respectively, as sustainability-linked sukuk gained momentum during the pandemic. As of Q1 2024, the global issuance of sustainable bonds reached a total of \$235.4 billion, according to data from LSEG. The total issuance of sustainable sukuk in Q1 2024 amounted to \$4.0 billion, representing an increase of 17.2% from the same period in 2023. In 2023, sustainable sukuk issuance reached a total of \$13.4 billion, exceeding the full-year total of \$9.4 billion for 2022. A collaborative global effort is necessary to accomplish the 17 Sustainable Development Goals (SDGs) outlined in the UN's 2030 Agenda for Sustainable Development, involving both governments and the private sector, and the entire financial services industry. Achieving these goals is projected to require over \$5 trillion in annual investment, while the current financing gap is approximately \$2.5 trillion each year (*London Stock Exchange Group [LSEG], 2023; UKIFC, 2023*).

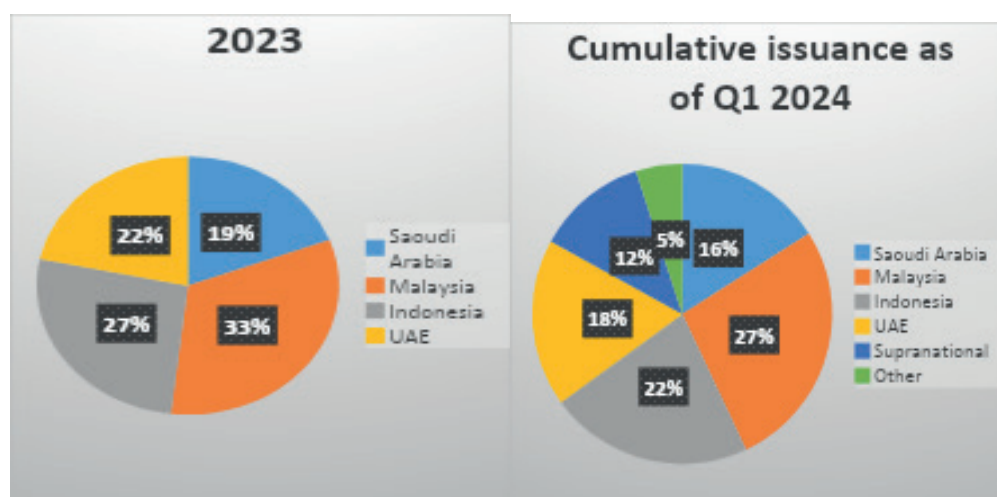


Figure 3. the cumulative issuance of Green and Sustainability Sukuk by country as of Q3 2023 Sustainable sukuk issuance by country (% of value of sukuk issued)

Source: Global Ethical Finance Initiative (GEFI, 2024).

Regionally, the issuance of sustainable sukuk has been driven by a surge in issuers ahead of COP28, with Malaysia, Indonesia and Saudi Arabia leading the way. Together, these countries accounted for 77.4% of the total value of cumulative issuances by the third quarter of 2023. Saudi Arabia emerged as the largest market for ESG sukuk, with cumulative issuances reaching \$10.1 billion which constitutes approximately 83.3% of the total as of Q1 2024.

In Q1 2024, the issuance of ESG sukuk from entities in the GCC totaled \$3.6 billion, reflecting over half of their entire issuance for the year 2023. Additionally, assets in this sector are estimated to exceed \$3.8 trillion, highlighting Islamic finance as one of the fastest-growing segments in the global financial landscape.

Currently, corporations and banks are the primary issuers of sustainable sukuk across all markets, with the exception of Indonesia, accounting for 47.8% of the cumulative value issued by Q1 2024. Banks alone have contributed the largest share, making up 21.9% of the total cumulative issuance, with substantial contributions from Saudi Arabia and the UAE. Most sustainable sukuk have been issued in international markets, averaging 75.4% of total annual issuances from 2018 to Q1 2024, with all sustainable sukuk from GCC issuers being launched in the Eurobond market. In comparison, traditional sukuk issued internationally averaged 25.2% of annual issuances. Typically, the subscription rates for sustainable sukuk have surpassed those of traditional sukuk.

4. RESEARCH METHODOLOGY

This study adapted a descriptive analytical approach based on a case study of Saudi Arabia – focusing particularly on the Saudi Electricity Company – to examine the role of green sukuk in promoting the Sustainable Development Goals (SDGs) within the framework of Vision 2030.

