

Assessing the Impact of Sukuk Bond on Road Transport Infrastructural Development in the North-Eastern Nigeria....Dr.Terkura Fella Ayem-Fella, Sunusi Abdulkarim, Sani Babayaro

Assessing the Impact of Sukuk Bond on Road Transport Infrastructural Development in the North-Eastern Nigeria

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Abstract

One of the most advanced Islamic finance instruments today is the sukuk bond, which can be used as an alternate source of funds to close infrastructure gaps in developing nations like Nigeria. Using a mixed-methods research design, the study examines both the financial mechanisms and developmental outcomes of sukuk-funded road projects. Qualitative data were collected through semi-structured interviews with four directors from Nigeria's Federal Ministry of Works, while quantitative data were obtained from questionnaires administered to 110 members of the National Union of Road Transport Workers (NURTW) in North-East Nigeria. The research addresses two key questions: To what extent have sukuk bonds impacted road network completion and quality in the region? And what challenges have affected sukuk-funded road project implementation? Findings reveal that sukuk bonds had a positive impact on road infrastructure, with the government investing NGN 612 billion (approximately USD 1.526 billion) leading to the completion of 1,862 kilometers of roads. Major projects including Sections II and III of the Kano-Maiduguri Road achieved 100% completion, while Sections IV and V, along with the Mayo Belwa-Jada-Ganye Roads, reached 98%, 68%, and 74.4% completion levels respectively. Regression analysis shows mixed results, with some sukuk indicators demonstrating significant positive effects ($p < 0.05$), while others showed positive but statistically insignificant relationships. Qualitative findings identified security challenges from ISWAP and Boko Haram insurgents as the primary obstacle to project completion. The study concludes that sukuk bonds represent a viable alternative financing mechanism for infrastructure development, though security and project implementation challenges must be addressed. The findings have implications for Islamic finance development, infrastructure policy, and achieving SDGs 8, 9, and 11 in developing countries.

Keywords: Sukuk Bonds, Road Infrastructure, Islamic Finance, Infrastructure Financing, North-Eastern Nigeria, Conflict Zones, Mixed-Methods

1. Introduction

The global financial crisis of 2008 is responsible for the growth in popularity of Sukuk. One of the three main strategic goals of the Economic Recovery Growth Plan (2017-2020) is to establish an economy that can compete worldwide. Infrastructure investment is one way to achieve this goal; hence, all possibilities for growing Nigeria's infrastructure should be taken into account. Given that crude oil is the main source of government revenue, it is not surprising that Nigeria's earnings have declined since the 2016 drop in crude oil prices and the violent actions of the Niger Delta militants, who reduced the amount of crude oil produced from 2.2 million to 1,400,000 barrels per day (Abdulkarim et al., 2022b). These reductions have made it more difficult for the government to finance its budget deficit, and the Debt Management Office (DMO) is responsible for securing funds to cover budget deficits and managing the debt in an efficient manner. The DMO has effectively covered shortfalls over the years by employing creative fundraising techniques (Debt Management Office, 2017). The Federal Government of Nigeria is adopting Islamic finance, and Mr. Wale Edun, the finance minister and coordinating minister for the economy of the Federal Republic of Nigeria, has stated why "high-rate interest-based finance" is no longer affordable for the entire world (Donald, 2024). Mr. Edun made this claim during a workshop that the Islamic Financial Services Board (IFSB) and the Security and Exchange Commission (SEC) hosted in Abuja. The minister said that interest rates have skyrocketed due to both natural and man-made shocks and that the rising cost of borrowing is another factor limiting progress. He cited infrastructure, healthcare, and education as some of the essential sectors suffering from the weight of excessive borrowing prices, emphasising the debilitating effect of high interest rates (Donald, 2024). In light of the aforementioned, Nigeria's primary motivation for issuing Sukuk is the requirement to fill the large financial gaps in the nation's infrastructure (Debt Management Office, 2017).

Al-ijarah Sukuk, issued in 2013 by the Osun State Government, was the first Sukuk to be issued in Nigeria and the first in Sub-Saharan Africa. The sukuk was introduced for the development of 20 high schools, two middle schools, and two primary schools in Osun State, Nigeria, was intended to be funded by the NGN 60 billion issuance (Waziri & Doma, 2018). Likewise, the Federal Government of Nigeria (FGN) used a similar approach in 2017 by releasing NGN 100 billion in sukukijarah for 25 road infrastructure projects around the country which was later increased to 44 road projects (Investogist 2020). The NGN 105.9 billion oversubscriptions for the sukuk indicate the need and desire for sukuk among investors. The euphoria generated by the FGN's first sukuk issue led to three more issuances, totaling NGN612.5 billion across the

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four separate offerings. The governments of Gombe and Katsina both issued NGN 35 billion in Sukuk Al-ijarah, a sub-sovereign note, most recently. This indicates that the issue of sukuk through the Ijarah idea has the ability to propel the growth of Nigeria's infrastructure as well as the Islamic capital market industry (Alakija&Yahuza, 2024). The issuance of sukuk was facilitated by the Nigerian Debt Management Office (DMO) (Moses-Ashike, 2025). According to Moses-Ashike (2025), the DMO successfully raised a total of ₦1.092 trillion through sukuk bonds between September 2017 and December 2023. Figure 1 depict a sukuk structure in Nigeria.

