Infrastructure Deficit in Africa: Islamic Finance as a Gap-filler[1]

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Abstract

The African continent has been bedeviled by an acute infrastructure deficit; and coupled with widening fiscal deficits occasioned by both internal and external shocks, the need for private sector participation in mitigating the infrastructure gap is paramount. Amidst other competing financing models, Islamic finance instruments, Sukuk, have been widely applied globally in providing socioeconomic and sustainable infrastructure. Accordingly, this study assesses the catalytic role of Islamic finance in alleviating the wide infrastructure deficit in Africa. The study covers a total of five countries: Egypt, Kenya, Morocco, Nigeria, and Saudi Arabia, and utilizes survey research, a total of 414 sample data, and SmartPLS Structural Equation Modelling (SEM) techniques in its analyses. Major findings show that tweaking the internal legal and regulatory requirements provides the necessary environment for Islamic finance to thrive. Also, deducing from the Keynesian investment multiplier, Sukuk (Islamic bond) and sustainable Sukuk (green) were found to exert modest multiplier effects of 1.61 and 1.59, respectively, for any $1.00 change in Sukuk investment. In addition, threats to global peace, energy, and commodity prices, low-interest regimes in developed countries, and huge infrastructure deficit in the African continent are among the factors driving Islamic finance in the continent, and globally. Thus, filling the infrastructure gap requires concerted efforts by various African governments towards using Sukuk as a viable instrument in the continent.

Keywords: Infrastructure, Islamic finance, deficit, *Sukuk*, PPP

JEL Classification: E43, G12, G13, F3, P4

1.0 INTRODUCTION

The link between infrastructure and economic growth has received tremendous attention in the literature in the context of market failure in the provision of public goods that generate positive externalities. The exogenous growth models dominated the literature space from [1], [2], [3], and [4], and together with the new economic geography, the literature posits that infrastructure improvement reduces production costs, expands markets, and allows the implementation of innovations that do not become cost-effective until a certain production scale is reached [5]. The endogenous growth theory further sheds light on the importance of complementary investments, and public infrastructure–social overhead capital (SOC), in

[1] The author is grateful to the African Export-Import Bank (Afreximbank) for fully funding the research under its 2022 Sabbatical Fellowship Programme. Other research papers are *'Islamic Finance and Promotion of Trade Finance in the African Continental Free Trade Area (AFCFTA): An Exploratory Study', 'Intra-African Trade and Macroeconomic Performance of Africa: Implications for the African Continental Free Trade Area (AfCFTA)', and 'Migration and Youth Unemployment in Africa: Implications for the African Continental Free Trade Area (AfCFTA)',* accomplished within the 2022 Fellowship Programme.

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increasing returns to scale and a permanent source of continued long-term growth [6], [4], [7], [8], [9], and [10], and knowledge and skills [11].

Good infrastructure impacts growth directly through an increase in total factor productivity (henceforth TFP) as it enters production as an input, and indirectly, it raises TFP by reducing transaction and other costs and allowing more efficient use of conventional productive inputs [12]. Therefore, public infrastructure investment boosts the productivity of private capital and labor, as public capital is a complement to private capital, leading to higher output. However, this positive effect can be offset, after a certain threshold of capital accumulation, the complementarity between infrastructure capital and non-infrastructure physical capital, and eventually crowds out private investment [13], [14] and (Zhang & Sun, 2019) or when the investment is financed with additional government borrowing [15]. Nonetheless, infrastructure can still influence the type of production technology to be adopted [16] and contribute to economic growth by stimulating the marginal productivity of capital (physical and human capital) and labor [5]. Further, [17] buttresses that infrastructure affects productivity and output directly as part of GDP formation and as an input to the production of other sectors.

The importance of infrastructure cannot be overemphasized, better quality, well-run, and well-financed infrastructure sector is essential to increasing sustainable economic growth and reducing poverty and inequality [18], [19], [20], [21], [22], [23], [24], [25], [26] & [20]. Infrastructure projects promote high economic and social returns and hence can improve people's welfare [27] & [28]. Fostering technological innovation and sustainable industrialization [29]. On the contrary, inadequate, and poor-quality infrastructure not only holds back economic activity but also considerably reduces the quality of life [30], hampers country investment [31], and leads to the collapse of the social sector [32]. Yet, in many developing countries, wide gaps in the quantity of infrastructure per capita subsist. For instance, the power generation capacity per person in these countries is only one-fifth that of advanced economies.

Infrastructure provision is the government's responsibility [33]. However, due to the huge funds required coupled with an upsurge in demand as well as increasing public debt and interest payments [34], [35], [36] & [37], infrastructure provision should be supplemented with the capital provided by the private sector [38]. Reliance on public budgets to finance infrastructure is no longer sustainable [39]. Consequently, policymakers seek alternative innovative solutions [40], for financing the development of infrastructure [23], including the public sector and private sector arrangements [24].

Infrastructure deficit poses a significant challenge to development, especially in developing countries [41], [42], [43], [44] & [45]. The global infrastructure gap is large: 940 million individuals are without electricity, 663 million lack improved sources of drinking water, 2.4 billion lack improved sanitation facilities, 1 billion live more than 2 kilometers away from an all-season road, and uncounted numbers are unable to access work and educational opportunities due to the absence or high cost of transport services [46]. In Asia, for instance, it is estimated that funding of USD 8.3 trillion is required until 2020 for infrastructure projects and up to $26 trillion from 2016 to 2030, or $1.7 trillion per year if the region is to

maintain its growth momentum, eradicate poverty, and respond to climate change [47]. In the Middle East, funding requirements are estimated to be USD 2 trillion over the same period [48].

Similarly, Africa equally has a vast infrastructure gap. Evidence shows that the continent's infrastructure financing gap is in the range of $68 and $108 billion [49], [50] & [51], or an estimated amount of $45.5 billion annually until 2040 [52]. In another development, over two-thirds of the global population without power is in Sub-Saharan Africa, and electricity consumption per person in Ethiopia, Kenya, and Nigeria is less than one-tenth that of the BRICS countries [53]. The World Bank estimates show that the Sub-Saharan Africa region needs to invest approximately 7.1 percent of GDP each year in infrastructure if it is to meet its Sustainable Development Goals. However, investment is currently running at around 3.5 percent of GDP. Equally, infrastructure investments in Africa have not kept pace with growth in demand, creating a huge deficit as less than 45% of the continent's population has access to electricity, less than half of the rural population has access to an all-season road and only 5% of agriculture is under irrigation [54].

The Public-Private Partnership (henceforth PPP) financing of infrastructure projects provides a latitude to reduce the overall cost and burden of project finance on the public sector as well as help to attract commercial or private sector finance ([55]; [38]; [56]; & [24]). PPPs offer solutions to increase investments and efficiencies in public infrastructure as they leverage private innovation and capital to provide public services more efficiently [57]. It could also play a complementary role in financing infrastructure investments in African countries. However, [57] laments that PPP flow in Africa has been limited, with PPP projects in Sub-Saharan Africa making up only 5% of the total PPP investment globally during the ten years to 2019. Besides, the PPP market in Africa is skewed to a few countries and sectors. The challenge of identifying, developing, structuring, and bringing bankable PPPs to the market and the complexities of PPP also hamper the growth of PPP projects in Africa [57]. Notwithstanding, the AfDB was actively involved in the most transformative and pioneering PPP projects in Africa, such as the Dakar Toll Highway, Dakar Container Terminal in Senegal, the AES SONEL, Dibamba and Kribi Power Projects in Cameron, and the Lake Turkana Wind Power Project in Kenya.

Notwithstanding the headways recorded under the PPP arrangements, an alternative infrastructure financing arrangement has emerged as studies on sub-Saharan Africa (SSA) point to the serious need for financing infrastructure to foster development in the region ([51]; [58]; [56]; [59]). For instance, [60] argues that Sukuk are sought-after instruments for financing the African infrastructure gap. Also, the huge infrastructure deficits in the SSA can be financed by issuing Sukuk which will be readily subscribed by investors in the Middle East, and Southeast Asia, particularly Malaysia and Indonesia ([61]; [62], [63]; [34]). Accordingly, numerous emerging and frontier economies are paving the way for the enlargement of the Sukuk market through appropriate regulations [64]. It has been argued that Sukuk bring a lot of economic advantages to issuer countries which include industrial and infrastructural development [58]. Evidence shows that sovereign Sukuk issues represent about three-fifths, equivalent to 60 percent, of the global Sukuk in 2018 [34], and more

recently, 58.6 percent in 2021 [65]. Sukuk is not only capable of promoting growth and mitigating sustainability issues but attaining the SDG-9, which is on sustainable development; infrastructure, industrialization, and innovation [25].

Against this background, this study seeks to review the level of infrastructure gap in Africa and unveil the bridging role Islamic finance could play in filling the gap. The analysis is expected to guide policymakers in terms of the legal regime needed for the operations of Islamic finance, the instruments used in financing infrastructure and sustainable development, and the prospects and challenges of the adoption of Islamic finance for infrastructure finance and sustainable development. both qualitative and quantitative tools of data collection and analysis are employed in keeping with the trends in the literature. The study is presented in six broad sections. Section one dwells on the background of the research, introduction, research objectives, and research hypotheses. Section two contains a review of theoretical and empirical issues from both conventional infrastructure finance and Islamic finance perspectives. An analysis of stylized facts and trends trails in section three and a presentation of the study's research methodology subsequently in section four. Section five presents empirical results and conducts analysis and interpretations. Section six contains the research summary, conclusions, and policy recommendations.

1.2 Research Aim and Objectives

The broad aim of the study is to assess the catalytic role of Islamic finance in filling the infrastructure gap in Africa. This is pursued based on a sample of selected countries within and outside the continent comprising Egypt, Kenya, Morocco, Nigeria, and Saudi Arabia. The specific objectives are:

i) Assess the level of infrastructure performance in the African continent.
ii) Assess the adaptability of the unique Islamic legal (*Shari'ah*) regime necessary for deploying the infrastructure finance in Africa.
iii) Review the global trends of Islamic infrastructure finance.
iv) Assess the catalytic role of Islamic finance in filling the infrastructure gap in the African continent.
v) Investigate how sustainable (green) Islamic finance could boost infrastructure development in Africa.
vi) Identify factors that are likely to impede infrastructure development using Islamic finance instruments; and
vii) Leverage on country experiences to identify prospects for mitigating infrastructure deficit using Islamic finance instruments in Africa.

1.3 Research Hypotheses

The study seeks to test the following research hypotheses which are stated in non-affirmative form, that is, the null hypothesis.

i) The level of infrastructure gap in the African continent is insignificant.

ii) The Islamic legal (Shari'ah) regime, a core requirement for deploying infrastructure finance in Africa is rigid and unadaptable.
iii) The global trend of Islamic infrastructure finance is not robust.
iv) The use of Islamic finance is unlikely to fill the infrastructure gap in the African continent.
v) Sustainable (Green) Islamic finance is unlikely to boost infrastructure in Africa.
vi) Application of Islamic infrastructure financing in the African continent is unlikely to be inhibited by any factor.
vii) Islamic finance portends no prospects for infrastructure development in Africa.

2. LITERATURE REVIEW

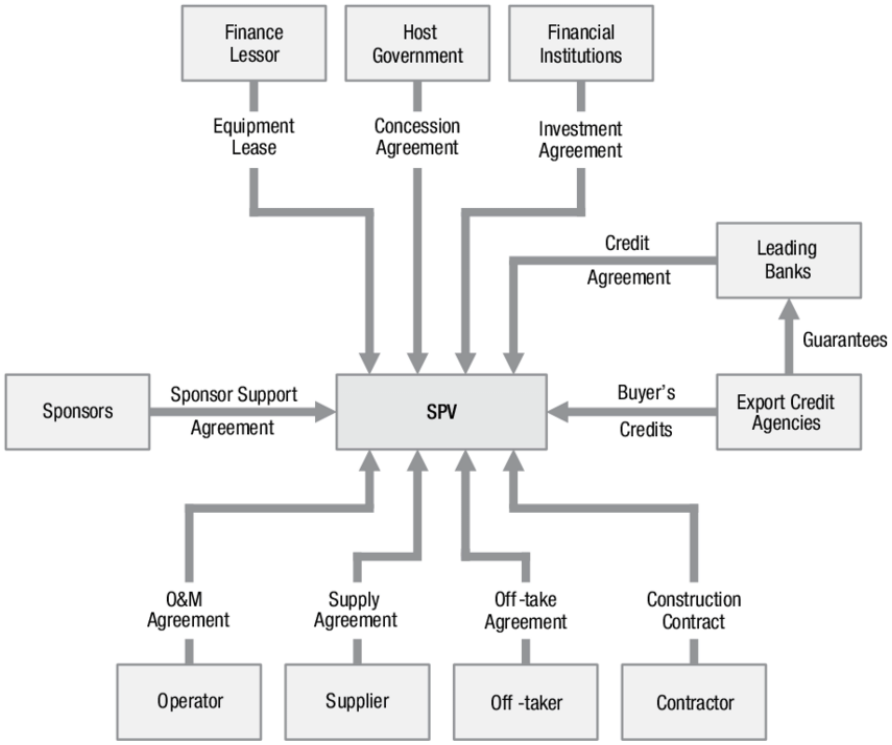
2.1 Theoretical Issues on Infrastructure Financing

The case on why infrastructure has been established in the literature: reduction in production costs, market expansion, fostering innovations and economies of scale, promoting long-term economic growth, sustainable development, and generating social returns ([5], [9], [10], [12], [16], [20], [51]). Conversely, the lack of it slows down economic activity, hampers country investment substantially reduces the quality of life, and leads to the collapse of the social sector ([44]; [45]; [46]).

The theory provides the how of infrastructure development. Infrastructure refers to the basic physical and organizational structures and facilities such as buildings, roads, power supplies, etc., ([66], [67], [68], [69]), that are needed for the operation of a society or an enterprise. The two main types are the hard infrastructure, that is, the physical components that support daily life–such as electrical grids, roads, bridges, and highway systems, and soft infrastructure which refers to human capital–social and economic components such as health-care facilities, education, telecommunications, water supply, sanitation, sewage disposal, health, and financial institutions, directly impact citizens' quality of life [70] [71]. Infrastructure or project financing requires organized funding mobilized from investors either by utilizing debt or equity through a special purpose vehicle (SPV). Invariably, a Public-Private Partnership (PPP) project is constructed through a 'Special Purpose Vehicle' (SPV), acting as a managing and operating company for project(s) as well as the legal body that guarantees concessions from the public authority [27]. Equally, SPV owns and operates the facility/project and collects revenue which is used to repay the financial and investment costs [72], [73].

Often, infrastructure projects are paid back from the revenues (cash flow) generated by the project, taxes, debt, or equities through SPV. Figure 1.1 depicts the interrelationship between SPV and various parties in a project. Although most of the boxes in the diagram are self-explanatory, the most common agreements surrounding SPV are the loan agreement, off-take or purchase agreement, supply agreement, concession agreement, O&M agreement, Engineering Procurement-Construction (EPC) agreement, and sponsor's support agreement as shown in the Figure. Participation of Multi-lateral Development Banks (MDBs) and Export Credit Agencies (ECAs) in PPP projects has some specific roles. No doubt, SPV's ability to mitigate risks is a great incentive for many offshore and domestic banks'

willingness to participate in a project. Equally, ECAs are also popular stakeholders in the financing of PPP projects as they offer finance, insurance, and guarantee repayment of commercial lender financing in case of political risk and/or commercial risk [27], [74]).



Adopted from: [75]. Project Finance: The guide to financing the build-operate-transfer project. Euromoney Publication PLC, Hong Kong.

Figure 1.1: SPV Relationships/Agreements with Various Parties

The rest of the section dwells on a review of the empirical literature on infrastructure financing from both conventional and Islamic perspectives. Stylized facts are also presented at the two levels: a review of stylized facts on Africa's infrastructure performance and stylized facts on Islamic infrastructure financing.

2.2 Empirical Studies Based on Conventional Perspective

A study by [76] applies a simultaneous equations approach to assess the impact of transportation infrastructure, and knowledge infrastructure, on industrial geography, regional income disparities, and growth across 286 cities in China. The investigation found that an improvement in transportation infrastructure that eases trade costs on goods raises economic growth and lowers the income gap albeit, at the expense of increasing industrial accumulation between cities. Accordingly, this confirms the existence of a trade-off between spatial equity (more even spatial distribution of economic activities) and spatial efficiency (higher growth rate). On the other hand, knowledge infrastructure which reduces trade costs on ideas intensifies growth and lowers income gap and industrial agglomeration as well. Further, the impact of knowledge infrastructure is found to be larger in the case of high labor mobility.

[77] observes that energy poverty afflicts nearly 620 million people in Africa, limiting economic opportunities and creating health risks using low-cost, alternative energy sources, such as wood fuel according to the report by the IEA, 2014. Africa's energy infrastructure, for instance, needs a staggering amount of around $63 billion in 2013. Their paper analyzes the trends, strengths, and weaknesses of various sources of energy infrastructure financing in Africa, including domestic public investment, PPI, ODF, and Chinese financing. The paper contends that major obstacles to infrastructure financing in Africa include lack of project feasibility, country/political risk, profitability, and the legal/regulatory environment. The paper posits that governments could leverage increasing tax revenues which though may not be sufficient, and access funds from the international capital markets through international sovereign bond issuances. But, as global financial conditions tighten, borrowing costs rise. Thus, domestic capital markets, pension funds, and other relatively untapped financing mechanisms, including diaspora bonds and Islamic financial instruments (such as Sukuk) present other viable options. Equally, to scale up infrastructure in the continent, development banks could attract co-financing from bilateral and multilateral partners as well as dedicated private investors, the paper adds. See Appendix I on the distinction between Sukuk and conventional bonds.

[56] posit that infrastructure is direly needed in sub-Saharan Africa to reclaim its pre-global financial crisis growth and productivity momentum. Given an emerging consensus in the empirical literature which postulates that an adequate supply of infrastructure can help foster growth in the region. Accordingly, the paper develops a scorecard on infrastructure development in Sub-Saharan Africa over the past decades along four sectors (telecommunications, electric power, transportation, and water and sanitation) and three dimensions (quantity, quality, and access). Among others, the paper employs the system GMM econometric technique in its analysis. Empirical results reveal the existence of a large gap in infrastructure in the region and found that the potential growth benefits from closing the infrastructure gap are equally large. Infrastructure financing needs are very large, and the public sector so far is unable to cover these needs. The paper recommends that private sector involvement may be desirable for the region and efforts at improving the efficiency of public infrastructure spending may increase the output multiplier of investment spending.

[5] attempt an empirical investigation of the role of infrastructure on economic growth using a semiparametric smooth coefficient model to avoid specification problems encountered by some existing studies and acknowledge infrastructure-induced nonlinearity and parameter heterogeneity. The estimation involves a three-step procedure that controls for endogeneity in both the regressors and the environmental variable. The model regards infrastructure not as a factor input but is treated in the specification as an environmental variable. Being one of the fastest-growing industries, the model was applied in the context of telecommunications infrastructure in China. The results reveal that telecommunications contribute to output through various sources, namely its neutral and non-neutral impacts, that is, affecting $\beta 0$ and the productivity of the conventional factor inputs, respectively. Examining infrastructure's impact on the efficiency of labor and human capital, the paper found telecoms have a stronger productivity-promoting effect on human capital than on labor. The total/net effect is positive but largely decreases with telecommunications stocks.