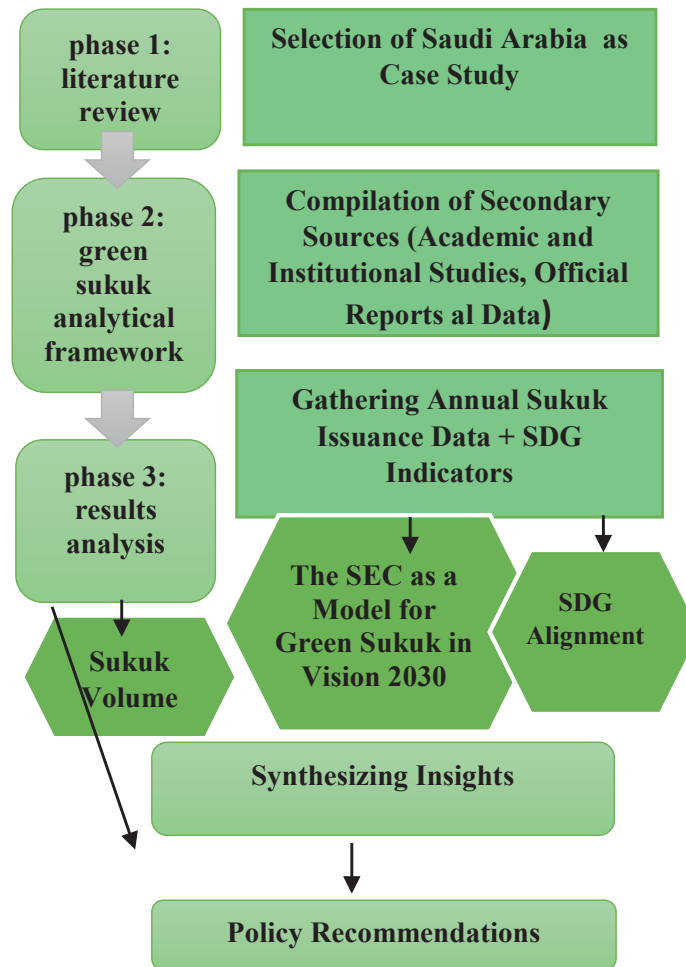


Figure 4. Stages of the Methodology Flowchart

Source: Prepared by the authors.

5. Sustainable Development 2030 Agenda and Islamic Finance through Green Sukuk: The Case of Saudi Arabia (Saudi Electricity Company):

Saudi Arabia Vision 2030 aims:

- Renewing laws to increase competitiveness with industrialized nations.
- Strengthening Saudi Arabia's sukuk market and attracting global investments.
- Targeting innovative green technologies.
- Establishing key market sectors and making Saudi Arabia a leader in asset finance and investment management.
- Enhancing funding options and supporting economic growth, making stock market investment more accessible.

Additionally, Vision 2030 promotes innovative and ethical energy solutions worldwide. During its G20 presidency, Saudi Arabia advocated for a circular carbon economy, which emphasizes reducing, reusing, recycling, and eliminating carbon emissions while supporting economic growth and diversification (Shalhoob, 2023). Currently, Saudi Arabia states decarbonize its power sector by 2035 and achieve net-zero emissions by 2050 to limit global temperature increases to 1.5 °C. By 2030, the Kingdom aims to generate 58.7 GW of renewable energy, with 40 GW from solar photovoltaics, 16 GW from wind energy, and 2.7 GW from concentrated solar power (Islam, Ali, 2024).

Signature projects leverage Saudi Arabia's significant solar and wind potential, along with investments in energy efficiency, to diversify energy sources and enhance the Kingdom's energy mix. By 2030, it is

projected that 50% of electricity will come from renewable sources; these renewable energy projects are essential for reducing emissions and optimizing electricity generation, thereby playing a critical role in sustainability efforts (Shalhoob, 2023).

As a case study, the Saudi Electricity Company (SEC) is presented as a vision alignment with vision 2030 sustainable development goals.

5.1. The Saudi Electricity Company

The SEC and its subsidiaries and affiliates (taken as a whole, the SEC Group) is the Kingdom leading producer of electricity which has a dominance over the transmission and distribution of electric power in the Kingdom. 81.1% of SEC is, indirectly, owned by the government, comprising a 74.3% share held by the PIF and a 6.9% share held by Saudi Aramco, with the remaining 18.8% being held by the general public. SEC has been rated A1 by Moody's, A-by Fitch and A-by S&P (Shalhoob, 2023).