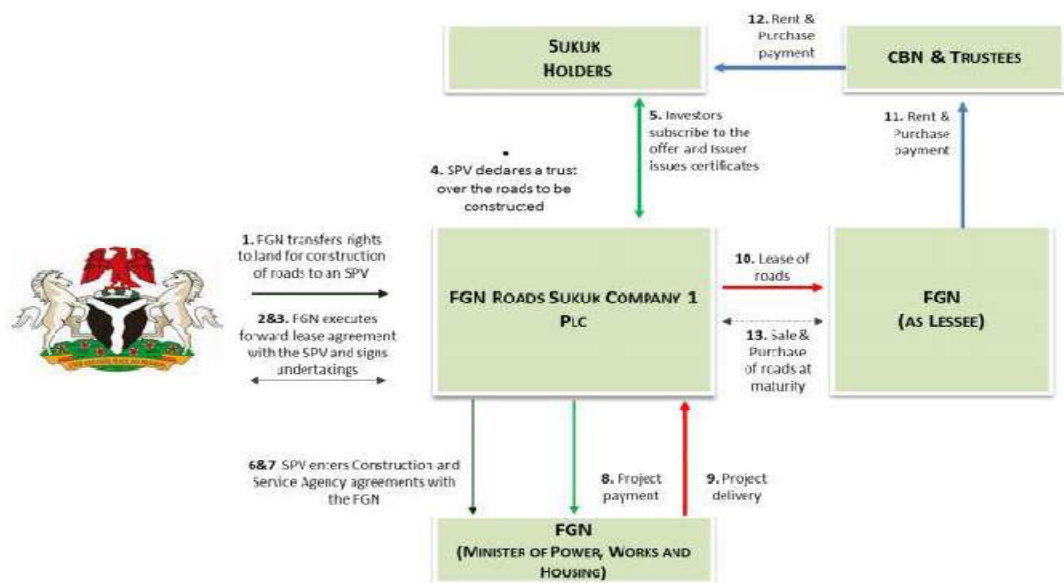


Figure 1: Structure of the FGN Sukuk Issuance (Salaudeen, 2021).

Despite this significant financial mobilization, empirical research on sukuk namely are Augustine, (2024), Abdelrahman, (2019), Abdullahi, (2018), Alakija and Yunusa, (2024), Ahmad et al., (2012), AmranI et al., (2017), Baita, (2019), Bala et al., (2022), Benhalim, (2016), Davis (2015), Islam et al., (2023), Jawad, (2019), Mohamed(2014), Ogbomo, (2018), Paltrinieri et al., (2020), Salaudeen, (2021), Sulaiman and Rabiu, (2023), Waziri and Doma, (2018), Yildirim et al., (2020), Yunusa(2019), Zulkhibri, (2015) among others but none found in the literature that really expounded and related the impact of sukuk bond on road transport infrastructural development in the North-Eastern Nigeria. Therefore, these have open space for empirical, contextual, and environmental gaps that warrant the conscious research of this nature.

The importance of road transport infrastructure for socio-economic and political development of any nation cannot be overemphasized (Aithor, 2024,

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Anikeze et al., 2024). This is even more essential for developing countries. Nigeria is a developing country with vast land mass of about 910,770 square kilometers or 356,668 square miles (World Bank, 2025). The country accordingly parades a total road network of about 195,000 kilometers, the construction and maintenance of which is the combined responsibility of federal, state and local governments (Infrastructure Concession Regulatory Commission, ICRC, 2017). About 135,000 kilometers out of the total road network remained un-tarred as at 2017 (Fashola, 2021). The proportion of federal roads out of the 135,000-kilometer network as at December 2022 was 36,000 kilometers. However, only about 30% are in perfect condition (Aina, 2022). Giving this background, the major objectives of the research is to Assess the Impact of Sukuk Bond on Road Transport Infrastructural Development in the North-East, Nigeria. While the research questions are:

RQ1: To what extent have sukuk bonds impacted road network completion and quality in North-Eastern Nigeria?

RQ2: What challenges have affected the implementation of sukuk-funded road projects in the North-Eastern region?

2. Literature Review

2.1 Conceptual Review

2.1.1 Sukuk Bond

The Arabic word "sukuk" basically means "certificates." It's known as "certificates of equivalent worth guaranteeing undivided shares in the possession of tangible assets, usufruct, and services or (in the ownership of) the assets of specific projects or special business activity" (Accounting and Auditing Organisation for Islamic Financial Institutions, 2008). Sukuk, also known as "Islamic bonds" (profit or fruit), are asset-backed trust certificates that prove possession of an asset. The payment of interest is prohibited in Sukuk securities that conform to Islamic commercial jurisprudence and investing principles (AAOIFI, 2008). In a traditional Sukuk arrangement, real estate is bought by a special-purpose corporation that was founded in a tax-neutral nation. The corporation uses sukuk to raise capital. Sukuk holders take on the hiring risk in return for a yield derived from the rental income of their assets. The word "Sukuk" describes bonds that comply with sharia and are issued by governments or companies as asset producers using special purpose vehicles (SPVs) to generate money on the open market. Consequently, the Sukuk of the originator may be secured or unsecured. Asset-backed sukuk are discussed in the second scenario, while asset-based sukuk are discussed in the first. Also, the sukuk holder is entitled to the return of the asset and has an undivided part in it (Amraini et al., 2017). Amraini et al. (2017) discuss various sukuk structures, namely:

1. **SukukIjarah:** a sukuk deal in which current assets, including real estate, machinery, aircraft, and ships, are sold and then released. Other tangible assets can likewise be structured using a master or sublease.
2. **SukukMudhara:** It is a financing arrangement that has legal ramifications and gives the originator actual ownership of the underlying asset. In contrast, holders of this type of sukuk can use their shares in cases of default. The investor provides financial support through the SPV handling the transaction, and the organizer lends their experience to make the project come to life. If there is a profit, it is distributed by the latter based on each person's portion; if there is a loss, the SPV passes the money only to the sukuk.
3. **SukukMusharaka:** This type of sukuk can be used by the originator or project donor and the sukuk holders to finance a project through a co-ownership arrangement. Both parties provide money. Each party contributes funds or in-kind materials to the project (such as land). The profit and loss shall be distributed by the SPV in accordance with each party's respective shares. A reserve account is included in this financing transaction to receive earnings on each day of detachment that exceeds the coupon value.
4. **SukukMubaraha** is a cost-plus-minus sukuk where payment is postponed and the asset is provided immediately. Islamic principles forbid interest payments, while sukuk bonds are meant to yield profits to moral investors. Furthermore, it denotes an ownership interest to be financed rather than a financial obligation. It is among the most significant tools in the quickly developing field of Islamic finance.

2.1.2 Road Transport Infrastructure

Infrastructure is a term that is essential for evaluating the state of a nation or region because it describes a network of interconnected structural elements that form the framework for a development's entire structure. National infrastructure includes roads, bridges, tunnels, water supplies, sewage systems, electrical grids, and telecommunications. According to Oreleye (2019), infrastructure also describes the physical components of networked systems that provide the products and services required to enable, preserve, or improve living circumstances in society. In addition to facilitating the movement of completed items to markets and vital social services like hospitals and schools, infrastructure promotes the production of goods and services (Oreleye, 2019). Transportation of passengers and cargo on roadways is referred to as road transport (Abdulkarim, 2020). A road is an improved or paved path that connects two locations and permits the passage of both powered and non-powered carriages. The traditional horse-drawn carriage combines maritime and terrestrial motion. Early forms of road transportation included the carrying of products across dirt roads, usually following natural routes, by horses, oxen,

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and even humans. Any country, regardless of its population, level of industry, or level of technological innovation, needs transportation. Strong economic and political ties between areas within a state are dependent on the movement of people and goods between them. Migration takes several forms depending on the location and advancements in technology, but the need is always there. The commodities that transportation moves create demand for it; transportation is only economically viable when the commodities are desirable (Abdulkarim et al., 2022a).

Comparing road transportation to other modes of transportation reveals a number of benefits. Road travel requires extremely less capital compared to other types of transportation like trains and airplanes. Road construction, operation, and maintenance are less expensive than railway operations and maintenance. In addition to providing door-to-door delivery of supplies and goods, road transportation also makes cartage, loading, and unloading incredibly affordable. When rail, water, or air transportation is not available, road travel may be the only means of transporting people and goods to and from remote locations. The only means of moving commodities between cities, towns, and small villages is by road. Routes and ports, which connect airports and train terminals, are essential to the growth of intermodal transportation (Abdulkarim et al., 2022a). Road travel is currently the most popular mode of transportation in Nigeria. Since road traffic makes up over 90% of the GDP (gross domestic product) of the sub-contribution sector, it is highly dependent on the trajectory of human settlement. Road transport operations include the movement of people in big or small groups, the transportation of animals, the delivery of goods to different parts of the country, and the provision of mobile institutions (banks, clinics, and libraries). In addition to the three applications mentioned above, the voluntary use of motor vehicles for leisure also makes a substantial contribution to the significance of road transportation in Nigeria. Due to the poor condition of other means of transportation that could have been utilized for travel and the psychological satisfaction that comes with having an automobile, which is more common in Nigeria. The overall length of roads in Nigeria is 193,200 km, of which 34,123 km are federal highways, 30,500 km are state government (sub-national) roads, and 129,577 km are local government roads (Federal Ministry of Finance, Budget, & National Planning, 2020). The road transport network was depicted in figure 2 below.

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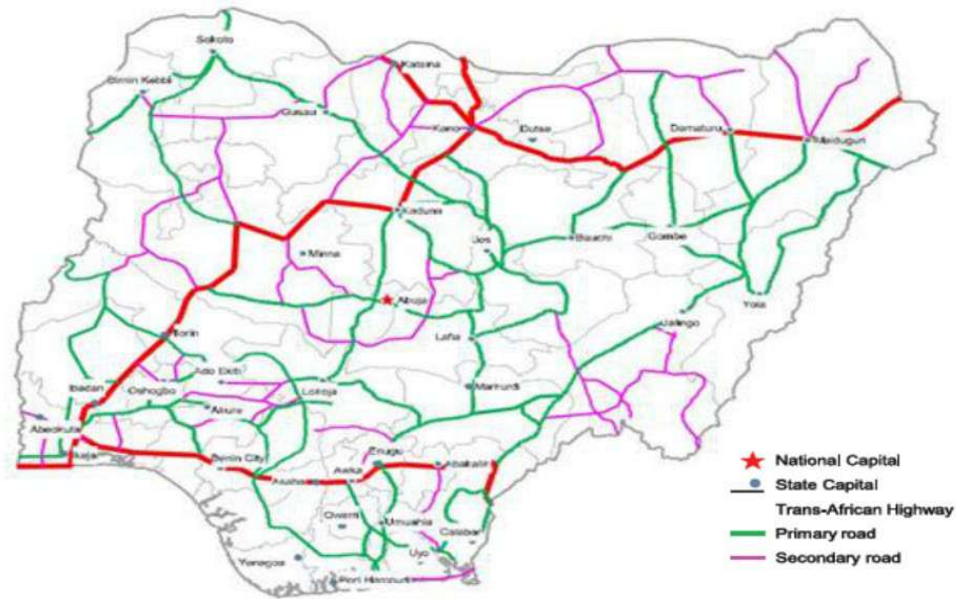


Figure 2: Roads Transport Network in Nigeria (Federal Ministry of Finance, Budget and National Planning, 2020).