A study under the auspices of the World Bank by [46] assesses how much low- and middle-income countries (LMICs) need to spend on infrastructure to enhance access to infrastructure and achieve climate goals. The study covers 138 countries and the period of 2015-2030. Based on thousands of scenarios, the study finds that new infrastructure could cost anywhere between 2 percent and 8 percent of gross domestic product (GDP) per year to 2030. In particular, the preferred spending scenario requires investments of 4.5 percent of GDP, equivalent to USD 1.5 trillion to achieve the infrastructure-related Sustainable Development Goals (SDGs) and limit climate change to 2°C. Under this scenario, the study identifies policy blends that could enable the LMICs to achieve universal access to water, sanitation, and electricity; greater mobility; improved food security; better protection from floods; and eventual full decarbonization. The maximum spending or the most ambitious scenario projects spending by up to 8.2 percent of GDP, which is equivalent to US2.7 trillion. Investing in infrastructure is not enough as maintaining it also matters. Accordingly, the study found that good maintenance generates substantial savings, and reduces the total life-cycle cost of transport, water, and sanitation infrastructure by more than 50 percent.

[78] note that resorting to conventional infrastructure financing methods has proven unsustainable. With an estimated funding gap of $93 billion a year up to 2020, the paper observes, Africa must look beyond traditional methods of finance. The paper relies on infrastructure finance literature and catalogs several infrastructure-financing options including Sovereign wealth funds, pension funds, as well as public-private partnership arrangements. It was found that countries that have started implementing these options demonstrate greater prospects for infrastructure development. Hence governments in Africa must reform the legal, regulatory, and institutional frameworks across the continent to accommodate these financing sources. Further, regionalization of infrastructure provision may prove a speedier way of bridging Africa's infrastructure deficits according to the paper.

[79] conduct an empirical study to assess the short- and long-run impact of infrastructure on export and trade deficit in selected South Asian countries during 1990–2017 by using Pooled Mean Group (PMG) estimator and cointegration techniques like Pedroni and Kao test. Empirical results of the PMG approach confirm the existence of a robust long-run impact of aggregate and sub-indices of infrastructure such as transport, telecommunication, energy, and financial sector, on export and trade deficit. These suggest that while infrastructure is export-promoting, it worsens the trade deficit. Results further reveal that the other control variables such as exchange rate, human capital, per capita GDP, and institutional quality boost exports and as well retard trade deficit significantly, especially in the long run. The paper also established evidence of cointegration using the Pedroni and Kao test while the fully modified ordinary least square (FMOLS) and the dynamic ordinary least square (DOLS) support robust and consistent results in the baseline model.

[80] explore why resource-financed infrastructure (RFI), a case where developing countries pledge future resource revenues to repay infrastructure loans, mitigates credit rationing in poorly governed countries. The paper employs a novel project-level database and found that loan sizes for resource-financed infrastructure are much larger than if were to be determined by the traditional government infrastructure purchasing model, especially in poorly governed

countries. The credit rationing model adequately explains these empirical patterns. It was also found that the traditional government infrastructure purchasing model suffers from two key limitations: the borrowing government due to corruption may steal the infrastructure funds or fail to make a sincere commitment to leveraging on tax revenues to settle the infrastructure loans/financing. The novelty of the new financing model is that it resolves these problems by assigning loans directly from the lender to the contractor thus minimizing government corruption, and channeling resource revenues into an independent agent's account to repay the infrastructure loans. The findings are significant as they could help in mitigating credit rationing in poorly governed resource-rich countries.

Using data covering 29 Sub-Saharan Africa (SSA) countries during the 2000–2014 period, [81] empirically examines the infrastructure–aggregate growth nexus. The chapter employs the Generalized Method of Moments (GMM) over the study period and results reveal a positive and significant impact of infrastructure development on both industry and services sectors' growth. The chapter, however, found no empirical relationship between infrastructure development and agriculture sector growth. Policy-wise, findings present crucial insights to policymakers and regulators in SSA to design and implement policies targeted at improving infrastructure to propel growth in the agriculture, industry, and service sectors.

According to [74], Africa's development requires substantial investment in infrastructure systems, such as water, energy, and telecommunications, though financing is always a major challenge on the continent. As much as the need for bankable projects and creditworthy institutions is important, so is overcoming the mismatch between investor expectations and the actual risk/return profile of infrastructure programmes and projects. Often, many useful projects are regarded as simply unbankable given the mismatch, either because the short-term returns are too low, or the risks are too high or not easily quantified, the authors posited. In its taxonomy of infrastructure finance instruments, the paper highlights three forms of financing, namely debt, equity, and blended (hybrid finance).

On the mechanisms for infrastructure financing, an array of institutional arrangements and finance instruments were presented. [74], for instance, posit that Export Credit Agencies (ECAs) offer a better deal for African sovereigns, beating bonds on tenor and price and tapping long-term, and stable credit providers whereas Project Preparation Facility (PPF) organizations help to bridge the technical and financial capacity gap of local and national governments in designing and developing bankable infrastructure projects. The finance instruments include natural resource-backed infrastructure loans (RBL), impact finance and patient capital (for maximizing social and environmental goals alongside financial returns in the investment), and bonds which could be either development impact bonds (DIB) or green bonds (generally used to finance green infrastructure projects that are large-scale and capital intensive). Using data from the Infrastructure Consortium for Africa (ICA), the paper shows that in 2018, infrastructure spending in Africa crossed the USD 100 billion threshold with the African governments accounting for 37.2 percent. China and ICA members followed by 25.5 percent, and 20 percent, respectively, and 11 percent by the private sector.

[82] examine the effects of aggregate and disaggregated infrastructural development indices (transport, electricity, ICT, and water and sanitation infrastructure indices), on economic

performance in Africa. The study uses the dynamic system GMM framework over a period between 2010 and 2018 and included a total of forty-nine (49) African countries. It was found that both aggregate and disaggregated infrastructural development indices impact positively on the level of GDP per capita growth in Africa. The impacts were significant in all except for the transportation infrastructure index. The results overwhelmingly confirm the prevalence of the symmetric hypothesis in the infrastructure–growth relationship in Africa. Further, the study found evidence in support of the significant roles of capital, labor, and initial GDP per capita in Africa's economic performance, while the role of trade remained negative and muted. Through effective public administration, African leaders and policymakers can promote economic performance on the continent by evolving policies that favor increased infrastructural development, human capital development, and capital accumulation.

[83] report a widening infrastructure development gap between developed and lower-middle-income countries (LMICs). Using fully modified ordinary least squares (FMOLS) and dynamic ordinary least squares (DOLS) covering the period of 1995–2017, the authors assess the impact of infrastructure on economic growth across 18 lower-middle-income countries. Findings reveal that investment in telecommunication, electricity consumption, and transportation contributes to economic growth in lower-middle-income countries. The study recommends a continuous investment is needed in transportation, electricity power, and communication sectors to achieve the target of high economic growth.

A Policy Brief by [84] posits that amidst rapidly escalating climate crises, there is an urgent need for African countries to remodel their financial infrastructure to strengthen climate resilience and develop green infrastructure. In addition, with rising debt challenges from commodity prices and the COVID-19 pandemic, it is becoming increasingly difficult for African countries to turn to borrowing for infrastructure development. Nonetheless, there is a particular need in Africa for green and resilient infrastructure to cope with the effects of climate change, mitigate the damages wrought by natural disasters, and limit emissions. Although donor partners and private capital have an important role to play, their support remains fragmented and inefficient while private capital faces serious constraints, according to the Policy Brief. Therefore, amidst global economic uncertainty, de-risking vehicles can incentivize the private sector to take on additional risk. The Policy Brief further recommends that the G20 countries should support Africa by providing grant and technical assistance to the Programme for Infrastructure Development for Africa (PIDA) to increase high-quality bankable projects and mobilize financiers, strengthen the G20 climate financing to the continent, as well as help to unlock financial technology and entrepreneurship to mobilize financing for bankable projects.

[69] assess how institutional reforms can attract more private investment in infrastructure by examining the determinants of private participation in infrastructure (PPI) in a sample of 36 African countries. The paper employs a panel data econometric model and findings show that the quality of institutions is the most important driver of PPI, while the cost of lending, the size of the economy, macroeconomic stability, and openness to trade are also significant determinants. The paper also identifies private investors' biases, that is, preferences granted to countries (based on intertemporal characteristics) after objective factors are controlled for.

Estimates reveal that the SSA region has the potential to attract 0.8 percentage points of GDP (or $20 billion) in additional private infrastructure financing with four years of continuous improvement in the quality of regulatory frameworks. The paper highlights that institutional reforms have, on average, higher payoffs for low-income countries than for middle-income countries.

2.3 Empirical Evidence on the Islamic Perspective

Assessing the post-announcement performance of both conventional and Sukuk bonds by investors from a behavioral finance perspective**,** [85] and [86]**,** using a market-based approach found that the stock market is neutral to the announcement of conventional bonds. On the contrary, they observed a significant negative stock market reaction to the announcement of Sukuk. They explained this different stock market reaction using the adverse selection mechanism, which favors Sukuk issuance by lower-quality debtor companies. They concluded by saying that differences exist between Sukuk and conventional bonds because the market can distinguish among these securities.

Furthermore**,** [85] argue that Sukuk which is the Shari'ah-compliant alternative mode of financing to conventional bonds has considerably expanded over the last decade. We analyze how the Sukuk type, characteristics of Shari'ah scholars, and their interaction influence the stock market reaction; reputation, proximity to the issuer, tenure, and the number of scholars involved in the issue. The paper employs an event study methodology to measure abnormal returns for a sample of 131 Sukuk from eight countries over the period 2006–2013. Findings show that Ijara Sukuk structures exert a positive influence on the stock price of the issuing firm. Similarly, positive impact from the Shari'ah scholar's reputation and proximity to the issuer as well. Overall, our results support the hypotheses that the type of Sukuk and the choice of scholars engaged to certify these securities matter for the market valuation of the issuing company.

During the G20 Summit, the World Bank Group, Capital Markets Board of Turkey, and Borsa Istanbul held a conference on "Mobilizing Islamic Finance for Long-Term Investment Financing". The conference according to [87] restates that while private-public partnerships are often cited as one way to bridge this financing gap, using Islamic finance or other asset-backed financial mechanisms to fund long-term development has started to gain traction in recent years. Further, it calls for rebranding Islamic finance as "asset-based" or "participatory finance" to gain wider acceptance to reduce the sensitivity associated with the religiosity aspect and to encourage traction based on the merits of responsible and ethical practices. It assesses that as Sukuk continue to gain momentum, the need for the development of institutional investors, regulatory and legal framework to promote asset-based finance, *Takaful* (Islamic insurance), and diversification of financial products for resource mobilization and risk management is paramount. With reduced information asymmetry through asset-based and risk-sharing, there is a need to enhance transparency, disclosure, and governance to leverage Islamic finance for long-term investment financing to lend more credibility and sustainability. The World Bank and IMF, as a means of achieving the key takeaways, prepared a joint G20 note on integrating Islamic finance with the global financial

system outlining a roadmap for national and international stakeholders to actualize the potential of Islamic finance for development.

[62] under the auspices of the World Bank, investigate the role of Islamic finance in the attainment of Sustainable Development Goals (SDGs). Accordingly, given the principles of Islamic finance that support socially inclusive and development-promoting activities, the Islamic financial sector has the potential to contribute to the achievement of the SDGs. The paper emphasizes that both the supply side, investors, and demand side factors/actors; corporations, and governments, are critical for meeting the SDGs through Islamic finance. Some landmark demand-side factors include the recent rise in demand for Islamic finance products by enterprises across sectors and sizes, as well as the growing demand by sovereign and quasi-sovereign entities for long-term finance based on Islamic principles. In addition, there is the need for the supply of an innovative mix of products, adequate governance of Islamic finance intermediaries, and a supportive legal and regulatory framework. The paper identifies five pathways through which Islamic finance could support the attainment of the SDGs: financial stability, financial inclusion, reducing vulnerability, social and environmental activities, and infrastructure finance.

[88] builds his arguments on government intervention based on two theoretical viewpoints; the provision of public goods and infrastructure is justified due to the incidence of market failure ([89], [90], [91], [92], [93]), and the endogenous growth model's view that public infrastructure and capital goods allow the private sector's production processes to witness increasing returns to scale ([6], [7], [94]). Hence, public infrastructure development yields positive externalities [95]. Accordingly, the paper posits that to achieve economic growth via public infrastructure, the government of Pakistan should mobilize enough resources through sovereign Sukuk financing. The provision of public infrastructure is spherically intertwined with investment, tax base, and tax revenue. Expansion in public infrastructure, therefore, induces investment in the economy that can help in increasing the tax base with the entry of firms and increase employment creation. Consequently, increased tax revenues offer the government the leverage to service sovereign Sukuk effectively while achieving other macroeconomic objectives; generate employment in new urban centers, facilitate closer migration to a wide choice of urban centers, unlock new growth knobs and production zones, and reduce urban congestion, among others.

[64] decries how the lack of physical and technological infrastructure and low quality of human resources dispirited the inflow of foreign direct investment in these countries. Therefore, the paper assesses whether sovereign sukuk issuances in the infrastructure sector affect economic growth using data covering five years before and after infrastructure Sukuk issuances in Malaysia and Saudi Arabia. Employing a paired sample t-test, results show significant differences in several economic, financial, and social well-being indicators, including GDP per capita, debt per capita, debt to GDP ratio, official reserves, and human development index. Thus, sovereign sukuk issuances impact positively on the economic development of Malaysia and Saudi Arabia in view of significant differences in the aforesaid indicators before and after the issuances. Relatedly, [96] evaluates the opportunities, barriers, and potential risks for funding large-scale infrastructure projects using Sukuk in developing

countries. Using the maximal variation and snowball approach, the paper identifies the key challenges for large-scale Sukuk issuances and provides useful interpretations that can contribute to the expansion of Sukuk structures for a wider international investor base.

[97] posits despite decades of infrastructure development by Multilateral Development Banks (MDBs) and local governments through public-private partnerships (PPPs), human misery in the form of poverty and hunger persists. Using a qualitative research methodology, technical review, and stock-taking of real-life examples, the author analyses the conventional PPP arrangements and dwells on the Islamic finance PPP perspective. The paper identified the critical success factors for the Islamic finance PPP arrangements as Maqasid Al-Shari'ah, Shari'ah compliance, and resource mobilization from the Islamic capital markets. The major finding of the research is that employing infrastructure PPPs within the precincts of Islamic finance principles can illuminate the path to success in achieving sustainable development goals. Traditional risk issues were well addressed in PPPs with vast real-life cases that have been the subject of many academic studies. For instance, Islamic finance ring-fences and protects loan seekers and corrects imbalances in conventional finance agreements; there are no upfront or commitment fees or default interest penalties incurred by Islamic banks in Islamic project finance contracts; Murabaha, Ijarah, Istisna (see Appendix II on definition of terms).

[28] assess Islamic infrastructure financing and barriers to adoption in Indonesia. The study employs qualitative research methodology using the Delphi iterative method which involves several repeated processes in data collection and analytics. It was found that over the last decade, Shari'ah-compliant instruments such as Musharakah, Istisna, and Murabaha were integrated into financing infrastructure projects in Indonesia with the Murabaha contract being most applied. Islamic banks play a pivotal role in financing infrastructure projects using the Shari'ah principles. In addition, it was also found that the main barriers to utilizing Islamic project financing are a lack of understanding of the Islamic project financing concepts, resistance to using Islamic finance, and investors' behavior and characteristics– profit-oriented mindset and risk avoidance. The paper argues that the Islamic mode of financing is not just another option for project financing; rather, it offers additional value from the perspective of infrastructure stakeholders.

[35] argue that the provision of an efficient super-infrastructure is a precondition for faster economic growth for any country and is uneasy to come by due to increasing public debt and interest payments. The paper explores how a modern international airport could be financed using an Istisna Sukuk-based expansionary monetary policy (MP). Central Bank (CB) can buy and sell Istisna Sukuk in the open market as a tools of monetary policy. They are issued against assets, such as the Airport, and Sukuk holders are the true owners of the Airport who derive their income from the asset instead of coupon or interest rates. Using the *Istisna-Sukuk*-based expansionary monetary policy tool does not incur public debt nor require payments of interest. The Sukuk financing arrangement will have expansionary monetary policy effects and, as such, it will increase output and employment and consequently reduce the unemployment rate. In addition, it will also eliminate the high incidence of public debt and interest payments for the government, and the government will have more funds

available for public spending as no transfers of domestic resources as interest payments to foreign creditors will be made. As a result, economic expansion and prosperity will continue to flourish [98]

It has been argued in a conceptual paper that Islamic finance's checks and balances shape the way infrastructure is developed through Islamic finance contracts [99]. The paper uses the case study of three multilateral development finance institutions namely, IsDB, ADB, and WB). It posits that the uniqueness of Islamic finance appears in the way funds are disbursed and the legal (Shari'ah) principle applied in the contract are fair to both the lender and the borrower and is contrary to conventional finance contracts, which often secure the interest of lending institutions. An *Istisna* contract for the provision of infrastructure holds the financier liable for assets produced, for instance, and hence encourages putting in place strong environmental and social safeguard measures [99].

An empirical study by [100] employs a sample of sixty-one listed companies that have issued corporate Sukuk in Malaysia between 1997 and 2017, to assess whether their financial stability is being influenced by Sukuk characteristics and the firms' internal characteristics. The study applies the nave distance to default (DD) introduced by Bharath and Shumway as a measure of the firm's financial stability. The method of Ordinary Least Squares (OLS) was employed in this study, and the findings confirm that Sukuk features can promote the level of firms' financial stability. The variables that measure up to this impact are the intensity of Sukuk and the proportion of Sukuk financing. Internally, firm size, valuation, solvency, and profitability significantly affect the firm's financial stability. These provide pieces of evidence that are critical to the Malaysian authorities and private firms in efforts to promote the development of the Sukuk market in Malaysia and beyond.