Saudi Power Company and its affiliates (the SEC Group) are the Kingdom's main energy producers and oversee power transmission and distribution; it is still the region's biggest electricity provider. SEC's strategies aim to improve power plant efficiency and transition it to a cleaner energy mix; these strategies are concerned with developing the complete displacement of liquid fuel by 2030 to increase environmental compliance. Furthermore, they are concerned with improving the reliability of the electricity transmission network, which enables for renewable energy production within the kingdom and abroad to automate distribution networks and improve end-user satisfaction in the Kingdom (SEC, 2024).

The current framework adopted by the SEC as an alignment model plays a pivotal structural role in the economic pillar of the Kingdom Vision 2030, providing reliable and high-quality electricity services nationwide. The company ensures alignment of its corporate strategy with the national vision, incorporating key components of Saudi Vision 2030, which charts a sustainable path for KSA's future. The vision refines the importance of the Kingdom on a global scale, offering insights into its unique challenges, culture, and opportunities. Its fundamental aim is to ensure that the company's sustainability efforts drive toward a positive change at the national and local levels. SEC actively contributes to the KSA Vision 2030 across its pillars of 'A Vibrant Society', 'A Thriving Economy', and 'An Ambitious Nation', as outlined below (ibid., 2023),

There is a growing demand for electricity in Saudi Arabia due to the country's increasing population. The administration wants to reduce fossil fuel use, introduce renewables and nuclear electricity, and increase efficiency while increasing generation capacity to 120 gigawatts (GW) by 2032. The Kingdom also plans to liberalize the industry and increase private sector participation (Shalhoob, 2023).

5.2. SEC alignment with the UN SDGs

In 2023, SEC developed a forward-looking ESG strategy that aligns seamlessly with the Kingdom's renewable energy goals and its pursuit of Net Zero emissions. This strategic direction is focused on long-term positive impacts in a response to global challenges associated with transitioning to a decarbonized economy. Endorsed by the Board, this comprehensive ESG strategy reflects SEC's unwavering commitment to sustainability, responsible business practices, and long-term value creation. The ESG strategy was also developed through a comprehensive process incorporating the outcomes of a materiality assessment exercise, establishing key interim and long-term targets, actionable steps, and enablers to integrate ESG principles across the company. Furthermore, SEC has formulated a 3-year detailed roadmap for shortlisted initiatives/ projects to deliver on key ESG strategy & meet its targets.i.e., this inclusive approach considered alignment with overarching business strategy, reinforced executive-level governance, and enhanced accountability – collectively contributing to the cohesive and effective implementation of the ESG initiatives.

SEC has issued the first Green Sukuk out of the Kingdom and for a utility company in the Middle East region. It was the largest Green/ESG corporate issuance in the Kingdom in 2020. Further to this

pioneering position and strategic move, in early April 2023, SEC bolstered its green financing mechanisms, emphasizing renewable energy opportunities and grid integration initiatives, as well as promoting energy efficiency. SEC successfully completed a SAR 7.5 billion dual-tranche sukuk issuance consisting of green and conventional tranches, under its international sukuk program. The green tranche raised SAR 4.5 billion for a 10-year tenure; it was based on SEC Green Sukuk Framework which was published in 2020, and it covers two green projects under two distinct eligible categories with climate change mitigation co-benefits. These categories are energy efficiency, comprising projects for the procurement and installation of smart meters and renewable energy, and capital expenditure, comprising the construction and/or operation of the transmission and/or distribution infrastructure for connecting renewable energy sources to the grid. (SEC, 2020).

In line with its commitment to innovative sustainable finance, SEC formed a Green Financing Committee and developed a Green Sukuk Framework based on Green Bond Principles issued by the International Capital Market Association (ICMA). This framework empowers SEC and its subsidiaries to secure Green Sukuks for initiatives like energy efficiency and renewable energy generation. Hence, a significant achievement was the issuance of the Kingdom's first international Green Sukuk in 2020, raising SAR 4.88 billion. Furthermore, in April 2023, SEC successfully raised SAR 7.50 billion dual tranche sukuk, including a 10-year green tranche of SAR 4.50 billion (Shalhoob, 2023).