2.2 Theoretical Review

The study is anchored on the economic theory of infrastructure and common management and the theory on infrastructure-led development.

2.2.1 Economic Theory of Infrastructure and Common Management

Frischmann (2005) popularized the economic theory of infrastructure and common management. A theoretical framework for examining how a nation's road network contributes to economic growth and development, as well as the ensuing social ramifications in developing countries, is provided by Frischmann's theory of infrastructure and common management. Frischmann maintained that granting the general public unrestricted access to infrastructure, such as a road system, would benefit society economically and bring about social change. Frischmann's economic theory of infrastructure examines how transport infrastructure, like a road network, might benefit the general public and has concentrated on the demand side of an economy. Value creation is the main tenet of this ideology. Frischmann suggests that providing the general public with unrestricted access to a road network can have a major positive impact on society. I, therefore, anticipated that granting the general

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public unrestricted access to a road network would have a substantial impact on economic development by raising the standard of living for the majority and bringing about social transformation, in accordance with Frischmann's economic theory of infrastructure and commons management (as cited in Agbigbe, 2016).

2.2.2 Theory on Infrastructure-Led Development

However, Horner et al. (2018) reported that infrastructure-led development highlights the durability of globalization, diversification of emerging marketplaces, and frontier economy. Currently, infrastructure-led development in Sub-Saharan African countries is motivated by worldwide growth with a partnership of development banks, multinational corporations, multilateral government institutions, and greater developed nations like China, Japan, and the United States of America. The theory views infrastructure as an engine for economic growth and development. Agenor (2010) claims that most emerging nations economic growth and development are hindered or limited by inadequate infrastructure, particularly the road system. The importance of large-scale infrastructure, including roads, bridges, telecommunications, airports, seaports, hospitals, schools, dams, and others, for a country's economic development is becoming increasingly widely acknowledged. Furthermore, according to the African Development Bank (AfDB) (2018), African states may become industrialized and become part of the global economy by investing in strategically placed infrastructure to support competitive sectors (as cited in Augustine, 2024).

2.3 Review of Empirical Studies

There is acute paucity of empirical studies on sukuk bonds and infrastructural development in Nigeria. This contrasts sharply with an avalanche of conceptual research works on the phenomenon. Among the accessed and reviewed studies in this paper was Adekoya (2024). The study examined the goals, benefits, challenges and risks factors of sukuk instrument for international finance in Sub-Saharan African countries. Using exploratory research design, the study concluded that sukuk has become an instrument of choice for real development in Sub-Saharan African, Muslim and Non-Muslim, countries. It recommends public enlightenment on the imperative of sukuk bonds for accelerated national and international development. Here is an affirmation of earlier findings that sukuk bonds has significantly impacted infrastructural development in Nigeria (Sulaiman&Rabiu, 2023), with potentials for sustainable development (Abdulkareem& Mahmud, 2019; Abubakar& Baba, 2020).

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Sulaiman and Rabi (2023) examined the impact of sukuk on infrastructural financing in Nigeria. It collected secondary data for eight years (2013-2021) from the Central Bank of Nigeria (CBN), Public Finance, and Debt Management Office. The collected data were analysed using Robust Least-Square Technique (RLST). Revenue from the issuance of sukuk bond and expenditure on infrastructure were proxies for the independent and dependent variables respectively. The study found that sukuk bond has statistically significant impact on infrastructural financing in Nigeria, and accordingly, recommended increased issuance of the bonds for enhanced capital expenditure. However, the extent to which such significant financing has impacted infrastructural development eludes the paper. Nonetheless, the finding aligns with prior conceptual submissions (Abubakar& Baba, 2020; Abdulkareem et al., 2021) that sukuk is a veritable infrastructural project financing instrument, and has even in its novel form, has incalculable impact on nation-building financing. Adekoya (2024) also later corroborated this finding.

Rahman et al. (2022) evaluated the potential of sukuk to finance economic infrastructure projects in Bangladesh. This work is essentially a conceptual paper to the extent that it adopted desktop methodology. Nonetheless, it concluded that sukuk has the potential of being a robust financial instrument for financing infrastructural projects. This position aligned with earlier ones (Abubakar& Baba, 2020; Abdulkareem et al., 2021), and later, empirically corroborated by Sulaiman and Rabi (2023) and Adekoya (2024).

Smaoui et al. (2021) examined the effect of sukuk bond market on infrastructural development in fifteen emerging countries. Adopting ex-post facto research approach, the study collected secondary data across the study area for thirteen years (1997-2018). The collected data were analysed using a combination of regression and generalized least square (GLS) tools. The study made a striking finding, which posits that a well-developed sukuk market contributes more to the expansion of infrastructure whereas a conventional banking system and better organized conventional capitalized stock market jeopardize infrastructure expansion. It is clear that these findings focus more on sukuk market than the instruments per se. There is no doubt that this is an affirmation of earlier findings (Oladunoye, 2014; Abdelkafi&Badoni, 2016; Baita& Mustapha, 2019; Yildirim et al., 2020) that sukuk offers a better alternative long-term financial vehicle for infrastructural financing and development.