A study by [101] seeks to answer the question of whether Sukuk issuances boost economic growth using a sample of some Islamic economies comprising Bahrain, Indonesia, Malaysia, Pakistan, Saudi Arabia, and the United Arab Emirates. The dynamic panel cointegration model with pooled mean group/autoregressive distributed lag (PMG/ARDL) and the panel causality test were employed to analyze the causal relationship among the study variables with the aid of quarterly data over the period of 2005–2000. Empirical results show that Sukuk has significantly and positively impacted the level of economic growth in the long run but not in the short run over the study period. Additionally, a unidirectional causality was found between Sukuk and economic growth, which suggests the growth-leading role of Sukuk towards economic growth. This theoretically supports 'Schumpeter's supply-leading hypothesis.' The findings are indicators to policymakers in formulating Islamic financial reforms, which would further the course of the Islamic financial system in stimulating investments/financing that enhance economic growth. See numerous other empirical studies on the growth impact of Sukuk ([102], [103], [104], [105], [106], [107], [108], [109], [110], [111], [112], [113], [114], [115]

[26] conducts an exploratory study on Islamic infrastructure financing: imperatives, prospects, and challenges. The study argues that amidst an acute shortage of infrastructure, the institutions for financing infrastructure are in short supply. Therefore, it opines that in a system that is based on the principles of Shari'ah of protecting the public interest, removing

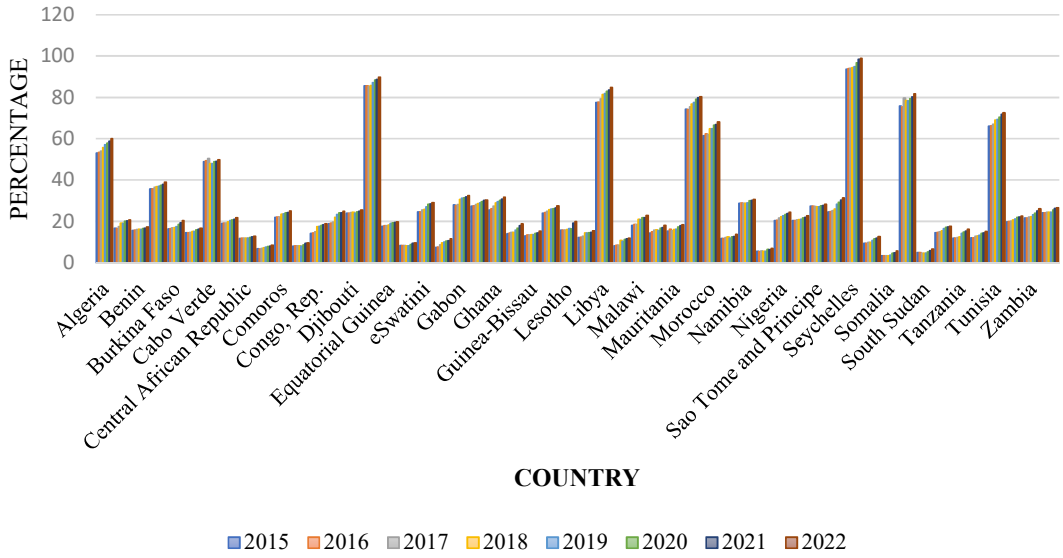
hardship, and promoting justice, a typical infrastructural project has a natural fit with Islamic financing. The findings of the study reveal no relationship between the status of implementation of Basel III reforms prudential regulations and the Islamic banking sector supply of infrastructure financing. Positively, the study lauds improvements in the standardization of contractual structure and legal framework that allows the combination of Islamic and conventional financing for infrastructure development. The study extols the roles of Islamic finance infrastructure organizations in their efforts aimed at strengthening the regulatory framework for infrastructure finance in general and sustainable finance needed to support transitioning to a low-carbon global economy.

3.0 REVIEW OF STYLIZED FACTS

3.1 Stylized Facts on Africa's Infrastructure Performance

Infrastructure comprises water and sanitation, electricity, transport, irrigation, and flood protection ([46]; [116]). The African Development Bank, as part of its infrastructure development initiatives, introduced an Africa Infrastructure Development Index (AIDI). The AIDI monitors the status and assesses the progress made on infrastructure development across the continent since its inception. The assessment is based on five major components: electricity, transport, Information and Communication Technology (ICT), and water and sanitation [50]. AIDI's assessment assists individual countries in benchmarking the relative performance of their infrastructure sectors and in formulating their country-specific strategies for better performance.

Chart 3.1: Africa Infrastructure Development Index (AIDI)



Source: AfDB (2022b) Africa Infrastructure Development Index (AIDI)

Based on data from the [117], this study decomposes the African countries into five major regions, North, East, West, South, and Central Africa. Broadly, the top ten countries in terms

of IDI performance indexes, in a total of fifty-four countries are Seychelles, Egypt, Libya, South Africa, Mauritius, Tunisia, Morocco, Algeria, Cabo Verde, and Botswana. Enviably, the first five countries in this category had an index score above 80 percent while Seychelles and Botswana had the highest and lowest index scores of 98.9 percent and 39.0 percent in the category in the year 2022, respectively (see Chart 3.1: Africa Infrastructure Development Index (AIDI) Index.

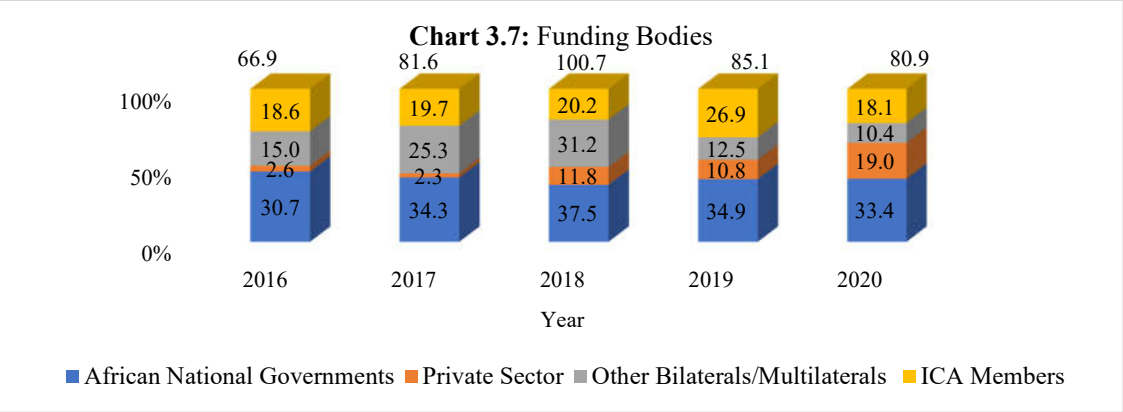
Infrastructure performance level differs significantly across the five regional groupings namely Northern, Eastern, Western, Southern, and Central Africa. For instance, the Northern African countries which comprise six countries had the most impressive performance in terms of infrastructure index. The region's average index score stood at 56.6 percent in the year 2022, and four countries; Egypt, Libya, Morocco, and Tunisia scored above 60 percent. Sudan and South Sudan, however, constituted a drag in the overall performance of the region with scores of 17.6 and 6.5 percent, respectively (see Chart 3.2 in Appendix III). Similarly, three countries in the East African region topped with an index score of 60 percent and better; Seychelles, Mauritius, and Algeria, in the year under review, while seven others; Burundi, Eritrea, Ethiopia, Madagascar, Mozambique, Somalia, and Tanzania had an index score of less than 20 percent throughout the period between 2015 & 2022 (see Chart 3.3 in Appendix III). Despite being the region with the highest scorer, low index scores from other weak economies pulled down the average score to 29.2 percent.

Chart 3.4 in Appendix III depicts the West African region's average index score stood at 21.8 percent and Cabo Verde topped with an index score of close to 50 percent in the year 2022. Senegal, Ghana, The Gambia, Cote d'Ivoire, and Nigeria had index scores above 20 percent each. However, Niger Republic had the least index score of 6.8 percent in the year under review. In the Southern African region, Chart 3.5 in Appendix III shows that six countries recorded a mean score of 37.8 percent, and indubitably, South Africa ranked the highest at 81.7 percent in the region. Botswana and Namibia had 39 percent and 30.5 percent, respectively and the lowest scorer, Lesotho scored 19.9 percent in the region. Chart 3.6 in Appendix III covers the Central African region which comprises six countries. Relative to the other four regions, this recorded the least infrastructure indexes. It had a mean score of only 19.1 percent and the best-performing country, Gabon had an index score of 32.5 percent and was followed by Sao Tome and Principe with 28.3 percent. The lowest scorers however are Chad, 8.5 percent, and Congo Democratic Republic, 9.7 percent.

In the foregoing analyses, there seems to be no plausible explanation as to what determines the level of infrastructure performance in the African continent. However, for the top five economies in the continent; Nigeria, South Africa, Egypt, Algeria, and Morocco, albeit except Nigeria, there is support for the infrastructure-led growth hypothesis. Noticeably, countries with small populations; Seychelles, Angola, Botswana, Namibia, and Cabo Verde, enjoy economies of size in terms of little pressure on available infrastructure, despite limited tax handles. Finally, the levels of infrastructure performance across the continent unveil the need for greater funding to accelerate faster rate of economic development in the continent.

3.2 Stylized Fact on Infrastructure Financing in Africa

Infrastructure financing in Africa underwent difficult times during covid-19 pandemic, like many other economic activities. [20] in its annual report notes that the sectors worst hit are the energy, transport, and water sectors. Total infrastructure commitments, for instance, declined from USD 85 billion in 2019 to USD 81 billion in 2020 partly due to the shift by some bilateral and multilateral organizations from infrastructure to the pressing need to address the Covid-19 pandemic, particularly in intervention in the health and macroeconomic sectors. Notwithstanding, the report shows that ICA members and other bilateral and multilateral organizations contributed close to USD 68 billion within the period 2019-2020.



Source: Adapted from the Infrastructure Consortium for Africa (ICA) 2022

Evidence in Chart 3.7, for instance, shows that in 2018, infrastructure spending in Africa reached the USD 100.7 billion threshold while consequent to Covid-19, the spending dropped to USD 85.1 billion in 2019 and further down to USD 80.9 billion in 2020. Also, the Chart shows that African governments were consistently the largest source, with commitments reaching above the USD 30 billion mark throughout the period from 2016 to 2020. Other bilateral and multilateral bodies including China accounted for USD 31.2 billion while the ICA members and private sector USD 20.2 and USD 11.8, respectively in 2018. Noticeably, while the level of spending by the bilateral and multilateral bodies declined in 2019 and 2020, that of the private sector steadily increased reaching USD 19 billion in 2020. According to the Center for Global Development (CGD), between 2007 and 2020 Chinese development banks provided $23 billion for African infrastructure, compared with $9.1 billion from all other development banks. China's Belt and Road initiative is set to finance ports, roads, rail, and other infrastructure in the regions of Africa [118].

Chart 3.8: ICA Member Total Commitments and Disbursements

Source: Adapted from the Infrastructure Consortium for Africa (ICA) 2022.

In Chart 3.8, we present the total commitments and disbursements made by ICA members between 2016 and 2020. Over the span of the five years, ICA members committed a total sum of USD 103.5 billion while total disbursement stood at USD 74.2 billion, equivalent to 71.69 percent of the total commitment made. The year 2019 witnessed the highest commitment and disbursement of USD 26.9 billion and USD 23.9 billion, respectively. According to the [20] report, the MBD members, comprising among others, the African Development Bank (AfDB), the African Export-Import Bank (Afreximbank), the Africa Finance Corporation (AFC), the European Investment Bank (EIB), the Islamic Development Bank (IsDB), and the World Bank Group, etc., accounted for 78 percent of ICA's total financing in 2019 and 79 percent in the year 2020. Notwithstanding, the 2020 commitments and disbursement were substantially lower than in previous years as many organizations were absorbed in developing Covid-19 response and macroeconomic recovery. Equally, non-ICA members committed the largest share of total financing in 2019 (56%) and in 2020 (54%)

Even though the African Governments continued to provide the largest share of commitments, commitments by the private sector reached USD 19 billion in the year 2020, the highest level in the span of five years. This is even though the sector is held back by concerns of sector creditworthiness, perceptions of political risk, bureaucracy, and red tape. Further, the [20] report notes that infrastructure projects are a key driver of regional integration and are weaving the continent together. The report concludes that the shortfall in financing for infrastructure in the continent results principally from two key factors. Lack of financial sustainability especially in water and power sectors due to low tariffs that do not sufficiently cover investment costs and low contribution of the private sector in contrast with the practice in other regions of the world. Thus, as a way out, tariffs on public utilities should reflect investment costs and be able to yield adequate cash flows both for new investments and for the maintenance of existing investments. Also, there is a need to explore the securitization of existing assets with stable cashflows to attract private sector investors and other innovative financing arrangements.

3.3 Background and Stylized Facts on Islamic Infrastructure Finance

Several types of Islamic financing instruments are available that might be applied for infrastructure investment. These instruments can be grouped as equity-based financing, debt-based financing, and service-based financing. Viewed in terms of contract features, Islamic financial instruments can be divided into profit and loss sharing (PLS) contract-based and debt contract-based [119]. Financing is often designed based on real, illiquid assets and inventories [120] [121] & [122], as Islam, in strong terms, forbids the giving and taking of interest or usury (riba[3]), uncertainty (gharar), gambling (maysir) and trading in particular items such as pork and alcohol [123], [120], [124], [125] & [122], and the system must also uphold ethical values in every transaction [126].

In consonance with the Shari'ah principles, long-term funds are mobilized in the Islamic capital market through an instrument known as Sukuk. The origin of Sukuk is said to date back to the early Islamic period AD 700-1300 [127] & [110]. The Cairo genizah documents contain fragments that indicate the existence of Sakk in the 12th century CE and these money orders are remarkably similar in form to modern-day checks [128], (IFSB, 2009) [130], it was used to pay for goods when they were delivered and to avoid transporting money across dangerous terrain [131]. The Jewish merchants from the Muslim world transmitted the concept and the term Sakk to Europe [132]. In recent times, there was no unveiling of the Sukuk until the year 2000, when the first sovereign Sukuk was issued by the government of Sudan worth 77 million Sudanese pounds based on the Musharakah structure and was followed by Bahrain's first US-dollar-denominated Ijarah Sukuk, worth $100 million by the Central Bank of Bahrain in 2001 [133]. Meanwhile, the World's first corporate sukuk was issued by Shell MDS company in Malaysia in 1990 worth USD33 million [134].

Sukuk is an interest-free bond that generates returns for investors without infringing the principles of Shari'ah (Islamic law) which prohibits the payment of interest [135] and a more accurate, classical translation of the Arabic word would be an 'Islamic Investment Certificate' [136]. It is a Shari'ah-compliant security backed by a specific pool of underlying assets. Other definitions include [137], [127], [138] & [139].

Sukuk are known as an Islamic capital market instrument and its issuance lies in Islamic Shari'ah and its principles [140]. The Council of the Islamic Fiqh Academy in Jeddah resolution No.30 (5/4) describes Sukuk as "investment instruments which allocate the (Muqarada) capital (Mudarabah) by floating certificates, as an evidence of capital ownership, based on shares of equal value, registered in the name of the owner, as joint owners of shares in the venture capital or whatever shape it may take, in proportion to (…) each one's share therein" [141]. The Accounting and Auditing Organization for Islamic Financial Institutions [142] defines Sukuk as "certificates of equal representing undivided shares in ownership of

[3] In Islam, a fixed interest generally refers to *riba* (as mentioned in the Holy book of Al-Quran: 2:275–276, 2:278, 3:130, 4:161; 30:39) that is an increment on the borrowing and lending of money which is paid or received in cash or otherwise above the loan amount. The *riba* (a fixed rate of interest) is prohibited in any kind of financial transaction, because it may lead to exploitation on the borrower due to an unjustified or excessive charge (known as *usury*) on the borrowing that has also been condemned by the other faiths such as Hinduism, Buddhism, Judaism, and Christianity in addition to Islam [219].

tangible assets, usufructs, and services or (in the ownership of) the assets of particular projects or special investment activity." AAOIFI recognizes fourteen different Sukuk structures; Al Musharakah Sukuk; the Al Ijarah Sukuk; Al Murabahah Sukuk; Al Mudarabah Sukuk; Al Istisna Sukuk; As Salam Sukuk; and several hybrids. While some are not suitable for infrastructure financing, several of them are, including *Istisna, Ijarah, Ijarah mawsufah fi al-dhimmah*, *Mudarabah/ Musharakah,* and *Salam*, and *Wakalah*, and there may be scope for novel approaches using other contracts or new combinations [143] & [144].

Unequivocally, Sukuk are issued based on Islamic law (Shari'ah) principles that are derived from the Holy Qur'an and Sunnah of the Holy Prophet Muhammad (May peace be upon him) [145] and enunciated upon the rules of Islamic jurisprudence. Broadly, the basic principles of the Islamic financial system are the prohibition of interest (*riba*) [146]; [147]; risk sharing through profit and loss [148]; treatment of money as actual capital which negates the time value of money in conventional finance[132]; prohibition of speculative behavior [145]; the sanctity of contracts for risk mitigation [149]; and operating only within the Shari'ah approved activities [146].

Unlike the conventional bond that can be simply created and supported by the full confidence and credit of the guarantor, sukuk depends on the transfer of ownership or utilization of beneficial value from an underlying asset, and its structure and form must follow the objectives of (Shari'ah) Islamic law. Sukuk is, therefore, asset-backed, ring-fenced, and project-specific nature of Islamic finance structures and their emphasis on sharing risks makes them a natural fit for public-private partnerships in the infrastructure space ([150] [151]. Furthermore, [152] posits that Sukuk have the potential to act as a public sector financing instrument and could help to bridge the funding gap for infrastructure projects [153], and are well-suited to infrastructure financing because their risk-sharing features make them suitable for filling financing gaps in emerging countries [154].

In Africa, [155] states that Seychelles and Ghana turned out to be the pioneers in the region to debut Islamic bonds (Sukuk), in 2006 and 2007, respectively. In the same manner, Gambia and Sudan have done so, albeit, on a small scale. Nigeria became the first giant economy in sub-Saharan Africa to debut Sukuk at the sub-national government level in 2013 and soon after, Senegal raised $200 Million through a sovereign sukuk issuance which was the first and foremost sukuk issued by a West African nation in 2014. South Africa debuted the first international dollar-denominated sukuk of $500 million in September 2014. The Ivory Coast issuance of sovereign Sukuk came up in 2015, its 5-year 300 billion CFA priced at a return rate of 5.75%, and Togo's debut in July worth CFA 150 10-year maturity priced at 6.5 percent. Recently, the sixth Nigerian sovereign Sukuk of N150 billion which was closed on 11th October 2023 received a total subscription of N652.82 billion, which is equivalent to 435 percent oversubscription [156].

Mammoth sovereign sukuk issuances in the continent came from Nigeria and between 2017 and 2021, a total of four issuances generated the sum of N612.557 billion for the construction and rehabilitation of key economic road projects in the six (6) geo-political zones and the Federal Capital Territory (FCT). The last sovereign sukuk issued in December 2022 worth N100 billion was upsized to N130 billion due to an oversubscription of over 165 percent by

teaming investors. Despite the absence of a regulatory framework dedicated to issuing Islamic financial products, four countries in the WAMU, namely Senegal, Togo, the Ivory Coast, and Mali, have issued a total of six long-term Sukuk Ijarah that amounted to XOF864 billion (USD 1.47 billion) by using the regulatory framework of the mutual fund securitization which was set up in March 2010 [157]. Recently, in March 2022, the Egyptian Financial Company for Sovereign Sustainability along with the Egyptian Ministry of Finance assuming the status of binding, launched a dollar-denominated sukuk for the first time worth $1.5 billion. The country aims to raise $5 billion in sukuk issuances within 6 months.