5.3. SEC Activities

SEC executed Many projects helped in reducing carbon emissions; they increased stakeholders' confidence, and improved access to capital on advantageous terms. SEC advanced well on its renewable energy ambitions as it is ranked among the 22 targeted renewable interconnection projects. By the end of 2023, 6 RE projects – Sakaka PV, DAJ Wind, Jeddah PV, Rabigh1 PV, Sudair PV, & Shoaiba1 PV - with a total capacity of 3,400 MW were successfully integrated with the grid. Currently, 16 projects are under construction, and it is expected that another 9 RE projects will be connected at the end of 2024. Furthermore, the company has successfully completed two high-efficiency renewable energy projects: The Green Duba plants, which utilizes Concentrated Solar Power (CSP) for steam production and electricity generation, and the Waad Al-Shamal project, designed to deliver a total of 1,390 MW and 43 MW of solar capacity (SEC, 2024).

SEC's green sukuk framework has been established in line with the most recent available version of the Green Bond Principles issued by the International Capital Market Association (ICMA) in June 2018. First, SEC's Green Financing Committee evaluates and selects projects to fund and/or refund, and it regularly reviews this framework. Second, it uses eligible fund project types, such as renewable energy and energy efficiency. Third, proceeds management includes systematic internal monitoring of allotted monies. Fourth, each green sukuk net revenue will be deposited to a designated sub-account and put aside for distribution to eligible projects. Next, if the project becomes ineligible, delayed, or divested, the issuer will replace it with another eligible project and re-allocate the fund within 12 months. Then, an external assessment is also needed for submitting an annual allocation (Shalhoob, 2023).

The SEC Green Sukuk are categorized into two eligible types:

Energy efficiency (smart meters)	Renewable Energy
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The SEC has designated 100% of the net proceeds from a Sukuk issuance to finance eligible green projects with a structured internal process in place to monitor the allocated funds. Each eligible green project will receive funds only once. If a project becomes ineligible, the Green Financing Committee will strive to promptly substitute it with another qualifying green project.

Saudi Electricity Company Green Sukuk

Issuer	SAUDI ELECTRICITY SUKUK PROGRAMME COMPANY
LEI	549300K24IK3RMU0096
Obligor	SAUDI ELECTRICITY COMPANY S.J.S.C
Obligor LEI	549300FX04ZKUIAXGP41
Obligor Sector	Electric Utilities
Obligor Rating	A (Fitch)/ A1 Moody's/ A S&P
Format	Regulation S, Registered, Category 2
Ranking	Senior Unsecured
Sukuk Structure	Ijara-Murabaha
Documentation	Issuer's Sukuk Trust Security Programme
Issue size	USD 1,200,000,000
Tenor	10 year
Pricing Date	3 April 2023
Settlement Date	11 April 2023
Maturity Date	11 April 2033
Profit Rate	Fixed Rate, 4.632%
Periodic Distribution Dates	Semi-Annually
Listing	London Stock Exchange's Main Market
Governing Law	English Law and Saudi Law for certain underlying Islamic documents
Denominations	USD 200,000 and integral multiples of USD 1,000 in excess thereof
Use of Proceeds	In line with Issuer's Green Sukuk Framework . Eligible project categories include Energy Efficiency and Renewable Energy.
ISIN	XS2608256827
SPO	Moody's ESG Solutions (Vigeo Eiris)

Figure 5. ICMA, IsDB, & LSEG. (2024). Guidance on Green, Social and Sustainability Sukuk. International Capital Market Association (ICMA).

Source: <https://www.icmagroup.org/assets/documents/Sustainable-finance/ICMA-IsDB-LSEG-Guidance-on-Green-Social-and-Sustainability-Sukuk-April-2024.pdf>

Table 2. Overview of Saudi Electricity Company Sukuk Issuances (2013-2024)

Program	Issuer	Value (Million USD)	Coupon Rate	Issue Year	Maturity Date	Listed Market	ISIN Code
International Market	Saudi Electricity Global Sukuk Co. 2	1000	5.06%	April 2013	2043	Euronext Dublin	XS0911024635 / US804133AB28
International Market	Saudi Electricity Global Sukuk Co. 3	1000	5.50%	April 2014	2044	Euronext Dublin	XS1054250235 / US80413MAA27
International Market	Saudi Electricity Global Sukuk Co. 4	1200	4.72%	September 2018	2028	Euronext Dublin	XS1877838877
International Market	Saudi Electricity Global Sukuk Co. 5	650	1.74%	September 2020	2025	Euronext Dublin	XS2203995670
International Market	Saudi Electricity Global Sukuk Co. 5	650	2.41%	September 2020	2030	Euronext Dublin	XS2203996306
Sukuk Programme	Saudi Electricity Sukuk Programme Co.	800	4.632%	11 April 2023	11 April 2033	London Stock Exchange	XS2608638602
Sukuk Programme	Saudi Electricity Sukuk Programme Co.	1200	5.684%	11 April 2023	11 April 2053	London Stock Exchange	XS2608256827
Sukuk Programme	Saudi Electricity Sukuk Programme Co.	800	4.942%	13 February 2024	13 February 2029	London Stock Exchange	XS2763630774
Sukuk Programme	Saudi Electricity Sukuk Programme Co.	1200	5.194%	13 February 2024	13 February 2034	London Stock Exchange	XS2763630857