Yildirim et al. (2020) examined the relationship between sukuk market and economic growth in countries that practice Islamic finance and banking system. Using ex-post facto research design, the study selected a sample size of nine countries, including Brunei, Indonesia, Jordan and Kuwait. Others

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were Nigeria, Saudi Arabia, Pakistan and Turkey. It is not clear which statistical data analytical tool was used. Nonetheless, findings revealed that there is a long-term co-integrated relationship between sukuk market development and economic growth. This implies that sukuk market development has a positive relationship with economic growth. The findings in Abdulkareem et al. (2021), and conceptual submissions of Hafsa and Oumaima (2021) and Smaoui et al. (2021) support this stand.

A thorough perusal of findings from the reviewed studies reveals three major findings: 1. Sukuk bond has significant impact on infrastructural development; 2. a developed sukuk bond market catalyzes infrastructural development whereas organized conventional capital market jeopardizes it; and 3. a positive relationship subsists between sukuk bond market development and economic growth. It is clear that these findings are generic, not sector specific. How does sukuk bond impacts road infrastructural development in particular, and especially north-eastern region of Nigeria? Here lies the research gap which this study seeks to close.

Table 1: Summary of Key Empirical Studies on Sukuk and Infrastructure

Study	Context	Methodology	Key Findings
Sulaiman&Rabiu (2023)	Nigeria	Quantitative (regression analysis)	Significant positive impact of sukuk on infrastructure financing
Rahman et al. (2022)	Bangladesh	Conceptual	Sukuk represents robust potential for infrastructure financing
Smoui et al. (2021)	Multiple countries	Panel data analysis	Developed sukuk markets accelerate infrastructure expansion; conventional stock markets may hinder it
Yildirim et al. (2020)	Multiple countries	Econometric analysis	Sukuk market development catalyzes economic growth
Sari et al. (2018)	Indonesia	Time series analysis	Islamic capital market development including sukuk positively impacts economic growth
Mohamed (2014)	Tunisia	Conceptual	Sukuk approach represents roadmap for economic development

3. Methodology

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For the purpose of this research, a mixed-mode research design, which espouses the use of both quantitative and qualitative sources of data, was adopted. Using multiple methods provides more reliability and validity than a single methodology approach. It is also complementary and easy to gain more understanding and interpretation (Abdulkarim, 2020). The use of both quantitative and qualitative methods is consistent with other studies (Sari et al., 2018; Abdulkarim et al., 2022). Secondary data (qualitative) for this study were sourced from the reviewing files obtained from the Nigerian Federal Ministries of Finance, Works and Transportation. Others were Debt Management Office, and Nigerian Security and Exchange Commission. To augment the investigation and close gaps in government records, studies from academic and research institutions and independent reports were also reviewed.

Moreover, semi-structured interview (qualitative) was conducted after using purposive sampling techniques to select the participants from the Nigeria's Federal Ministry of Work. Purposive sampling is appropriate when researchers seek information-rich cases with specific knowledge relevant to research questions (Patton, 2015). Four directors from different departments within the Federal Ministry of Works were selected based on the following criteria: (1) direct involvement with sukuk-funded road projects in North-Eastern Nigeria, (2) minimum of three years' experience in infrastructure project management, (3) willingness to participate and availability during the data collection period, and (4) diversity in departmental responsibilities to capture multiple perspectives (planning, implementation, monitoring, financing). While four participants may appear limited, qualitative research prioritizes depth over breadth, and saturation can be achieved with relatively small samples when participants possess rich, relevant knowledge (Guest et al., 2006). The four directors represented complementary perspectives across the project lifecycle, providing comprehensive institutional viewpoint. Prior to the interview session, an official appointment was requested through their respective secretaries and suitable date times are set for the interview. Every interview with each participant takes approximately 45 minutes which was recorded and transcribed into analysis.

Moreover, the population of the study for quantitative data are 240 registered members of National Union of Road Transport Workers (NURTW) North East, Zone, Nigeria. The study used Krejcie & Morgan (1970) Table to arrive at the sample size of 148. The Krejcie and Morgan table is widely accepted in social science research for determining statistically appropriate sample sizes that balance precision, confidence, and feasibility. For a population of 240, the table recommends a sample of 148 to achieve 95% confidence level with $\pm 5\%$ margin of error. With the help of research assistant, 148 structured questionnaires were administered to the Members of National Union of Road

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Transport Workers (NURTW) North East Zone (Bauchi, Gombe, and Borno State specifically), Nigeria who are operating and travelling across the North-East zone on daily basis. Out of 148 administered questionnaires, 110 were returned for the analysis which represents 73.8%. The qualitative data were analyzed using thematic analysis, and the quantitative data were analyzed using SPSS version 27.

4. Results and Discussion of Findings

4.1 Expert Interview Analysis

This section seeks to analyzed interviews data about the sukuk bond and it is impact on road transport in the region. Directors from different department of the Nigerian Federal Ministry of Work participated in the interview. 50% of the respondents are male while the remaining 50% are female. Table 3 present details of the participant. The results of the interviews are presented in this section along with a discussion on the state of road transport construction and rehabilitation in the North-East Nigeria.

Table 3: Details of the Participants

S/N	Gender	Respondents	Position
1	Male	Participant A	Director
2	Female	Participant B	Director
3	Male	Participant C	Director
4	Female	Participant D	Assistant Director

The gender balance in interview participants (50% male, 50% female) ensured diverse perspectives, though it should be noted this does not reflect the overall gender distribution in the ministry’s senior management.