Invariably, project cum infrastructure financing is a structured financing that requires a Special Purpose Vehicle (SPV) or Special Purpose Company (SPC) to mobilize financing from investors as well as manage the project leading equity (partnership/ participatory) and debt (Istisna and Salam contracts). [158] states that Istisna can be applied in both explicitly income-generating public infrastructure projects and non-income-generating projects. A co-financed structure which was a combination of Islamic and Western sponsor financing was implemented successfully in the Equate Petrochemical project in Kuwait [159].

3.3.1 Review of Stylized Facts on Islamic Infrastructure Finance

3.3.1.1 Regional Breakdown of Domestic and International Sukuk

Islamic finance turned out to be a major player in economic growth around the world given the rapid expansion of its assets [160], and the main instrument for boosting economic growth is Sukuk [161] & [162]. Since the debut by the Government of Sudan in 2000, interest in Sukuk has continued to grow in nature and stature. According to the [65], 38 countries issued Sukuk worldwide, till December 2020. As shown in Table 3.1, the total number of domestic Sukuk issued globally stood at 13,472 between January 2001 and December 2022 valued at USD 1.374 trillion. Fast forward to the year 2022, the domestic market constitutes around 80.45 percent (USD 146.90 billion) of the entire Sukuk market. Asia and the Far East maintain a firm grip accounting for 64.31 percent, which is followed by the GCC with 31.76 percent. Most certainly, domestic Sukuk is the engine room of the global market for Sukuk [65]

Over the same period, the Table shows that the Asian continent tops in terms of the overall number of domestic Sukuk issuances, and countries on the led across the regions show that Malaysia alone accounted for 85.4 percent (9,134) of the total Sukuk issued in the Asian region. Bahrain led in the GCC and Middle East with a total of 406 issuances equivalent to 54.1 percent, while The Gambia and Turkey in the African and European regions recorded 804 issuances (equivalent to 91.5 percent), and 1,147 (100 percent) Sukuk issuances, respectively, between January 2001 and December 2022. In value terms, the pattern is different, especially in Africa. Despite The Gambia's highest Sukuk issuances (804) valued at USD464 million, Sudan and Nigeria with 45 and 13 Sukuk issuances, respectively were valued at USD20,449 million and USD2,108 million. Domestic Sukuk is denominated in 27 different currencies and issued in both longer tenor and short-term [163].

Table 3.1: Regional Breakdown of Domestic Sukuk (USD million)

Region	Jan. 2001 - Dec. 2022			2022		
	Nos	Amount	Percentage	Nos	Amount	Percentage
Asia and the Far East	10,694	1,038,572	75.46	1,186	94,529	64.31
GCC and Middle East	750	244,422	17.76	73	46,686	31.76
Africa	881	25,763	1.87	131	1,264	0.86
Europe and Others	1,147	65,514	4.91	32	4,511	3.07
Grand Total	**13,472**	**1,374,271**	**100**	**1,422**	**146,990**	**100**

Source: Compiled by the Author based on data from the International Islamic Financial Market (IIFM) Sukuk Report 2023.

The international Sukuk market constitutes only around 23.27 percent of overall Global Sukuk issuances since its emergence [164]. Nonetheless, the market is the real attraction and major driver of the global Sukuk market. Invariably, the Sukuk is denominated in USD and other strong currencies are often issued in longer tenors ranging from 15 years to 30 years. The issuances are also either in the usual once-up or perpetual Sukuk with a call option.

The anatomy of the international Sukuk by region is presented in Table 3.2. Evidence shows that the GCC and Middle East region outperforms the Asian region with a total of 367 issuances between January 2001 and December 2022. Equally, an outstanding performance by a supranational body, the Islamic Development Bank (IsDB) stood at 246 issuances over the same period. In the African continent, Nigeria, South Africa, and Sudan had lone issuance each while Turkey recorded 42 out of a total of 66 issuances in Europe and Others. Although Sukuk performance remained relatively low in 2022, nevertheless, the IsDB accounted for 46.2 percent of the total international Sukuk issued both in value and number of issuances. While other regions performed fairly well, the African region had zero issuance. The 2022 international Sukuk were launched for medium to long-term tenors as well as perpetual Sukuk [164].

Table 3.2: Regional Breakdown of International Sukuk (USD million)

Region	Jan. 2001 - Dec. 2022			2022		
	No	Amount	Percentage	No	Amount	Percentage
Asia and the Far East	104	62,375	14.94	5	4,425	12.39
GCC and Middle East	367	195,536	46.84	12	9,300	26.03
Africa	3	780	0.18	0	0.0	0.0
Europe and Others	66	31,474	7.54	2	5,500	15.39
Supranational (IsDB)	246	127,311	30.5	39	16,500	46.19
Grand Total	**786**	**417,476**	**100**	**58**	**35,725**	**100**

Source: Compiled by the Author based on data from the International Islamic Financial Market (IIFM) Sukuk Report 2023.

Table 3.3 sums the domestic and international Sukuk issuances and redistributes them according to issuer status. Evidence shows that as of the end of 2022, total sovereign Sukuk issuance since inception in 2010 stands at USD 991.64 billion which is equivalent to around 55.28 percent of all global Sukuk issuances [164]. In particular, Sovereign Sukuk, which often is for infrastructure development witnessed an average increase of 19.74 percent between 2015 and 2022. Although Sukuk issuances in 2022 grew marginally by 1.47 percent to USD 111.827 billion as compared to 2021 issuances of USD 110.206 billion, the share of sovereign Sukuk in total Sukuk for the year stood at 61.2 percent. Thus, it is evident that sovereign Sukuk issuances are the main drivers of the global Sukuk market headway. Other issuer categories, however, witnessed fluxes in their levels of Sukuk engagements between the period of 2015 and 2022, the most variable being the issuances by IFIs. Major global sovereign Sukuk issuers are Saudi Arabia, Indonesia, Malaysia, UAE, Turkey, and Bahrain.

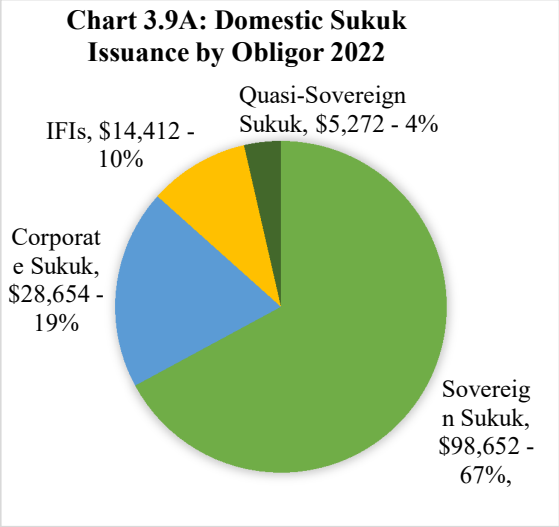
Table 3.3: Global Distribution of Sukuk by Issuer Status - all tenors all currencies, in USD million

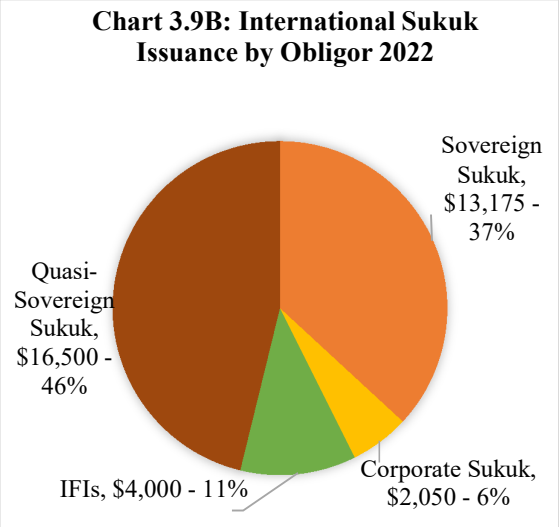
Issuer Status	Year							
	2015	2016	2017	2018	2019	2020	2021	2022
Sovereign	33,335	41,255	62,166	67,381	74,377	88,867	110,206	111,827
Corporate	14,731	19,817	16,835	22,039	21,703	22,348	25,660	30,704
IFIs	8,249	5,928	8,938	10,122	18,798	33,765	24,570	18,412
Quasi-Sovereign	11,503	21,317	28,778	23,609	30,823	29,661	27,685	21,722
Grand Total	67,818	88,317	116,717	123,151	145,701	174,641	188,121	182,665

Source: Compiled by the Author based on data from the International Islamic Financial Market (IIFM) Sukuk Report 2023

Further, Chart 3.9A and Chart 3.9B break the domestic Sukuk and international Sukuk for the year 2022 according to issuer status (obligor), respectively. Chart 3.9A depicts the distribution of domestic Sukuk among four major issuer categories: Sovereign, Corporate, Islamic Finance Institutions (IFIs), and Quasi-sovereign. Again, the Sovereign category tops with 67 percent followed by the Corporate Sukuk issuances with 19 percent. IFIs and Quasi-sovereign account for 10 percent and 4 percent, respectively. In the same vein, Chart 9B shows that the shares of Sovereign and quasi-sovereign Sukuk issuances together accounted for 83 percent in the year 2022, and for some time, the two maintained dominance with an average of 69.73 percent between 2010 and 2019 [65].

The major global Quasi-sovereign Sukuk issuers include DanaIfra Nasional, Khazanah Nasional, the Federal Land Development Authority, all in Malaysia, and the Islamic Development Bank (IsDB). [65] posits that due to the changing economic landscape and geo-political conditions in different parts of the world, the growth in the Sukuk market will, for some time, be driven by the Sovereign and Quasi-sovereign issuers while issuances from IFIs and Corporates may mimic 2021 performance. It has been observed that due to changing economic and geo-political conditions in different parts of the world, the global Sukuk market will continue to be driven by sovereign and quasi-sovereign issuers while issuances from IFIs and Corporates are likely to moderate largely due to the unfolding global inflationary conditions and rising global benchmark rates [163].



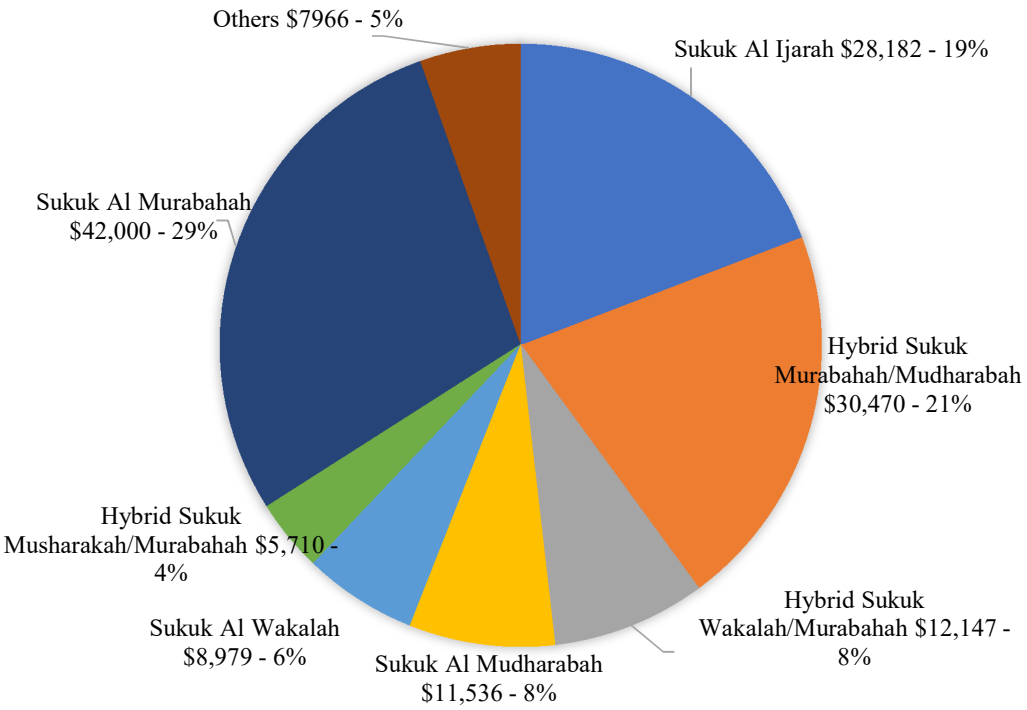


Source: Reproduced by the Author based on data from the International Islamic Financial Market (IIFM) Sukuk Report 2023

3.3.1.2 Global Sukuk Structure

The level of domestic Sukuk issuances in the year 2022 hit USD 146,990 as presented in Chart 3.10A. Based on the AAOIFI's recognized Sukuk structures, evidence shows that Sukuk Al Murabahah, which historically has been the most dominant structure for Sukuk accounts for 29 percent which is equivalent to USD 42,000 of the total Sukuk issuances in 2022. Its major contender, Sukuk Al Ijarah attracts 19 percent issuances, equivalent to USD 28,182 in the same year, 2022. In the hybrid structures, Murabahah/Mudharabah performed quite well with a 21 percent share of total issuances (USD 30,470). A combination of Sukuk structures comprising Sukuk Salam, Sukuk Musharakah, Hybrid Sukuk, and Hybrid Ijarah/Mushrakah account for 5 percent of total issuances also equivalent to USD 7,966. Among the high-profile domestic sovereign Sukuk issuances in 2022 are the Government of Indonesia whose total issuance (Sukuk Al Ijarah) stood at the tune of USD 18,187 million, the Government of Malaysia USD 67,624 million Sukuk Al Murabahah, and the Government of Nigeria USD 369.41 million Sukuk Al Ijarah [165].

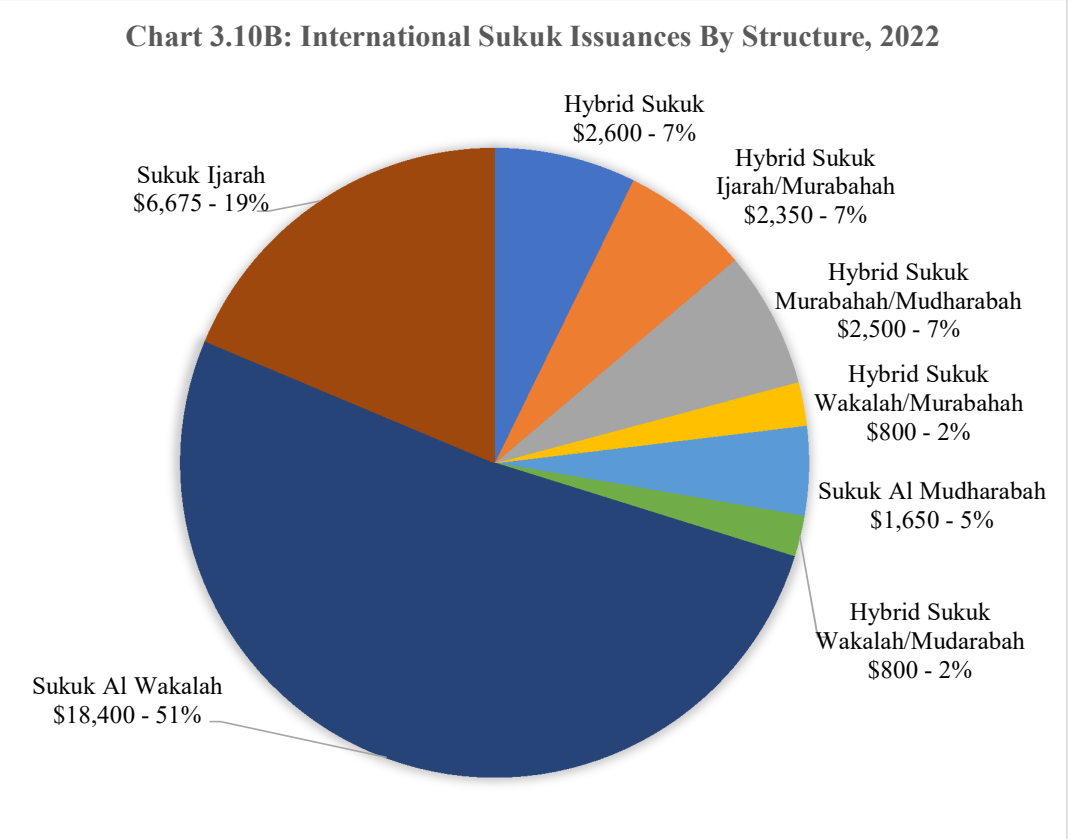
Chart 3.10A: Domestic Sukuk Issuance By Structure, 2022



Source: Reproduced by the Author based on data from the International Islamic Financial Market (IIFM) Sukuk Report 2022

Furthermore, evidence in Chart 3.10B reveals that the structure most widely used in international Sukuk issuances is the Sukuk Al Wakalah. Over the span of January 2010 and December 2020, the total value of Sukuk Al Wakalah issued stood at USD 148,068 million, which is equivalent to 52 percent [163]. This development gradually overshadows the prominence of Sukuk Al Ijarah. Thus, Sukuk Al Wakalah accounts for 51 percent of

international Sukuk issuances in the year 2022 with a total value of USD 18,400, followed by Sukuk Ijarah with 19 percent (USD 6,675). Other structures, as shown in the Chart were utilized at different levels as well based on market needs and investors' appetites. As observed by the [166], Sukuk Al Wakalah is often structured in the form of hybrid Ijarah/Murabahah which provides more flexibility, and the issue of shortage of available assets is lessened.



Source: Reproduced by the Author based on data from the International Islamic Financial Market (IIFM) Sukuk Report 2022.

3.3.1.3 Short-term and Long-term Trends of Global Sukuk

Global Sukuk issuance demonstrates a single-digit growth of 7.17 percent or USD 174.641 billion to USD 188,120 billion between 2020 and 2021 but decelerated by 2.9 percent, that is, USD 182,715 in 2022, as shown in Table 4. This is despite a rise in the short-term component after witnessing a series of declines since 2017. Nevertheless, the long-term Sukuk remained robust and maintained steady growth since 2015 as well, and by extension, the total Sukuk issuance. For instance, despite Covid-19, steady sovereign Sukuk issuance was recorded in 2021 in Asia, GCC, Africa, and other jurisdictions. Malaysia continues to dominate the Sukuk market while bourgeoning issuances from countries like Indonesia, UAE, Saudi Arabia, and other countries, were also remarkable during the years between 2021 and 2022.

Table 3.4: Total Global Sukuk Issuances - all tenors, all currencies, in USD million

Issuer Status	Year							
	2015	2016	2017	2018	2019	2020	2021	2022
Long-term	51,687	64,977	97,167	88,009	105,698	117,900	133,948	120,020
Short-term	16,131	23,340	19,550	34,141	40,003	56,741	54,172	62,695
Grand Total	**67,818**	**88,317**	**116,717**	**122,150**	**145,701**	**174,641**	**188,120**	**182,715**

Source: Compiled by the Author based on data from the International Islamic Financial Market (IIFM) Sukuk Report 2022.

The level of domestic Sukuk issuance between 2015 and 2022 witnessed robust growth and cumulatively amounted to USD 797,417 [65]. Table 3.5 shows that the long-term component depicts a consistent trend, unlike the short-term component, as often expected. In 2022, for instance, a total of USD 98.195 billion long-term Sukuk were issued against USD 48,795 billion short-term Sukuk. Key players in the domestic market outside of Malaysia are Saudi Arabia, Indonesia, Bahrain, Qatar, Turkey, and Bangladesh.