Source: Saudi Electricity Company (SEC). (n.d.). Sukuk issuances. Retrieved from <https://www.se.com.sa/en/Investors/Column2/Debt-Investors/Sukuk-Issuances>

The above table presents an overview of sukuk issuances by the Saudi Electricity Company, focusing on both international markets and dedicated sukuk programs. These issuances demonstrate several key financial and strategic dimensions:

1. Chronological and strategic expansion: The issuance timeline spans from 2013 to 2024, highlighting the company's long-term commitment to Islamic finance tools and the evolving role of sukuk in funding infrastructure and sustainable development.

2. Maturity diversification: Sukuk maturity dates vary from short-term (2025) to long-term (2053), indicating risk diversification and tailored financing strategies across multiple market cycles.
3. Coupon rate variations: Coupon rates range from 1.74% to 5.684%, reflecting both global financial conditions and investor confidence in the company's creditworthiness and the sukuk structure.

6. The Challenges in Issuing Green Sukuk

Despite its benefits, green sukuk has various challenges. According to the literature, issuers have limited credit absorption capacity and green sukuk standards costs. Investors have limited investment pipelines, data and analytical skills, and a lack of green sukuk indices, listings, and ratings. To raise awareness, the government must deploy many marketing methods. Therefore, issuer capabilities, project sources, large-scale issuance, stakeholder involvement, and support for green bond standards will influence green bond growth. (Shalhoob, 2023).

- Green sukuk confronts a set of challenges that need fast identification and government intervention to speed its growth (Abdullah & Keshminder, 2020).

There is a lack of clear and standardized guidelines for "green" projects, making it difficult for financial institutions to determine which projects should receive financing and can generate ambiguity in the implementation of sustainable economic practices and Islamic finance. Differences in regulatory approaches between countries or regions can create obstacles in implementing business models that effectively align with Green Economy and Islamic Finance (*Hafsyah Idris et al., 2024; Muhammad, 2023*).

- The green sukuk market requires trustworthy and transparent information because of the lack of clarity and data, making it hard to evaluate its performance and identify potential growth barriers. Thus, there is no market evidence that green sukuk yields higher returns to issuers (Nicholls, 2021).
- The lack of institutional capacities related to the formulation and implementation of environmental policies is the biggest challenge facing many developing countries wishing to transition to a green economy, due to a dearth of shariah expertise, and a credible regulatory framework for a rapidly expanding green sukuk market cannot be built (2021).

Results and Discussion

1. Saudi Arabia has long led the global oil industry, boosting global economic growth.
2. Saudi Arabia's Vision 2030 prioritizes sustainability across policies, investments, and infrastructure, inspiring global solutions to energy and climate challenges (Shalhoob, 2023).
3. Green sukuk are gaining significant attention as a strategic tool to finance the transition toward a low-carbon economy, particularly in Muslim-majority countries seeking to integrate environmental priorities into their economic development agendas. As a Shariah-compliant solution, green sukuk helps bridge the gap between the principles of Islamic finance and the global sustainability movement.
4. Green sukuk provides a Sharia-compliant instrument to finance environmental projects aligned with Vision 2030's objectives of economic diversification and environmental sustainability. This aligns with Saudi Arabia's ambition to reach net-zero emissions by 2060 and to generate 50% of its electricity from renewables by 2030 (Shalhoob, 2023).
5. SEC was the first in the Middle East to issue a green sukuk; it established a robust green sukuk framework in 2020, focusing on:
 1. Renewable energy and energy efficiency
 2. Smart meter deployment (10.4 million installed by 2021)
 3. Grid integration of 4.8 GW of renewable capacity by 2023, and 27.6 GW by 2030

Commitment to ESG principles and zero fatalities target in health and safety policies; (Eiris, 2020; SEC, 2024).

6. Vision 2030 inspires people worldwide to solve today's energy and climate problems creatively and responsibly. Green sukuk to fund sustainable infrastructure can help grow this market and bridge

the gap between conventional and Islamic finance. Environmentalists and sukuk investors want their money to represent their principles; so, they may be interested in green sukuk funding and environmentally friendly infrastructure projects like renewable or clean energy projects because sukuk are based on a specific pool of assets.