Theme 1: Strategic Project Selection Criteria

Participants described a systematic, multi-criteria approach to selecting road projects for sukuk funding allocation. Economic significance emerged as the primary criterion, with priority given to roads connecting major economic centers and facilitating regional trade.

“Roads like the Kano-Maiduguri roads, which link the region with the rest of the country, were given priority by the ministry since they are essential for both regional connectivity and national economic development. The Ibi Bridge similarly links the area to Nigeria’s North Central zone, creating crucial inter-regional connectivity.” (Participant A)

Beyond economic factors, regional connectivity considerations ensured that sukuk funding addressed critical gaps in the national road network rather than

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focusing solely on high-traffic urban corridors. The principle of completing stalled projects also guided selection, as Participant C explained:

“The ministry prioritized unfinished projects that had already been awarded but had stagnated because of lack of funding. Some of these projects had been abandoned for years, with contractors demobilized and communities losing hope. Sukuk provided an opportunity to resurrect these critical projects.” (Participant C)

Social impact factors, while secondary to economic considerations, influenced final selection decisions. Participant B noted:

“The routes that increase access to healthcare and education facilities, which promote social cohesion in the area, were among the social impact factors considered during the selection process. In conflict-affected regions, infrastructure that brings communities together has peace-building dimensions beyond just transportation.” (Participant B)

The multi-criteria approach reflects infrastructure planning best practices, balancing economic efficiency with equity and social development objectives. The emphasis on completing stalled projects specifically addresses a chronic problem in Nigerian infrastructure development where projects languish partially completed due to funding interruptions.

Theme 2: Distinctive Advantages of Sukuk Financing

Participants identified several advantages of sukuk bonds compared to conventional budget allocations and traditional debt instruments. The most frequently emphasized advantage was guaranteed, ring-fenced funding.

“The assurance of finance for road construction is one of Sukuk’s most significant advantages. Sukuk funds are allocated exclusively to the pre-identified road projects, which cannot be changed or transferred to another sector. This is in contrast to regular budgetary allocations, which are ineffective at funding projects and subject to virements (budget reallocations). Once sukuk funds are raised, they must be used for the specified roads” (Participant D)

This ring-fencing characteristic addresses a fundamental weakness in conventional budgeting where infrastructure allocations are often diverted to other priorities or reduced mid-year due to revenue shortfalls. The legally binding nature of sukuk structures protects infrastructure funding from competing claims.

Participants also highlighted sukuk’s role in capital market deepening and attracting new investor categories:

“It acts as a catalyst for new investors as well. It deepens the capital market by drawing in untapped Islamic and ethical finance funds. Many

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investors who were previously unable to invest in government securities due to religious concerns or ethical investment policies can now participate through sukuk. This expands the investor base beyond conventional channels.” (Participant B)

The transparency and accountability dimensions of sukuk financing were also emphasized:

“Sukuk bonds improve public trust, accountability, and openness. The public’s faith in government funding is increased because they can practically see the results of their investment. When you issue a sukuk for a specific road, people can go and see that road being constructed. This visibility creates a different dynamic than general borrowing where citizens cannot track where funds actually went” (Participant A)

These advantages align with theoretical expectations from Islamic finance literature regarding asset-backing and transparency. The visibility of sukuk-funded infrastructure may contribute to greater public support for government financing activities, an important political economy consideration.

Theme 3: Measurable Infrastructure Impact

All participants affirmed substantial positive impact from sukuk-funded road projects, supported by specific completion data. Participant C provided detailed assessment:

“The introduction of Sukuk Bond Initiatives for road construction and rehabilitation in the region has made tremendous impact, as many roads are completed while several are in different phases of completion. The sukuk funds are released timely to contractors and are strictly for the intended purposes, unlike conventional budgetary allocations. These roads are critical to supplying goods and services to other geopolitical zones of the country.” (Participant C)

Table 4 presents completion status for major sukuk-funded projects in North-Eastern Nigeria as reported by participants and verified through project documentation.

Table 4 Road Transport Infrastructures that were under Constructions and Rehabilitation by Sukuk Bond with their Level of Completion

S/N	Title of The Project	Level of Completion
1	Dualization of Kano-Maiduguri Section II: (Shuarin-Azare) in Jigawa/Bauchi State	100%
2	Dualization of Kano-Maiduguri Section III: (Azare-Potiskum) in Bauchi/Yobe State	100%
3	Dualization of Kano-Maiduguri Section IV: (Potiskum-Damaturum)	98%

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4	Dualization of Kano-Maiduguri Section (Damaturum-Maiduguri) in Borno/Yobe State	V: 68%
5	Reconstructions of Mayo Belwa-Jada-Ganye in Adamawa State	74.78%
6	Construction of Ibi Bridge in Taraba State	36.53%
7	Rehabilitation of Nguru-Gashuwa-Bayamari roads in Yobe State	59.30%

Table 4 above lists roads and bridges that have been finished or at various level of completions due to Sukuk Bond Initiatives.