Table 3.5: Total Domestic Sukuk Issuances - all tenors, all currencies, in (USD million)

Issuer Status	Year							
	2015	2016	2017	2018	2019	2020	2021	2022
Long-term	37,383	43,067	69,369	63,131	76,252	88,814	98,641	98,195
Short-term	8,555	14,040	9,700	27,031	30,973	43,419	40,052	48,795
Grand Total	**45,938**	**57,107**	**79,069**	**90,162**	**107,225**	**132,233**	**138,693**	**146,990**

Source: Compiled by the Author based on data from the International Islamic Financial Market (IIFM) Sukuk Report 2022.

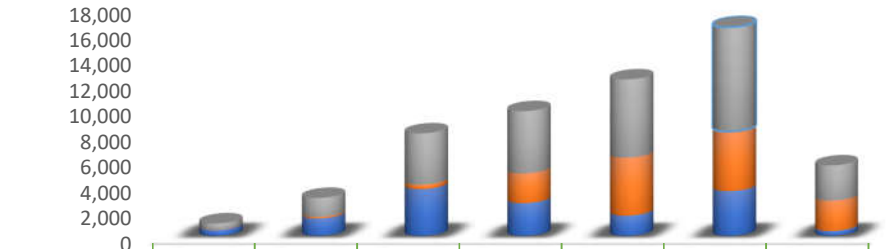
3.3.1.4 Green and Sustainability Sukuk

[167] posits that Islamic finance and ESG share complementary roles and given the the social, moral ethos, and asset-backed nature of the latter, it offers an alternative funding option for sustainable development activities and projects that are aligned with the former's initiatives. Accordingly, the composition of the ESG-based Sukuk includes Green Sukuk (renewable energy and transportation), Social Sukuk (affordable infrastructure, affordable housing, employment generation, workforce diversity), Sustainability Sukuk (combination of green and social, projects), SDG-linked Sukuk (issued based on issuer's commitment to SDG objectives), Transition Sukuk (reducing issuer's carbon emission, and Blue Sukuk (sewage treatment and ocean conservation) [168]. For instance, the United Kingdom Islamic Finance Council (UKIFC) estimates that Green and sustainable Sukuk could raise between $30 - $50 billion of capital for the SDGs by 2025.

It is manifest from Chart 3.11A that the Green and ESG Sukuk amounted to USD 8.1 billion in 2022, which represents up to 33.4 percent. [167] observes that the historic record of USD 6.1 billion in 2021 only represents 1 percent of global ESG issuance of USD 1 trillion and is equivalent to 26 percent of ESG-related Sukuk in the same year. Further, following the outbreak of Covid-19, green Sukuk issuance was overwhelmed by sustainability and

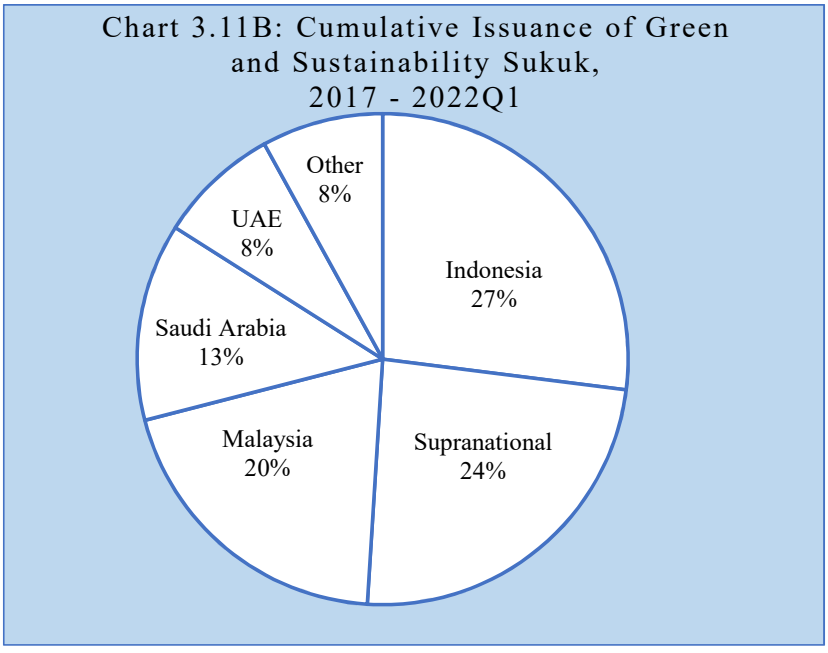
sustainability-linked Sukuk in 2021. Thus, while the green Sukuk dipped in 2020 and 2021, it budded to USD 3.5 billion in 2022 which represents a more than 120 percent increase. The year 2023 proved very bright with a record of USD 2.7 billion which is 29.1 percent of total issuance in 2022. Broadly, the Sukuk landscape has demonstrated an increasing trend since the year 2017.

Chart 3.11A: Green and Sustainability Sukuk Issuance, 2017 - 2023Q1 (USD Million)



	2017	2018	2019	2020	2021	2022	2023Q1
Grand Total	485	1,480	3,997	4,865	6,103	8,142	2,749
ESG Sukuk	24	119	348	2,314	4,524	4,656	2,370
Green Sukuk	461	1,361	3,649	2,551	1,579	3,486	379

Source: Compiled by the Author based on data from the International Islamic Financial Market (IIFM) Sukuk Report 2022.



Source: Refinitiv an LSEG Business, 2022

In Chart 3.11B, the Green and Sustainability Sukuk issuance is principally led by Indonesia with a cumulative 27 percent record since 2017. Evidence [65] shows that among the landmark sustainable Sukuk issuances is the IsDB's third 5-year sustainability Sukuk valued

at USD 2.5 billion at a profit rate of 1.262 payable semi-annually. It was reported that proceeds from the issuance are allocated to green finance/refinance (10%), and social development projects (90%). The social projects, among others, include employment generation, financing SMEs, affordable housing, sustainable water and wastewater management, and affordable basic infrastructure. The green projects include renewable energy, clean transportation, pollution prevention, and control, etc. Further, in September 2021, Kuveyt Turk which is the largest Islamic finance bank in the Turkish banking sector priced its inaugural USD 350 million sustainability tier 2 Sukuk with a profit rate of 6.125%. Moreover, in 2023, for instance, the IsDB's 7th March 2023 Sukuk of $2 billion and 26th September 2023 of $1.75 billion Sukuk were both highly rate-rated by the S&P, Moody, and Fitch rating agencies. Reports say that the IsDB is using the Sukuk proceeds to continue to extend its general corporate purposes with a sharper focus on green, resilient, and sustainable infrastructure and inclusive human development [169], [170].

In the longer to medium term, however, a report [65] predicts some challenges that could dampen both the supply and demand for global Sukuk. For instance, excess demand for global Sukuk is projected to fall to USD 98 billion in 2027, from USD 199 billion in 2021. The report posits that higher oil prices, combined with increased production and greater fiscal control would lead to reduced Sukuk financing needs for governments in core Islamic finance jurisdictions in both the GCC and Southeast Asia. On the demand side, legal complexities, such as the introduction of AAOIFI Shari'ah Standard 59, reduced investor appetite among the more risk-averse global investors with post-pandemic recovery, and hikes in the US interest rate, would hold sway. The continued Russia-Ukraine war will likely drive both demand and supply for Sukuk as it impacts energy prices, food, and agriculture and will continue to shape global trade and political alliances.

On a positive note, green and sustainability Sukuk continue to grow due to the increasing demand for green and sustainability Sukuk from investors in Western markets such as the US and Europe coupled with an unmatched supply of ESG investments, and green and sustainability Sukuk globally. Also, there is an emerging need for large-scale investments in developing economies to fund sustainable development [163]. To continue to harness their potential, there is a need to create more awareness – both issuer and investor awareness, to fill in the technical knowledge gap, invest in capacity-building, and clear Shari'ah compliance requirements.

Case study I - Sukuk Prihatin Malaysia

The Malaysian government launched the National Economy Recovery Plan known as PENJANA in response to the COVID-19 crisis. To raise funds for the stimulus package, Digital Sukuk (Sukuk Prihatin) was introduced. Using a digital mechanism, the sum of US151.7 million (RM660 million) was raised which exceeded (oversubscription by 32 percent) the initial offer of US115 million (RM500 million) between August and September 2020.

Objective:

The Sukuk is in line with the UN's 2030 Agenda for Social Development Goals (SDGs).

The Sukuk funds were used to provide subsidies to the poor (B40 group), support health-related expenditures including giving special allowance to front liners, grant financial assistance to Micro-SMEs to become resilient during the pandemic, and internet coverage to schools in the rural areas to enable them to continue their lessons during covid-19 lockdown.

Enablers:

The Malaysian Ministry of Finance (MoF), Bursa Suq al-Sila' (Stock Exchange), Bank Negara Malaysia, and 27 Deposit Money Banks (participating banks created their websites to promote and facilitate Sukuk Prihatin subscriptions from retail investors).

Challenges:

There were competing investment products existing in the market and limited participation among the rural population or senior citizens due to digital barriers.

4.0 RESEARCH METHODOLOGY

4.1 Introduction

The section discusses the methodology employed in the study. The research design is exploratory in nature which is open to the use of exploratory tools. The study employs a survey research method which often involves the use of nonparametric measures and structural equation modeling (SEM) techniques.

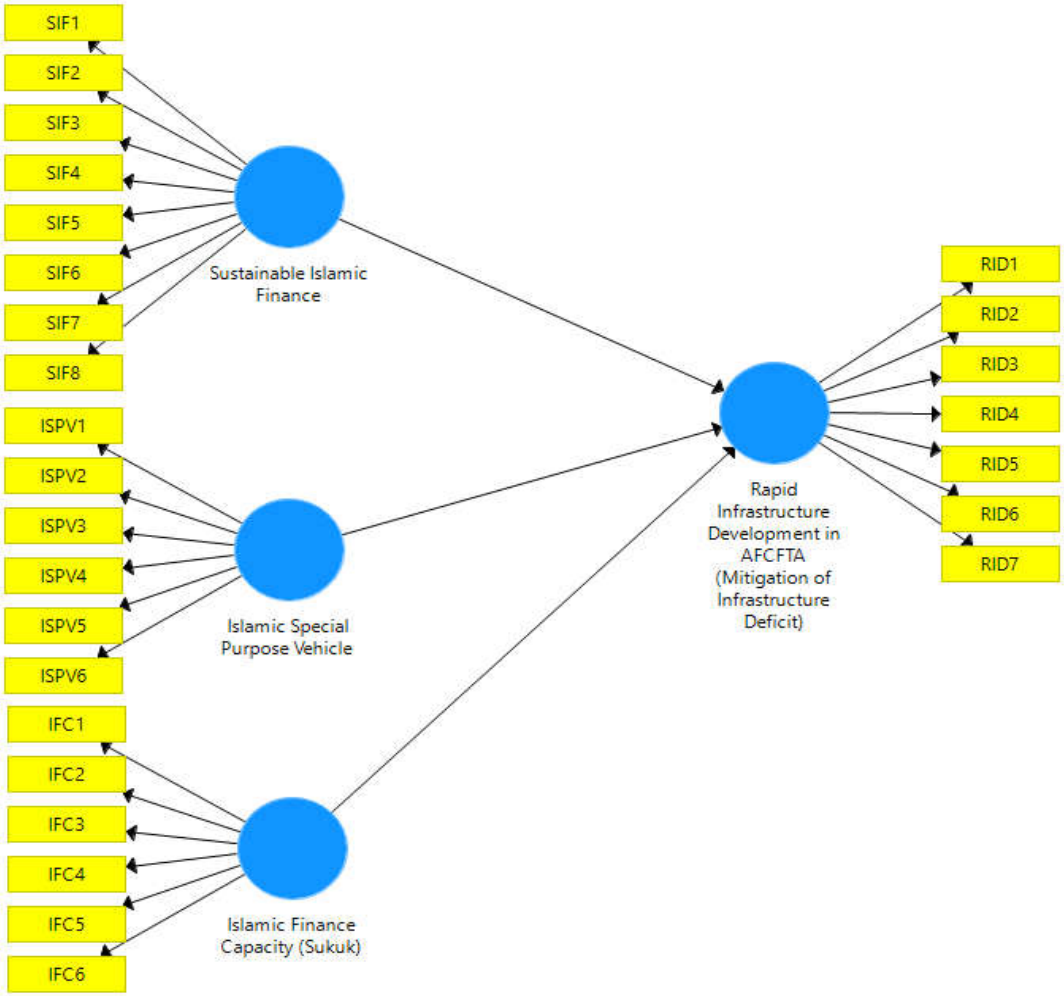
4.2 Survey Research Methodology

This study employs an exploratory research methodology to evaluate how Islamic finance could mitigate the level of infrastructure deficit in the Africa Continental Free Trade Area (AFCTA). The survey employs closed-ended questionnaires with a total of 700 questionnaires distributed across the sample. The approach is replete in the literature: [171], [172], [173], [174], and [175]. The study covers five countries, four in Africa – Egypt, Kenya, Morrocco, Nigeria, and Saudi Arabia, leading Islamic finance in Africa, and the Gulf Cooperation Countries (GCC) (see Appendix IV on Islamic finance performance indices). The headhunting technique was employed in the administration of the questionnaire using online platforms to respondents from relevant Islamic finance institutions, government ministries, agencies, and departments (MDAs), Shari'ah experts, academics, and other industry practitioners. [81] espouse the use of automated data collection tools to facilitate data tabulation and manipulation while [176] suggest the use of nonparametric statistics when small sample sizes are involved. Likewise, the analysis was done within [177] thematic approach. The survey data was analyzed using descriptive research tools, percentages, mean, median, pictorial figures, and charts.

4.3 Structural Equation Modelling Technique

Structural Equation Modeling (SEM) is a highly valued statistical technique in research across diverse fields, offering simultaneous analysis of complex relationships between observed and latent variables [178]. This method is particularly beneficial for modeling intricate relationships among multiple factors, considering both observed and latent constructs. SEM has two main categories: covariance-based SEM (CB-SEM), typically used in confirmatory studies and involving software like AMOS, and variance-based SEM, employed in exploratory studies, using tools like Partial Least Squares (PLS) for instance, SmartPLS ([179]; [180]).

In this investigation, SEM provides the analytical framework for estimation, appraisal of the coefficients, and hypothesis testing. Partial Least Squares (PLS) path modeling using Smart-PLS version 4.0 was employed. The SmartPLS enables simultaneous estimation of relationships between measurement models (indicators) and structural models (constructs) [181]. In addition, Smart-PLS has gained distinction as an analytical tool in other research disciplines, including operations management and finance [182].



Source: Survey Data (2023) and computed by the author using Smart-PLS.

Figure 4.1: SmartPLS Structural model

The use of the Smart-PLS Structural Equation Modeling in this study is in tune with previous research in the literature ([179]; [183]; [184]; [181]; [182]; and [185]), emphasizing its suitability for analyzing complex relationships within datasets. We follow the standard graphical SEM convention in specifying our Islamic infrastructure finance (IIF) model as shown in Figure 4.1. The three central variables in the model are shown adjacent to circles, with arrows used to connect them with the dependent variable as with the three formulated hypotheses.

For instance, the hypothesis that Islamic finance positively and significantly influences filling the infrastructure gap in Africa is depicted by the arrow going from Islamic finance to filling the infrastructure gap in Africa. The same is the case with other latent variables. The terminology for the central variables includes latent variables, theoretical variables, constructs, unobservable variables, and factors [186]. Similarly, each latent variable in Figure 4.1 is connected to more than one rectangle, which indicates measurements of the latent variables as well. The measurements are also referred to variously in the literature as manifest variables, empirical variables, observed variables, observations, indicators, or simply, measures, which are also represented by arrows.

Further, the functional relationship of the model is given as follows:

$$Y_i = (X_{i1}, X_{i2}, X_{i3}) \quad (1)$$

The multivariate form of the regression model is given by:

$$Y_i = \varphi_o + \varphi_1 X_{i1} + \varphi_2 X_{i2} + \varphi_3 X_{i3} + \varepsilon_i \quad (2)$$

$$RID_i = \varphi_0 + \varphi_1 SIF_i + \varphi_2 ISPV_i + \varphi_3 IFC_i + \varepsilon_i$$

Where:

RID_i= Rapid Infrastructure Development for mitigation of infrastructure deficit in the AfCFTA as an endogenous variable.

SIF_i = Sustainable Islamic (Green) Finance at a given point in time, latent exogenous variable.

$ISPV_i$=Islamic Special Purpose Vehicle (SPV) at a given point in time, latent exogenous variable.

IFC_i= Islamic Finance Capacity (Sukuk) in filling infrastructure deficit, latent exogenous variable.

φ_0= Intercept/ autonomous variable.

$\varphi_1, \varphi_2, \varphi_3$ = are parameter estimates or coefficients of exogenous constructs.

ε_i = the error term or the size of variation/errors which is accounted for by other possible factors that could influence Y_i not captured in the model.

A priori expectation: $\varphi_1, \varphi_2, and\ \varphi_3 > 0$.

4.4 SmartPLS Hypotheses

The hypotheses of the study are formulated in null form to guide the study as follows:

H_{01}: Sustainable Islamic (green) finance does not positively and significantly influence rapid infrastructure development for mitigation of infrastructure deficit in the AfCFTA.

H_{02}: Islamic Special Purpose Vehicle (SPV) does not positively and significantly influence rapid infrastructure development for mitigation of infrastructure deficit in the AfCFTA.

H_{03}: Islamic finance (Sukuk) cannot positively and significantly influence rapid infrastructure development for mitigation of infrastructure deficit in the AfCFTA.

5.0 DATA PRESENTATION, ANALYSIS AND DISCUSSION

5.1 Introduction

This section dwells on the presentation of empirical data, analysis, and interpretation based on survey research output and SmartPLS structural equation model results. A sample of seven hundred (700) from five countries: Egypt, Kenya, Morocco, Nigeria, and Saudi Arabia was used in this investigation. The selection of the countries was based on their level of exposure to Islamic finance within and outside the African continent. The study aims to assess the catalytic role of Islamic finance in filling the infrastructure gap in Africa under the auspices of the African Continental Free Trade Area (AfCFTA). Research questionnaires were distributed electronically between 10th October and 7th December 2023 and a total of four hundred and fourteen (414) were successfully retrieved. The questionnaire contains a total of fourteen (14) close-ended questions using a standard 5-Likert scale. Table 5.1 presents the distribution of responses retrieved by country. The rest of the section presents a level of responses per question and analysis. Further, it also contains an analysis of structural equation models specified in the preceding section and a test of the hypothesis.

Table 5.1: Level of Responses by Country

Country	Respondents	Percentage
Egypt	101	24.40
Kenya	72	17.39
Marocco	48	11.59
Nigeria	96	23.19
Saudi Arabia	80	19.32
Others	17	4.11
Total	414	100%

Source: Researchers computation, December 2023

5.2 Analyses of Research Questionnaire

Q1: What is your Profession?