7. Impact on SDGs and Vision 2030: The issuance of green sukuk in Saudi Arabia significantly supports various SDGs, particularly those related to climate action, clean energy, and sustainable infrastructure. By aligning financing mechanisms with environmental and social objectives, green sukuk facilitate investments in projects that have direct and measurable impacts on sustainability.
8. Saudi Arabia faces a set of challenges; for example, the need for standardized guidelines, and integration with global green finance initiatives by increased market awareness.
9. Despite their alignment with Vision 2030, green sukuk in Saudi Arabia faces major obstacles such as lack of standardization, weak institutional capacity, and high issuance costs – hindering their growth and impact (Keshminder et al., 2019; Shalhoob, 2023).
10. Institutional Capacity Gaps Hinder Green Sukuk Development Many relevant institutions lack the technical expertise and policy integration needed to design and implement green sukuk frameworks effectively, which limits their ability to scale up issuance (Keshminder et al., 2019).
11. Green Sukuk Enhance Financial Transparency and Accountability: The SEC's issuance model emphasized transparent governance, including ring-fencing of proceeds, annual reporting, and third-party verification. This improves investor's trust and sets a benchmark for responsible green finance (SEC, 2024).
12. Alignment with the UN Sustainable Development Goals (SDGs): Green sukuk directly contribute to global sustainability targets, especially SDG 7 (Affordable and Clean Energy) and SDG 13 (Climate Action), by channeling capital into climate-friendly infrastructure projects (Abdullah, Nayan, 2020).
13. Saudi Experience Can Be a Scalable Model for Other Islamic Economies The Saudi case – particularly the SEC framework – demonstrates how green sukuk can be tailored within an Islamic finance context, offering a replicable model for other Muslim-majority countries seeking to finance sustainable development (Boudia et al., 2020).

Conclusion

In light of the increasing global concerns over environmental degradation and climate change, Green sukuk has emerged as an innovative Islamic financial instrument designed to fund environmentally sustainable projects while adhering to Shariah principles. These sukuk aims to support investments in areas such as renewable energy, energy efficiency, clean transportation, and climate-resilient infrastructure, offering a faith-based mechanism that aligns ethical finance with sustainability goals. The study examined the emergence of Islamic green sukuk as a strategic financial instrument for advancing sustainable development goals. Focusing on the case of Saudi Arabia – particularly the Saudi Electricity Company – it provided a critical analysis of green sukuk issuance in alignment with Vision 2030. The findings emphasized three key dimensions: the benefits of mobilizing capital for green initiatives, the attraction of ethical investors, and support for national sustainability agendas.

However, the study also identified major institutional and structural challenges, including limited capacity, lack of standardized evaluation frameworks, and regulatory complexities. These issues underscore the need for stronger regulatory guidance, institutional awareness, and capacity-building measures. Addressing these gaps is crucial to unlocking the full potential of green sukuk in supporting sustainable finance and environmental transformation in the region.

Theoretically, this study contributes to the growing academic discourse on Islamic sustainable finance by offering context-specific insights into how green sukuk can support environmental objectives in a Shariah-compliant manner. Practically, the findings offer actionable implications for regulators, financial institutions, policymakers, investors, and development agencies by emphasizing the role of green sukuk as a strategic tool to finance low-carbon and climate-resilient projects in Saudi Arabia.

This study confirms the findings of previous research in the same field, reinforcing the strategic role of green sukuk in advancing sustainable development goals within Islamic finance frameworks. By focusing on Saudi Arabia's experience, particularly through the lens of the SEC, this research provides a relevant reference model for other economies seeking to develop faith-based green finance mechanisms that align with sustainability and national development strategies.

Future research should focus on longitudinal studies to assess the long-term impacts of green sukuk on environmental and economic outcomes. Additionally, comparative studies across different regions and financial instruments could provide a broader understanding of the role of green finance in diverse economic contexts. Furthermore, enhanced data collection and reporting on the impacts of green sukuk will also be crucial for refining strategies and ensuring the effective integration of Islamic finance into global sustainability efforts. Therefore, it is recommended to maximize the effectiveness of green sukuk, continue refining the regulatory environments, promote transparency, and foster investor confidence. Additionally, expanding the range of eligible projects and ensuring alignment with international green finance standards could further enhance the impact of green sukuk on sustainable development.

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