Participants emphasized the significance of completing Sections II and III of the Kano-Maiduguri Road, which had been awarded in 2006 with expected delivery in 2010 but remained uncompleted due to funding constraints until sukuk intervention:

“Sections II and III had been awarded since 2006 and were anticipated to be delivered in 2010 but this was not achieved due to financial constraints. For over a decade, these sections remained partially completed, creating dangerous conditions for road users and bottlenecks for regional commerce. Sukuk funding finally enabled completion in 2019.” (Participant B)

Beyond completion statistics, participants identified broader developmental impacts including employment generation, improved access to services, reduced travel time, enhanced safety, and economic opportunities for roadside communities:

“Some of the reports we get from Federal Road Safety Corps show that the accident rate in completed sections of the highway has drastically reduced. Highways are essential to Nigeria’s economic development because they connect the nation’s various regions, link farmers to markets, and connect remote residents to essential social services like healthcare and education” (Participant A)

The Ibi Bridge project, though only 36.53% complete at the time of data collection, represented a particularly notable success story according to participants:

“The Ibi Bridge in Taraba State had been abandoned for nearly forty years due to lack of funding. Communities on both sides of the river had given up hope of ever seeing it completed. Sukuk intervention brought contractors back to the site for the first time in decades. Even partial completion represents transformative progress for that area.” (Participant C)

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These qualitative accounts provide rich contextual understanding of the quantitative completion data, illustrating how even partially completed projects represent significant achievements given decades of neglect.

Theme 4: Implementation Challenges and Mitigation Strategies

Despite overall positive assessment, participants candidly discussed significant challenges encountered during project implementation. Security concerns dominated these discussions:

“The activities of ISWAP and Boko Haram terrorists are the major challenges that affected the completion of many roads in the region. In order to avoid areas with the most severe ongoing insurgency, the ministry had to select projects where we could deploy contractors in a reasonable manner and make quantifiable progress despite security obstacles” (Participant D)

Security challenges imposed both direct and indirect costs on project implementation:

“In order to provide workers with escorts and secure perimeters, the ministry had to liaise with security authorities. Projects become costlier as a result of the necessity to set aside a sizeable amount of the budget for personnel and equipment security. Sometimes contractors had to suspend work entirely when security situations deteriorated, leading to timeline delays.” (Participant C)

This security dimension distinguishes infrastructure development in North-Eastern Nigeria from other regions and helps explain why some projects achieved lower completion rates despite adequate funding.

Other implementation challenges mentioned included:

- Contractor capacity limitations in remote areas
- Supply chain disruptions for construction materials
- Seasonal weather impacts during rainy seasons
- Community relations and land acquisition issues
- Coordination among multiple government agencies

Participants described various mitigation strategies employed, including enhanced security coordination, flexible project scheduling to accommodate security and weather constraints, contractor capacity building, and community engagement initiatives to build local support for projects.

The candid acknowledgment of challenges and adaptive responses demonstrates pragmatic implementation approach rather than ignoring difficulties. This realistic perspective enhances credibility of participants' overall positive assessment of sukuk impact.

4.2 Analysis of the Questionnaires

These sections discuss the findings from the results obtained from the questionnaire survey which has been described based on each construct.

Table 5 Demographic Profiles of the Respondents

Profiles	Option	Frequency	Percentages
Gender	Male	11	10
	Female	99	90
Age	Less than 18yrs	1	0.9
	19-29yrs	32	29.1
	30-39yrs	56	50.9
	More than 40yrs	21	19.1
Educational Level	Secondary	56	50.9
	Certificate	18	16.4
	National Diploma	36	32.7
	B.Sc. Degree		
Frequency of Using the road	Everyday	46	41.8
	Once a Week	23	20.9
	Twice a Week	23	20.9
	Once a Month	18	16.4

The demographic profiles of the respondents are shown in Table 5 above. Considering the table, there are 99 respondents who are male, representing 90%, while female respondents are 11, representing 10%. The gender imbalance is as a result of norms and values of the most people of North-East Nigeria which didn't allow the female to drive public car like being a member of NURTW. Also, concerning the age, the majority of the respondents are in the age range between 30-39 years, with 56 respondents representing 50.9%. The second group is those within the range of 19-29 years, with 32 respondents representing 29.1%. With 21 responders or 19.1% of the total, the third category consists of those over 40 years. This shows that the majority of the respondents come from the active population. As regards to their level of education, the majority of the respondents have secondary certificates, with 56 respondents representing 50.9%. Those with National Diploma came in second with 36 responses, or 32.7%. B.Sc. degree holders are the last group, with 18 respondents representing 16.4%. As regards the frequency of using the roads, the majority of the respondents used the roads every day, with 46 respondents representing 41.8%. It follows that those who used it once a week and twice a week were 23 respondents (each), representing 20.9%, respectively. The last group is those who ply the roads once a month, with 18 respondents representing 16.2%.

Table 6: Descriptive Statistics of the Variables

Items of Variables	Observation	Minimum	maximum	Mean	Std. Deviation
SIJ1	110	1	5	3.636	1.126
SIJ2	110	1	5	3.291	1.224
SIJ3	110	1	5	3.709	1.155
SIJ4	110	1	5	3.636	1.059
SIJ5	110	1	5	3.427	1.179
IFR1	110	1	5	3.736	0.988
IFR2	110	1	5	3.682	0.972
IFR3	110	1	5	3.782	1.021
IFR4	110	1	5	3.755	1.063
IFR5	110	1	5	3.991	1.083
RQ1	110	1	5	3.736	1.157
RQ2	110	1	5	3.764	1.144
RQ3	110	1	5	3.518	1.312
RQ4	110	1	5	3.668	1.130
RQ5	110	1	5	3.573	1.057

Based on the results in table 6 above, the majority of the respondents agreed that infrastructures and road quality have improve after sukuk intervention as shown by the means range 3.182 to 3.991. Thus, based on the rule of thumb by Goodhue et al., (2012), a mean value of ≥ 3.0 in a five-point scale is acceptable. Thus, the result indicates that the respondents to this study have averagely agreed that sukuk bond impacted road transport infrastructural development in the North-East Nigeria.