Respondents' background is important in this analysis given the specialty of the investigation. This is even though a head-hunting technique was employed in the selection of the respondents from each country. On this note, Chart 5.1 shows that 7 percent of the respondents are 'Shari'ah Scholars'. This plus 47 percent 'Islamic Bank Practitioners' gives a total of 54 percent, which is equivalent to 241 respondents. 'Academicians' with a background in Islamic banking and finance constitute 24 percent while 6 percent are 'Top Government Executives'. 'Private investors' have only 1 percent and 15 percent are from 'Other' fields–conventional banks, consultants, solicitors, etc.

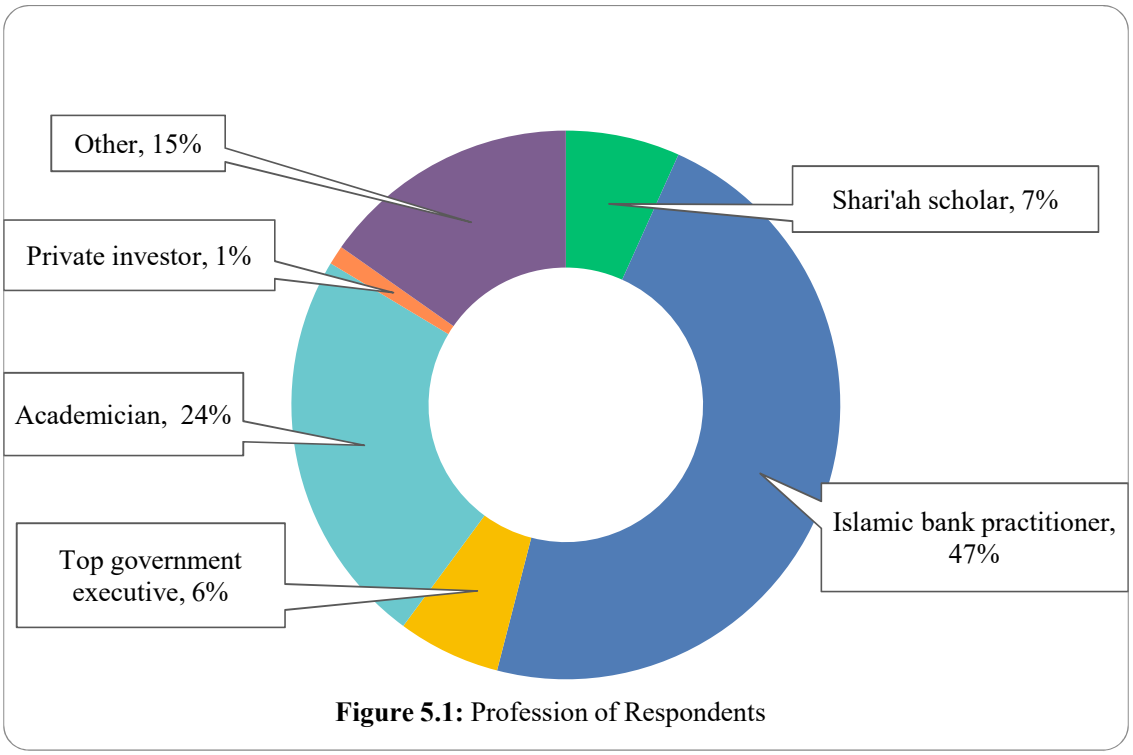


Figure 5.1: Profession of Respondents

Source: Survey data, December 2023

Q2: What is your level of involvement in Islamic finance cum infrastructure finance?

In addition, to the profession of the respondents, Chart 5.2 summarizes the depth of knowledge and their level of involvement in Islamic finance cum infrastructure finance. 28 percent and 24 percent revealed that they have 'a great deal' and 'a lot' of involvement with Islamic finance, respectively. 26 percent constitutes those in the 'moderate' category and 12 percent are those with 'a little' interaction with the field. Only 10 percent of the respondents were found not to have been involved with Islamic finance or Sukuk issuance.

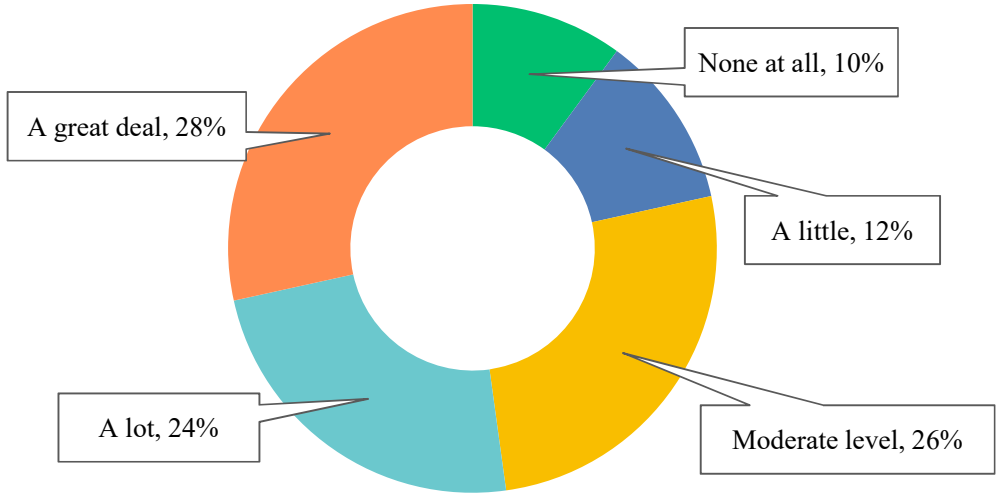


Figure 5.2: Respondents' Level of Involvement/Knowledge of Islamic Finance

Source: Survey data, December 2023

Q3: Structuring Sukuk meets the Shari'ah requirements and other national and international requirements–Central Bank, Securities Commission, AAOIFI, IFSB, ESG, IMF & WB, etc.

Chart 5.3 three depicts the answers given by the respondents regarding whether structuring Sukuk in their jurisdiction meets the Shari'ah requirements, those of regulatory institutions such as the Central Bank, Federal Ministry of Finance, Capital Market and Exchange Commission, and follows the international standard-setting boards/organizations (AAOIFI, IFSB, ESG, IMF & WB). The real essence of Sukuk (Islamic bond) lies in its Islamicity, without which it is not different from conventional bond (see Appendix I).

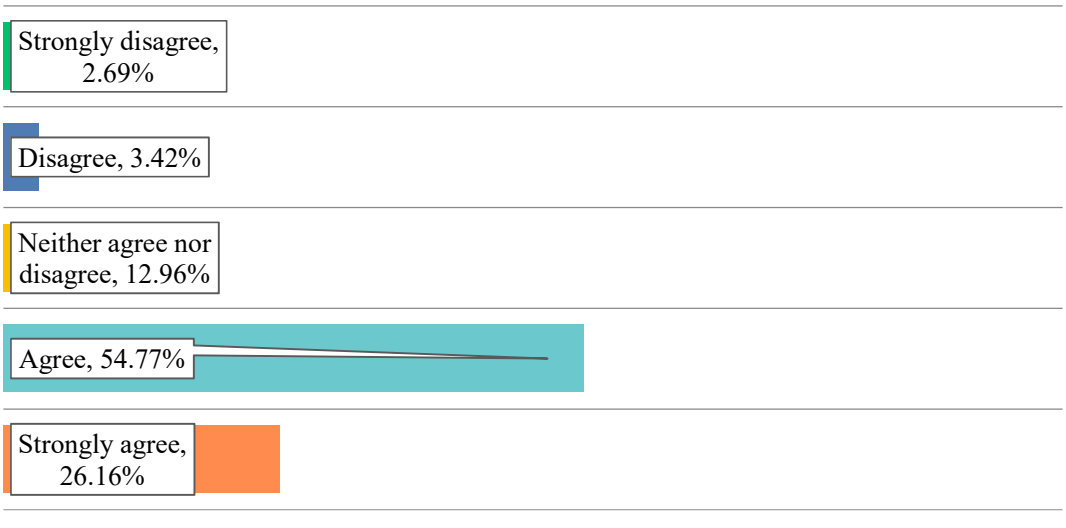


Figure 5.3: Sukuk Structuring Meets Shari'ah Compliance Requirements

Source: Survey data, December 2023

Hence, a total of 80.9 percent 'agree' of better that the structuring of Sukuk complies with the Shari'ah and other requirements, both internal and external. While about 13 percent could neither agree nor disagree, less than 6 percent 'strongly disagree' or less with the proposition. This is in line with the expectation. See for example ([187];[188]; [189]; & [65].

Q4: The Shari'ah/legal and other regulatory frameworks for Islamic finance are adaptable to all conditions and time and do not require radical changes in the national constitution/legal nor those of regulatory institutions; Central Bank, Exchange Commission, Ministry of Finance, Capital Market, etc.

To assess whether the adoption of Islamic finance by countries in the AfCFTA would require a radical change in the national constitution and other legal/regulatory frameworks, Chart 5.4 displays responses to the question asked. 72 percent of respondents either 'agree' or better that countries aspiring to adopt Islamic finance principles only need to adjust their legal and regulatory frameworks to do that. This is in line with many countries in Europe, Asia, and the United States, that is, Islamic finance thrives under a dual system. 8 percent 'neither agree nor disagree', whereas about 20 percent either 'strongly disagree or less with the proposition.

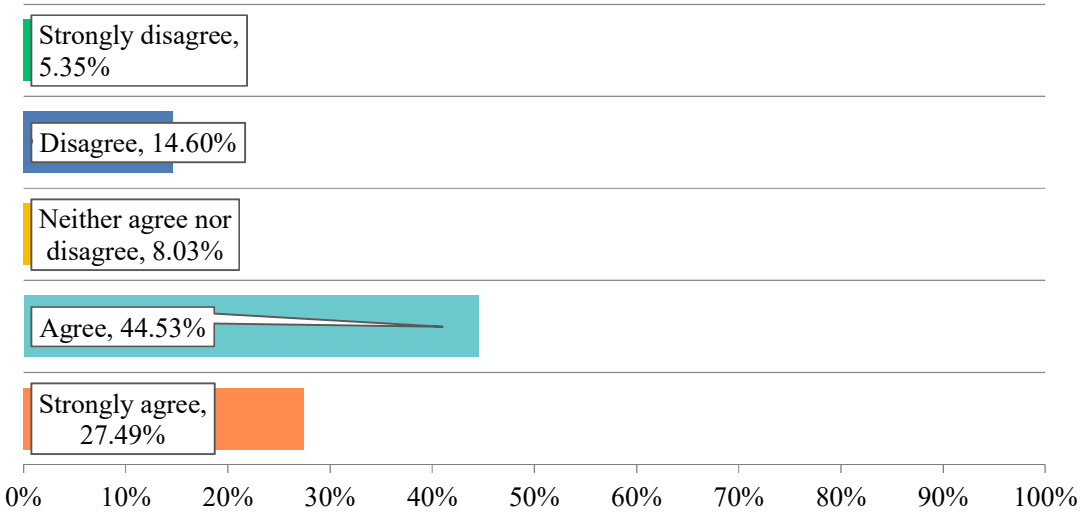


Figure 5.4: Adaptability of Shari'ah Legal and Regulatory Framework

Source: Survey data, December 2023

Q5: Which Sukuk structure is most applied in your country by the Sovereign and Sub-sovereign issuers? You can tick more than one option.

This question intends to assess the Sukuk structure that is most widely applied by sovereign and sub-sovereign institutions given the array of Sukuk structures recognized by the AAOIFI organization. Chart 5.5 depicts the responses of the respondents. The respondents were allowed to select more than one option. Three (3) Sukuk structures, Ijara (lease structure), Mudharaba (trustee-based structure), and Murabaha (Cost-plus structure) were ranked highly with Ijara topping with about 35 percent. This is in line with the evidence displayed in Chart 10A on domestic Sukuk issuances in 2022. Other structures too were ranked at various levels

which yet concur with the evidence in Chart 10A released by the International Islamic Liquidity Management Corporation (IILM, 2022).

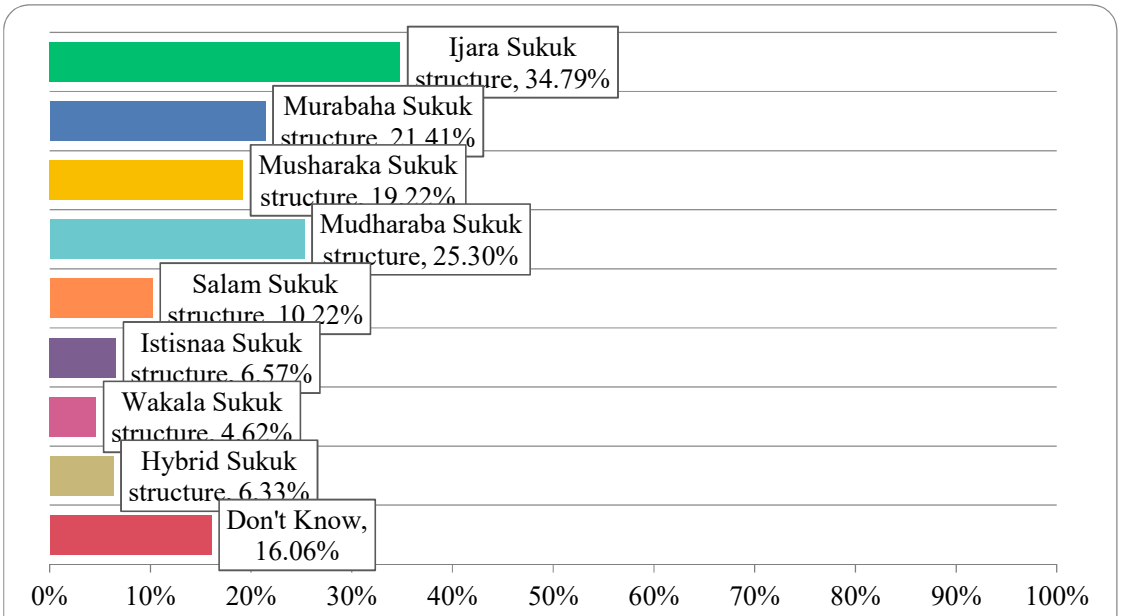


Figure 5.5: Sukuk Structure (Sovereign & Sub-Soverreign)

Source: Survey data, December 2023

Q6: Which Sukuk structure is most applied by the private sector in your jurisdiction? You can tick more than one option.

In line with question 5, this question assesses the Sukuk structures that are most widely applied as investment gateways by the private sector. Thus, Chart 5.6 reports that Ijara Sukuk (lease), and Istisnaa (debt-based structure) Sukuk top with 27.3 and 26.1 percent respectively. Similarly, *Murabaha* (cost-plus) and Salam (deb-based structure) Sukuk scored 17 percent each. The Sukuk structures, as well as the findings, indicate that various Sukuk structures are adopted by the private sector investors and Sukuk subscribers in Islamic finance investors for Shari'ah-compliant investment.

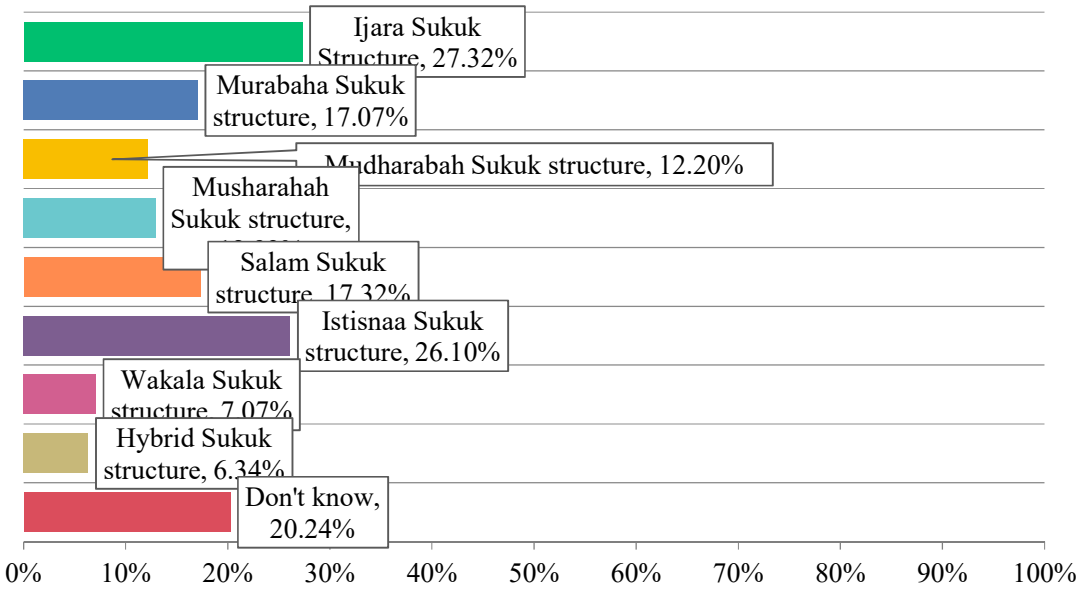


Figure: 5.6: Sukuk Structure (Private Sector)

Source: Survey data, December 2023

Q7: Invariably, Sukuk proceeds/funds are strictly used by the obligor/government to fund an agreed project such as the provision of roads, schools, hospitals, electrification, water supply, etc.

Islamic finance requires that both the sources and application of funds should be compliant with Shari'ah principles. [190] posits that while *Sukuk* provide investors with a high degree of certainty that their money will be used for a specific purpose, doing so complies with the underlying Shari'ah principles, which stipulates that the funds raised must be applied to investment in identifiable assets or ventures.

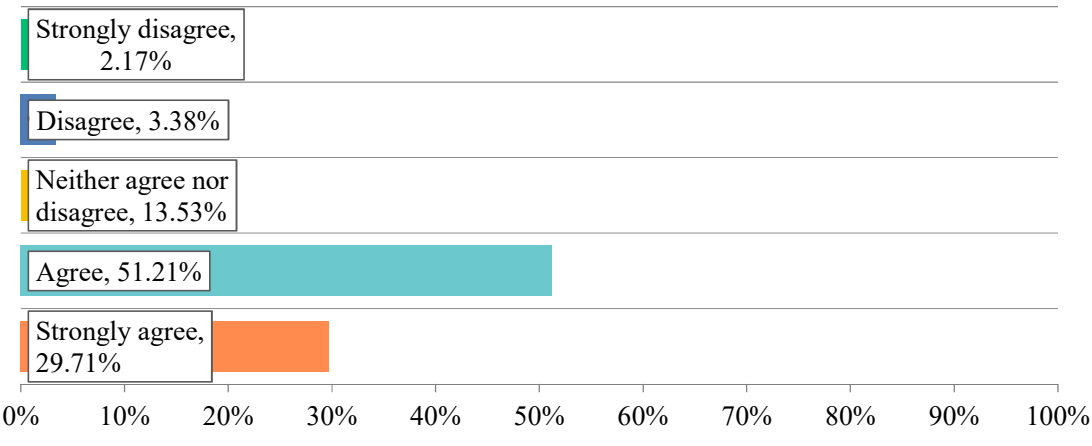


Figure 5. 7: Application of Sukuk Proceeds

Source: Survey data, December 2023

Chart 5.7 shows that overwhelmingly, over 80 percent of respondents either 'agree' or better with the proposition whereas only about 5.5 percent of the respondents either 'strongly disagree' or less with the proposition. About 14 percent of the respondents 'neither agree nor disagree' with the proposition. The finding implies that the Sukuk proceeds are invariably used in line with the agreed project to be executed. Although the resource-financed infrastructure (RFI) model is not a Shari'ah-compliant approach, it is nonetheless a closer ally of Sukuk finance.

Q8: Notwithstanding the type of Sukuk issued, the Shari'ah principles provide that a Special Purpose Vehicle (SPV) should ensure the following:

In line with the execution of PPP projects, as depicted in Figure 1.1, Sukuk structures also recognize the need for Special Purpose Vehicle (SPV). Chart 5.8 indicates the items that a Special Purpose Vehicle (SPV) should ensure regardless of the type of the Sukuk issued. This research question examines the roles of the SPV in administering Sukuk. Generally, evidence in Chart 5.8 reveals that on average, respondents either 'agree' or 'strongly agree' on all the six propositions listed under question 8 by up to 86.8 percent which is equivalent to a total number of 359 out of an average of 413 respondents. When this is disaggregated, for instance, strict application of funds in line with the underlying contract agreement has 87.4 percent of the respondents (360 out of 412) who either 'agreed' or better, and overwhelmingly, 90.1 percent (372 out of 413) respondents 'agree' or better that Sukuk issuance, and Islamic finance in general, do not discriminate based on religion. That is, Muslims and non-Muslim investors alike are free to invest in Sukuk. There is nothing intrinsic to *Sukuk* that make them inappropriate for conventional investors [190].

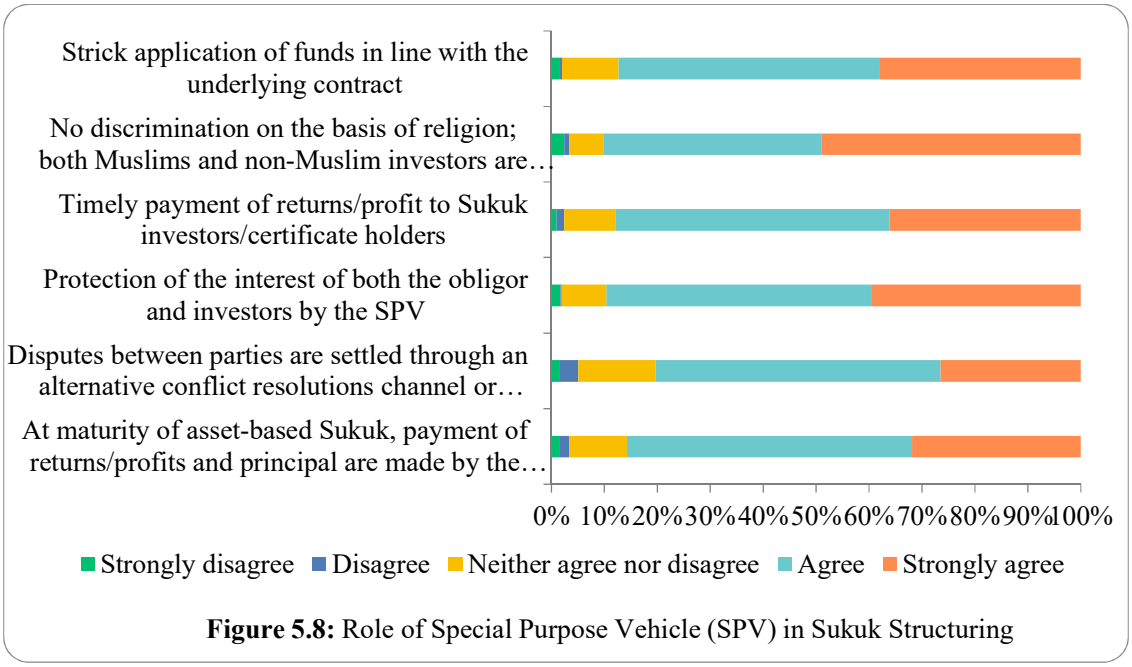


Figure 5.8: Role of Special Purpose Vehicle (SPV) in Sukuk Structuring

Source: Survey data, December 2023.

Additionally, the Chart depicts the respondents' view on whether SPV facilitates timely payment of returns/profit to Sukuk investors/certificate holders where about 88 percent (362

out of 412) respondents either 'agree' or better with the proposition and on the protection of the interest of both the investors and the obligor, 89.6 percent (371 out of 414) respondents either 'agree' or better with the proposition as well. Likewise, in the proposition on disputes between parties (investors and obligor) and settlement channels, 80.3 percent (331 out of 412) either 'agree' or better whereas in the proposition on the maturity of Sukuk contract, especially for asset-based Sukuk, the SPV ensure payment of returns/profits and principal to the investors and the return of the underlying asset to the obligor. This was concurred by 85.7 percent which is equivalent to 355 out of 414 respondents.

For support from the empirical literature, for instance, [191] asserts that the SPV the intermediary in the issuance process … raises funding from the issuance of sukuk to investors, the proceeds of which are then made available to the government as payment for the sale or lease of assets. Further, [192] states that the SPV plays the reciprocal role of a proxy, that is, a proxy to the originator on some issues and to the security investors on some other issues. Also, see [193] the title 'The continued use of offshore SPVs for Sukuk issuance'; [188] on the title 'An assessment of enforceability of foreign judgments and SPV incorporation in Sukuk with a specific reference to Saudi Arabia, UAE, and Bahrain, and [194] on the title 'Sukuk's role in financing infrastructural development during the Covid-19 pandemic in Nigeria.'

Q9: Sukuk help in the deepening and integration of the domestic capital market with the global Shari'ah capital market.

The international capital markets stand to benefit if the fundamental nature of Sukuk as a useful and diversifying instrument is more widely recognized and ignoring Sukuk will come at a cost as the product offers diversifying credits and great credit stories [190]. Chart 5.9 reports the views of the respondents regarding the contribution of Sukuk towards the deepening and integrating of the domestic capital market with the global Shari'ah-compliant capital markets. Generally, responses have been overwhelming with about 91 percent of the total respondents either 'agree' or better with the proposition that Sukuk contributes to the deepening and integration of the domestic capital market with the global Shari'ah market. On the other hand, less than 3 percent of the respondents either 'strongly agree' or less with the proposition while about 7 percent of the respondents 'neither agree nor disagree'. Therefore, this implies that Sukuk help in the deepening and integration of the domestic capital market with the global Shari'ah capital market. Sukuk market plays an important role in enhancing the linkages between financial markets as it facilitates cross-border flows in the international financial system and as well as adding to the depth and diversity of the overall global capital market ([195]; [187]; [196]; (IFSB, 2022)).

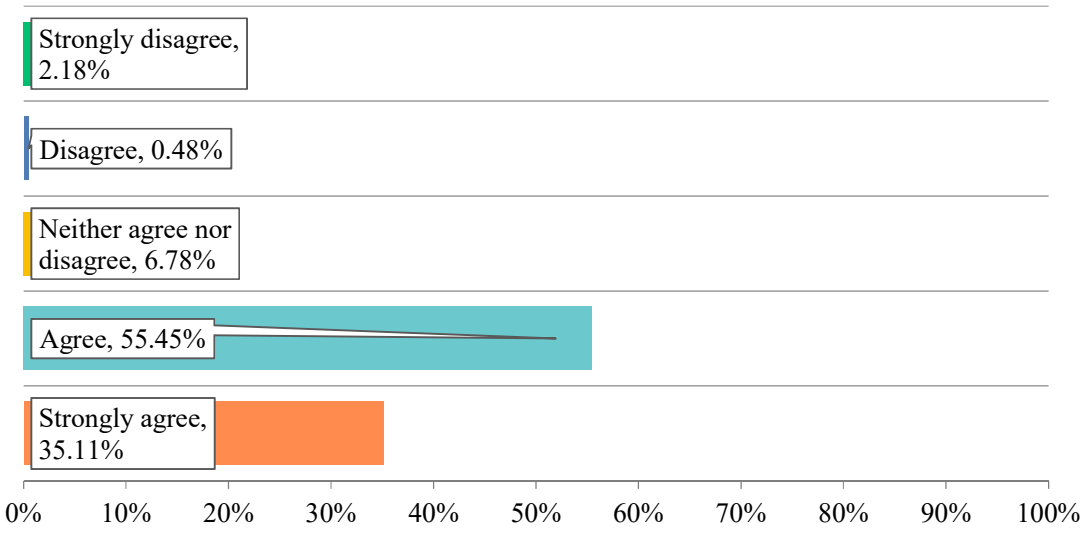


Figure 5.9: Sukuk Issuance, Deepening and Integration of Domestic Capital Market with Global Markets

Source: Survey data, December 2023.

Q10: Aside from the opportunity to engage in Shari'ah-compliant investments, Sukuk holders/investors enjoy steady and predictable cash flow over a long period.

Until the emergence of Islamic financial finance some five decades back, Shari'ah complaint investors encountered great difficulty in sorting out what constitutes Shari'ah-compliant investments. Henceforward, Shariah-compliant investing provides the opportunity for Muslim investors to align their investments with the established body of Islamic law and still gain rewards on the investments. Accordingly, this question seeks to assess respondents' views on the proposition. Chart 5.10 reports the percentage of those who 'agree' and 'strongly agree' put together at about 85 percent. Those who either 'strongly disagree' or less stood at less than 5 percent of the respondents whereas those who are neutral constitute about 11 percent only. This finding therefore indicates that Sukuk holders/investors enjoy steady and predictable cash flow over medium- to long-term periods.

Evidence, for instance, shows that the return on the Sukuk is 125 basis points over three months LIBOR payable quarterly, with the *Sukuk* having an overall tenor of five years and an option for early redemption [196]. And, using sukuk market risk and information asymmetry risk, Sukuk investment analysts can estimate the fair value of sukuk more precisely than other ad hoc measures available, that is, LIBOR and interbank benchmark rate [197].

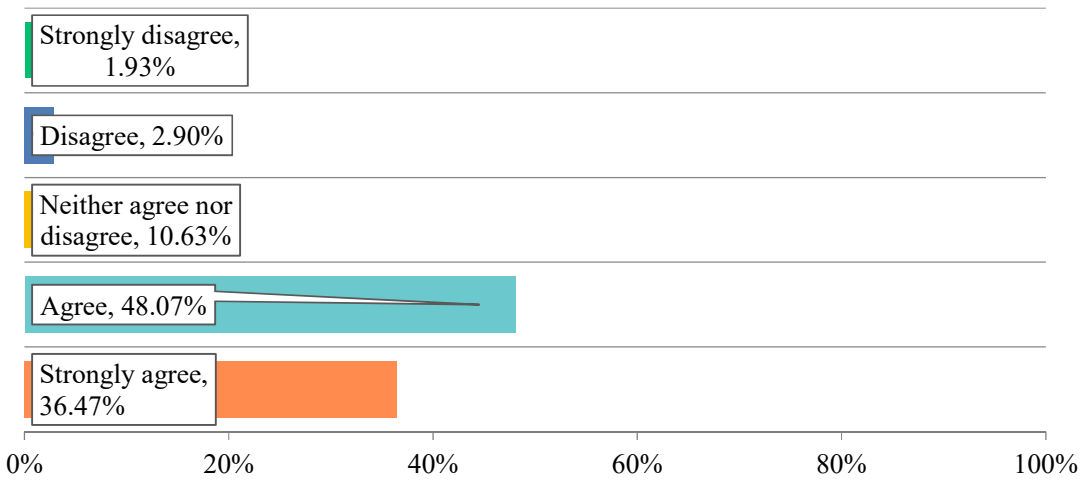


Figure 5.10: Sukuk, Shari'ah compliance Predictable Cash Flows

Source: Survey data, December 2023.

Q11: Islamic finance can fill the wide infrastructure deficit in Africa given:

We posit that given its unique characteristics, Sukuk cum Islamic finance can help in filling Africa's wide infrastructure gap as has been alluded to in the literature ([54]; [51]; [52]; [78] This argument was assessed based on the proposition raised in question 11 and the responses are presented in Chart 5.11. Overall, the assessment is overwhelming with an average percentage of those who either 'agree' or better at 87.9 percent equivalent to a mean of 362 respondents out of 412.

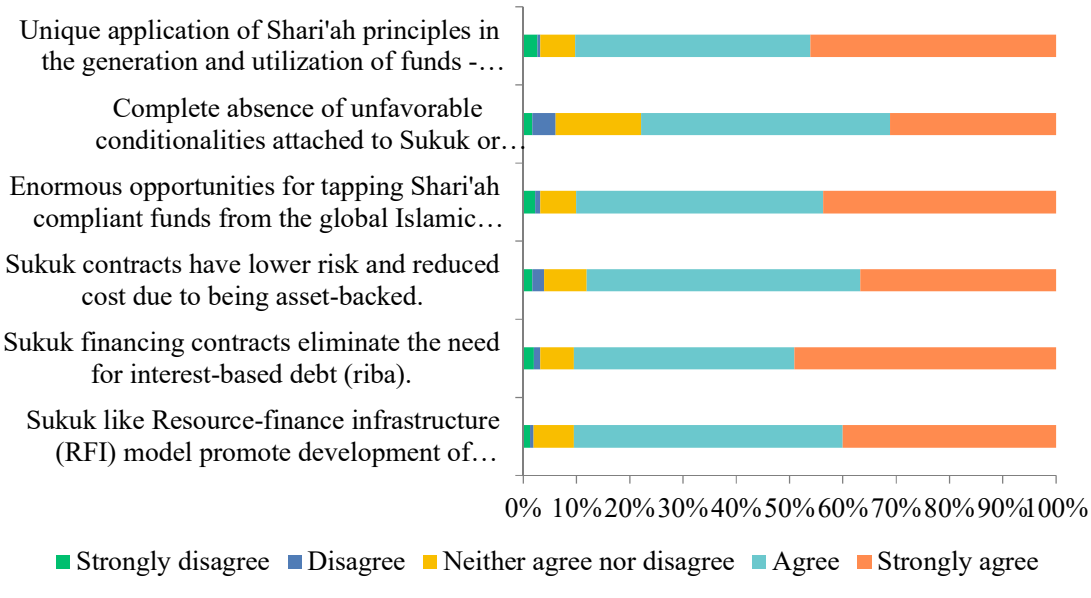


Figure 5.11: Sukuk is Capable of Filling Infrastructure Africa's Deficit

Source: Survey data, December 2023.

A total of 90.3 percent of the respondents either 'agree' or better with the proposition that the 'unique application of Shari'ah principles in the generation and utilization of funds–ethical investments, can spur infrastructure development in the continent. In the same vein, three other propositions were ranked highly at slightly above 90 percent, and these are: 'Sukuk herald enormous opportunities for tapping Shari'ah compliant funds from the global Islamic financial markets', 'Sukuk financing contracts eliminate the need for interest-based debt (*riba*)', and 'Sukuk, like Resource-finance infrastructure (RFI) model, promote the development of assets and hence ideal for Africa economies.' These findings are pivotal to the search for alternative means of funding infrastructure development in the African continent. See: [193]; [96]; [110]; & [194].

Furthermore, two other propositions, that are, 'complete absence of unfavourable conditionalities attached to Sukuk or Islamic finance contracts' and 'Sukuk contracts have lower risk and reduced cost due to being asset-backed' were flagged by the respondents equally very well as 'agree' or strongly agree' at 77.9 and 88.1 percent, respectively. The absence of unfair conditionalities in Sukuk transactions is a noble feature of Islamic finance distinct from their conventional counterparts. Again, Sukuk deals stand better than the RFI model, which often tends to be exploitative in nature as well. For instance, it has been found that due to corruption, the borrowing government may steal the infrastructure funds or fail to make a sincere commitment to leveraging on tax revenues to settle the infrastructure loans/financing [80]. Also, see: [198]. Our empirical findings also support the superior efficiency of Islamic banks and suggest that Islamic banking could be beneficial for Africa [199]

12: Sustainable Islamic finance - Green, and Environmental Sustainability and Governance (ESG) Sukuk, are capable of boosting Africa's infrastructure in the following:

An increasing number of investors are interested in 'environmentally sustainable investing' (in other words, investing to promote activities seen as positive for the environment [190]. The question on sustainable Islamic finance was posed to assess the respondents' view regarding whether sustainable Islamic finance, green and environmental sustainability Sukuk, and governance (ESG) are capable of boosting Africa's infrastructure in various ways. The question contains eight propositions as presented in Chart 5.12. Remarkably, respondents sighted all propositions with an average score of 90.1 percent, which is equivalent to 373 out of 412 respondents who either 'agree' or 'strongly agree'. For instance, four out of the eight propositions, that is, 'Renewable energy sector', 'Social security–affordable housing, employment generation, and workforce diversity', 'SDGs–Financial inclusion, *awqaf* finance and *Takaful*, wealth redistribution and poverty reduction, and 'Education and human capital development' each had a score exceeding 90 percent. Others had between 88.4 and 89.8 percent.

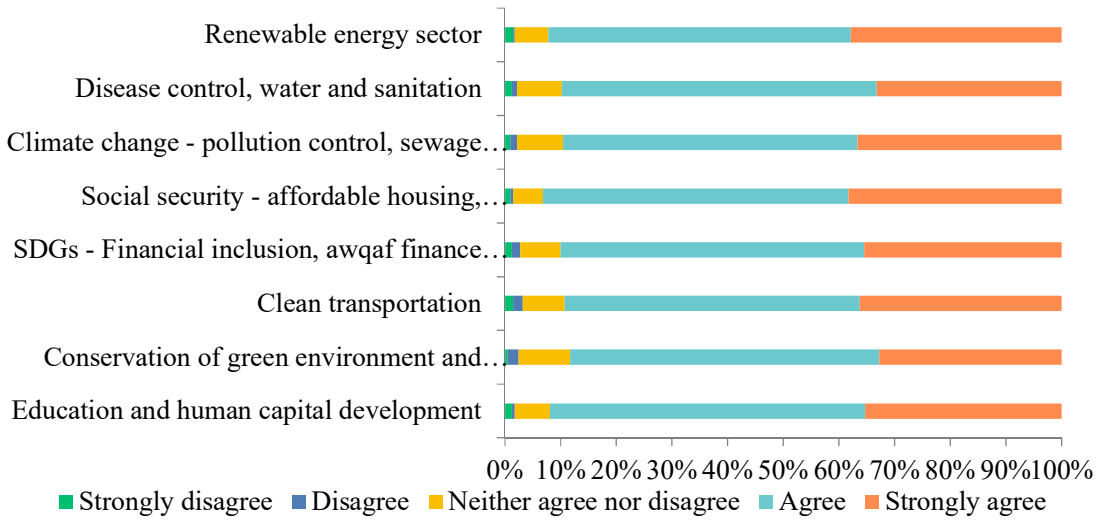


Figure 5.12: Susainable Sukuk is Capable of Boosting Africa's Infrastructure Development

Source: Survey data, December 2023.