4.3 Regression Analysis

Multiple linear regression analysis was conducted to examine the relationship between sukuk bond financing and road transport infrastructure development outcomes. Two dependent variables were examined: Infrastructure Quality (IFR) and Road Network Quality (RQ). Independent variables comprised the individual items from the SukukIjarah Financing construct (SIJ1-SIJ5), Infrastructure Quality items (IFR1-IFR5), and Road Network Quality items (RQ1-RQ5).

Table 7 presents the regression results examining predictors of overall road infrastructure development outcomes.

Table 7: Regression Analysis of SukukIjarah on Road Transport Infrastructure

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Variable	Unstandardized Coefficient (B)	Standardized Coefficient (β)	t-Value	p-Value	Significance
SIJ1	-0.030	-0.034	-0.369	0.713	NS
SIJ2	0.176	0.221	2.495	0.014	
SIJ3	0.167	0.199	2.163	0.033	
SIJ4	0.101	0.111	0.988	0.326	NS
SIJ5	0.253	0.306	2.835	0.006	
IFR1	0.278	0.323	2.470	0.015	
IFR2	0.194	0.237	2.101	0.038	
IFR3	0.197	0.221	1.706	0.091	NS
IFR4	0.016	0.018	0.174	0.862	NS
IFR5	0.363	0.384	3.111	0.002	
RQ1	0.218	0.217	2.089	0.039	
RQ2	0.229	0.236	2.263	0.026	
RQ3	0.278	0.245	2.052	0.043	
RQ4	0.133	0.139	1.435	0.154	NS
RQ5	0.334	0.361	3.178	0.002	

Note: NS = Not Significant; = Significant at $p < 0.05$; = Significant at $p < 0.01$

Model Statistics: $R^2 = 0.647$; Adjusted $R^2 = 0.591$; F-statistic = 11.573 ($p < 0.001$)

The regression model explains 64.7% of variance in road infrastructure development outcomes ($R^2=0.647$), with an adjusted R^2 of 0.591 accounting for the number of predictors. The overall model is statistically significant ($F=11.573$, $p < 0.001$), indicating that the set of predictors collectively explains significant variance in infrastructure outcomes.

Examining individual predictors, the results show mixed patterns. Among SukukIjarah Financing indicators:

- **SIJ2** shows a significant positive relationship ($\beta=0.221$, $p=0.014$)
- **SIJ3** shows a significant positive relationship ($\beta=0.199$, $p=0.033$)
- **SIJ5** shows a highly significant positive relationship ($\beta=0.306$, $p=0.006$)

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- **SIJ1** shows a negative but non-significant relationship ($\beta=-0.034$, $p=0.713$)
- **SIJ4** shows a positive but non-significant relationship ($\beta=0.111$, $p=0.326$)

The significant positive coefficients for SIJ2, SIJ3, and SIJ5 support the hypothesis that certain aspects of sukuk financing positively impact road infrastructure development. However, the non-significant results for SIJ1 and SIJ4 suggest that not all dimensions of sukuk financing equally predict infrastructure outcomes, or that their effects are mediated by other factors not captured in the model. Among Infrastructure Quality indicators, IFR1, IFR2, and particularly IFR5 show significant positive relationships, while IFR3 and IFR4 are non-significant. Similarly, among Road Network Quality indicators, RQ1, RQ2, RQ3, and RQ5 demonstrate significant positive relationships, while RQ4 does not.

These mixed results partially support Hypothesis 1 (sukuk bond financing has a significant positive effect on road construction and rehabilitation) and Hypothesis 2 (sukuk bond financing has a significant positive effect on road infrastructure quality). The evidence indicates positive effects but not uniformly across all measured dimensions. The regression findings align with interview data showing that while sukuk funding has generated substantial positive impact, implementation challenges and varying completion levels across projects create heterogeneous outcomes. Some road segments experienced transformative improvements (reflected in highly significant predictors), while others showed modest or delayed improvements (reflected in non-significant predictors).

5. Conclusion and Recommendations

Conclusively, the Sukuk bond is a commendable initiative by the Federal Government of Nigeria under the Debt Management Office and the Nigerian Security and Exchange Commission, which emerges as a new financing model that provides necessary funding for the construction and rehabilitation of road transport infrastructures across Nigeria. Although still in its infancy, the federal government, state governments, business individuals, and others have issued Sukuk bonds during the past ten years in an attempt to fill in the nation's infrastructure deficiencies, particularly with regard to road infrastructure. Sukuk bonds have generated substantial positive impact on road infrastructure in North-Eastern Nigeria. The Federal Government's investment of NGN 612 billion (USD 1.526 billion) through sukuk issuances resulted in completion of 1,862 kilometers of roads, including full completion of major segments like Kano-Maiduguri Road Sections II and III and significant progress on other projects reaching 68-98% completion. Also, the stakeholder perspectives converge on overall positive impact but diverge on magnitude,

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with ministry officials emphasizing transformative achievements, while transport workers offer more tempered assessments reflecting ground-level experiences. Both perspectives provide valid insights from different vantage points. Moreover, the implementation faces significant challenges in conflict-affected contexts, particularly security concerns from Boko Haram and ISWAP insurgencies requiring additional security expenditures, work stoppages, and strategic project location decisions. These challenges explain differential completion rates across projects and moderate user perceptions despite substantial overall progress.

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