Sukuk is not only capable of promoting growth and mitigating sustainability issues but attaining the SDG-9, which is on sustainable development; infrastructure, industrialization, and innovation [25]. Also, Islamic social finance has the potential to be a crucial tool to offer governments a strong, non-traditional source of financing to advance their SDG implementation and its investments generate returns through education, healthcare, welfare, and infrastructure for those in need [200]. Further, it has been argued that Sukuk provide funds for a specified infrastructure project, such as a renewable energy project, there is little chance the investors' money will be diverted and used for another purpose [190]. He adds that *Sukuk* could help fill the fixed income supply gap for environmental investors to the extent the proceeds of a *Sukuk* are earmarked for a particular environmentally beneficial purpose. Equally, Green Sukuk issuances positively exert a moderate effect on economic growth, a weak positive effect on social development, and a significant positive effect on financial development [201]

Q13: What should the economies in the AfCFTA do to tap from the global Sukuk market for rapid infrastructure development?

How we tap from the global Islamic finance market for infrastructure development in the AfCFTA hinges on how receptive the investment is. Therefore, the question is meant to elicit responses from the research respondents across the sample on a number of issues raised under the question. Chart 5.12 presents a pictorial summary of the responses. Impressively, 90.1 percent of the respondents (374 of 413) on average either 'agree' or 'strongly agree' that tapping the global Sukuk market for rapid infrastructure development requires the economies in the AfCFTA to act on all the issues raised. Except for the issue of the development of a unique tax regime to reduce transaction costs and boost the competitiveness of the ICM transactions which was flagged at 86.2 percent, all others scored 90 percent or better.

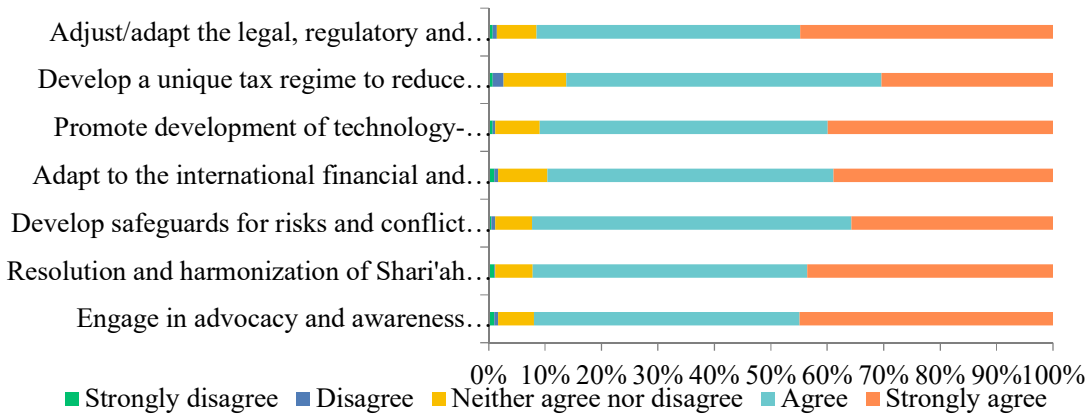


Figure 5.13: What AfCFTA Economies Should do to Tap from the Global Sukuk Market for Rapid Infrastructure Development

Source: Survey data, December 2023.

Pointedly, an adjustment in the legal, regulatory, and structural environment for smooth operations of the Islamic capital market and Sukuk and commitment to advocacy and awareness campaigns tower with 92 percent scores each. Moreover, economies in the AfCFTA could tap from the global Sukuk market for rapid infrastructure development by adapting rules, guidelines, and Shari'ah standards of the international standard-setting institutions like the AAOIFI, IFSB, IILM, etc., as adduced by the respondents.

On regulation of Islamic finance [202] posit that: "… the UK takes first place in Europe and first place among non-Muslim-majority nations in Islamic finance... Its approach has been to adapt pre-existing legislation and regulations governing conventional financial instruments to cater to the structures commonly used in Islamic finance to ensure a level playing field for Islamic finance products and conventional instruments. By so doing, the UK has proactively monitored and responded to any unequal treatment between the two by introducing remedial legislation and regulations."

Q14: Despite its wide acceptance and robust growth rates, Islamic finance in general, and Sukuk in particular, will continue to be shaped by the following:

The future of the Islamic finance industry and Sukuk for infrastructure development remains and will continue to be affected by predicaments in the global economy and sociopolitical events. We introduced this question to assess the likely impact of these factors on the research respondents. We identified ten (10) critical issues under this question.

Chart 5.14 summarizes the views of the various respondents regarding whether Islamic finance in general and sukuk, in particular, are shaped by various phenomena. Enormously, 82.1 percent (equivalent to 338 out of 412) of the respondents on average, 'agree' or 'strongly agree' that all the issues are significant in shaping the future of Islamic finance and Sukuk in Africa. When we discount those neutral, which constitute 11.8 percent (49 respondents), only about 7 percent (25 respondents) either 'disagree or 'strongly disagree' with the propositions.

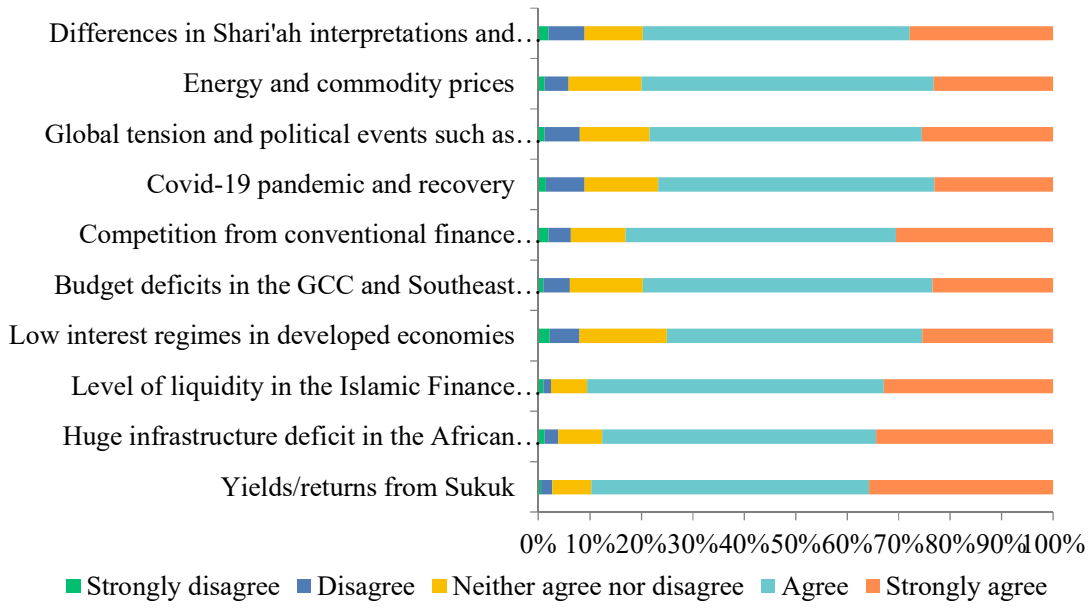


Figure 5.14: Factor Shaping Sukuk Issuance

Source: Survey data, December 2023.

Specifically, global phenomena such as 'Covid-19', 'Threat to global peace', 'Energy and commodity prices', 'Low-interest regime in developed countries' scored between 80 percent and below, whereas 'Level of liquidity in the Islamic finance institutions' presents the greatest motivation with a score of 90.6 percent. Incidence of 'Huge infrastructure deficit in the African continent' and 'Yields/returns from Sukuk' add other strong stimulants with 87.7 and 89.7 percent, respectively. Therefore, based on these findings, policymakers, government, and investors should reckon with and navigate the nascent industry's opportunities in the future. For instance, [203] flags increasing global economic uncertainty, rapid urbanization in Middle Eastern countries, and rising digitization of financial services as drivers of global Sukuk.

On the empirical plane, selected portfolios, including gold and Islamic return indices, record the best performance outside the COVID-19 crisis, and slightly more performing during the bear markets validating gold's intrinsic characteristic to be a haven. However, the portfolio performances, when we combined Brent crude with Islamic or conventional indices, have the same trend for the whole period [204]. Similarly, gold was found to be more stable and negatively correlated with the US Islamic stock index, making it more appropriate as a diversifier and hedging instrument and that gold combined with the US Islamic stock index portfolio reduces the portfolio's risk [205]. Further, the increasing expansion of Islamic finance and banking institutions, the rising diversification of assets, the growing infrastructure development, and the development of comprehensive and investor-friendly regulatory frameworks by Islamic finance authorities and standardization bodies are some of the factors propelling the market [203].

Q15: The global Sukuk market for infrastructure development will continue to remain robust.

Without prejudice to the above question, this question seeks to assess the level of perception of respondents regarding the use of Sukuk for infrastructure development globally.

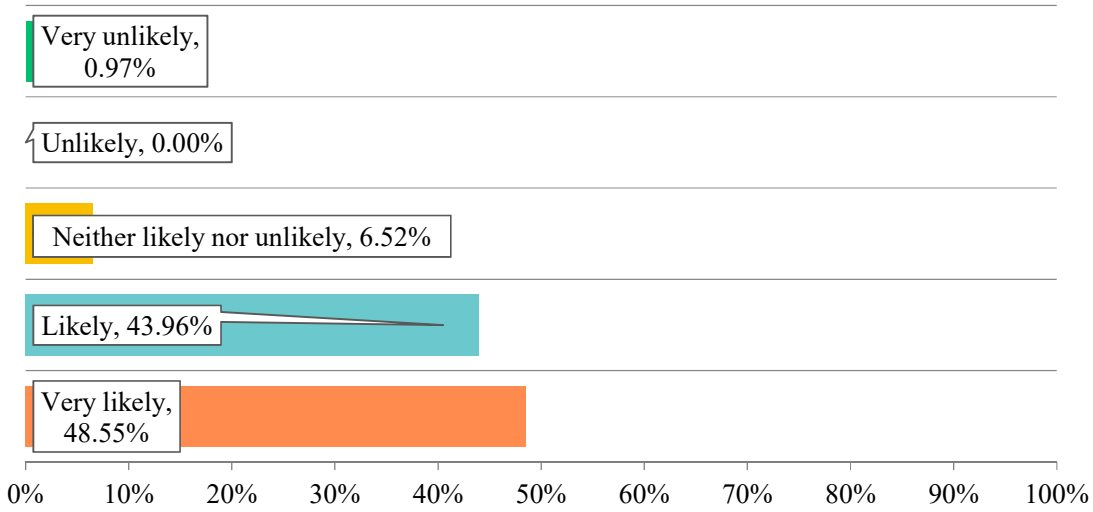


Figure 5.15: Global Sukuk Market for Infrastructure Development will Cntinue to Remain Robust.

Source: Survey data, December 2023

Chart 5.15 indicates the level of perception of respondents on the robustness of the global Sukuk market for infrastructure development in the future. Boisterously, 92.5 percent (383 out of 414) of the respondents feel it is 'likely' or 'very likely' that the global Sukuk market for infrastructure development will continue to remain robust. On the other extreme, only about 1 percent of the (4 out of 414) respondents feel it is very unlikely. The remaining about 7 percent of the respondents remain neutral. Thus, based on these findings, it can be concluded that the future of the global sukuk market for infrastructure development will continue to remain robust.

Empirical evidence reveals a great potential for financing infrastructure projects using Sukuk in the OIC and non-Muslim majority countries due to the rising trend of GDP and trade in the OIC countries and the success of Islamic banking, … [206]. Market data, for instance, shows that the global Sukuk market size has reached US$ 1,063.3 Billion in 2023 and is expected to clock US$ 3,619.3 Billion by 2032, exhibiting a growth rate (CAGR) of 14.1% during 2024-2032 [203].

5.3 Analysis of PLS-SEM Path Model Results

5.3.1 Assessment of Measurement Model

Following the application of the Partial Least Squares Structural Equation Modelling (PLS-SEM) results from the estimations are twofold: the measurement model, also known as the outer model, and the structural model. The former assesses the external aspects of a model,

whereas the latter delves into the internal dynamics of the model. Figure 5.16 depicts the measurement model structure. To evaluate the outer model (also known as the measurement or factor model) in SmartPLS, it is necessary to conduct tests for individual item reliability, the internal consistency of the items, as well as convergent and discriminant validity.

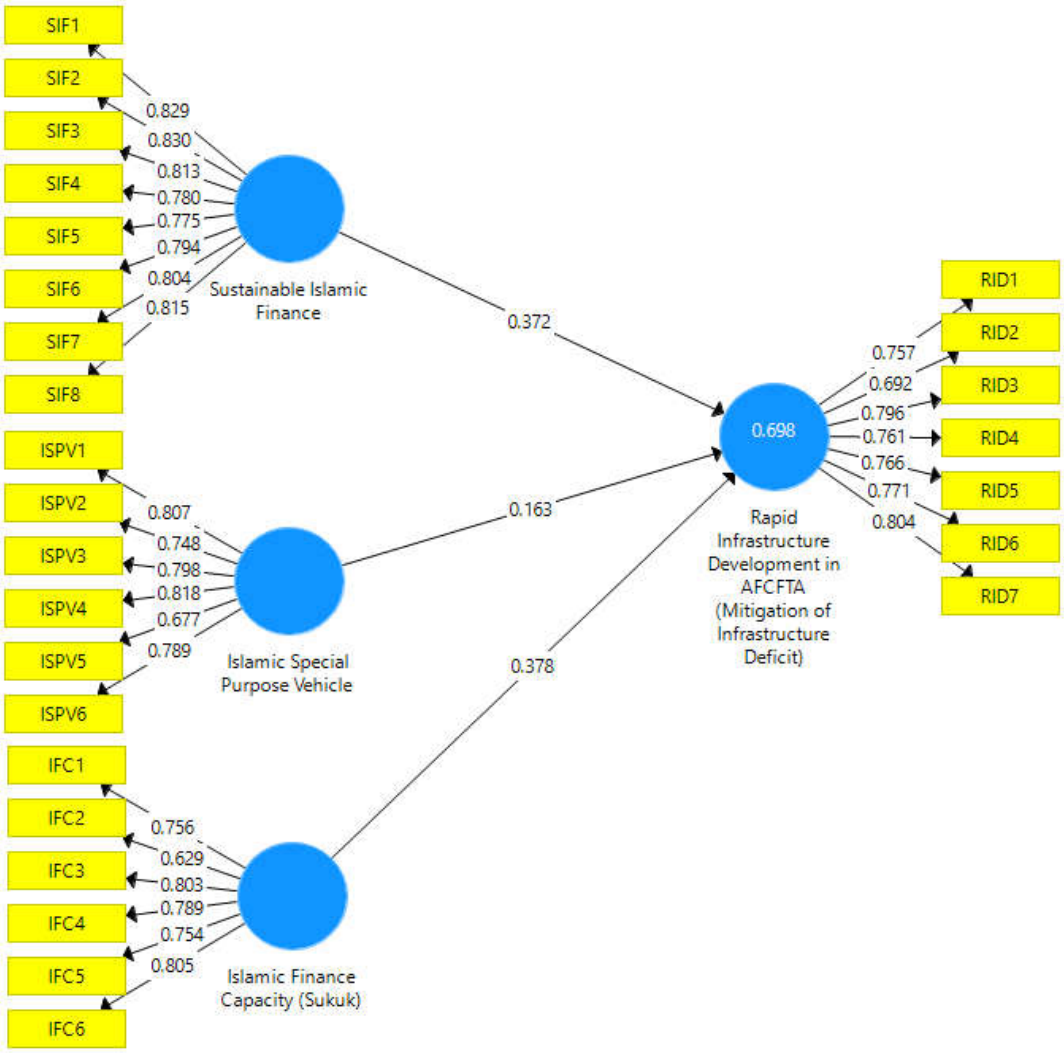


Figure 5.16: Measurement Model/Outer model

Source: Field Survey Data (2023) and computed by author using SmartPLS.

5.3.2 Individual Item Reliability

This process involves evaluating the factor loadings of items or indicators associated with a specific latent construct by examining each construct's outer loadings [207]. It has been established that indicators with loadings ranging from 0.50 to 0.70 are considered acceptable for retention. For exploratory research, a loading of 0.40 or higher is acceptable [183]. Upon examination of all the 27 indicators, it was found that the factor loadings exceeded the minimum benchmark of 0.50, resulting in no deletions.

5.3.3 Internal Consistency

Traditionally, "Cronbach's alpha" is used to measure internal consistency reliability in social science research, but it tends to provide a conservative measurement in PLS-SEM. Literature suggests the use of "Composite Reliability" as a replacement ([208]; [182]). Composite reliability, in this context, assesses the consistency across indicators, verifying that there is a correlation among the sub-indicators of a latent construct. We, therefore, employ three methods: Cronbach's alpha [209], rho_A, and composite reliability ([210]; [211]). Adhering to the guidelines suggested by [208] and [211], the reliability score should be at least 0.70. Results in Table 4.1 show that Cronbach's alpha, rho_A, and composite reliability all exceed the threshold value of 0.70. These indicate a high level of internal consistency reliability for the measures employed in the study.

5.3.4 Convergent Validity

Convergent validity assesses how well a specific indicator represents the intended latent variable and correlates with other indicators of the same latent variable [212]. To check convergent validity, each latent variable's Average Variance Extracted (AVE) is evaluated. Again, from Table 5.2, it is found that all the AVE values are greater than the acceptable threshold of 0.5, so convergent validity is confirmed.

Table 5.2: Individual Item Reliability, Internal Consistency Reliability, & Convergent Validity

Variable	Factor loading	Cronbach Alpha	rho_A	Composite reliability (pc)	Average variance Extracted
Islamic Finance Capacity		0.851	0.857	0.890	0.576
IFC1	0.756				
IFC2	0.629				
IFC3	0.803				
IFC4	0.789				
IFS5	0.754				
IFS6	0.805				
Islamic Special Purpose Vehicle		0.866	0.874	0.900	0.600
ISPV1	0.807				
ISPV2	0.748				
ISPV3	0.798				
ISPV4	0.818				
ISPV5	0.677				
ISPV6	0.789				
Rapid Infrastructure Development in AfCFTA (mitigation of deficit)		0.881	0.885	0.908	0.585
RID1	0.757				

RID2	0.692				
RID3	0.796				
RID4	0.761				
RID5	0.766				
RID6	0.771				
RID7	0.804				
Sustainable Islamic Finance		0.922	0.923	0.937	0.649
SIF1	0.829				
SIF2	0.830				
SIF3	0.813				
SIF4	0.780				
SIF5	0.775				
SIF6	0.794				
SIF7	0.804				
SIF8	0.815				

Source: Field Survey Data (2023) and computed by author using SmartPLS

5.3.5 Discriminant Validity

The classical approach for the Discriminant Validity test proposed by [210] suggests that the square root of AVE in each latent variable should be greater than other correlation values among the latent variables. Table 5.3 shows mixed results, that is, while some same values of the square root of AVE are greater than the pairwise correlations, they are less than others thus showing weak discriminant validity [210].

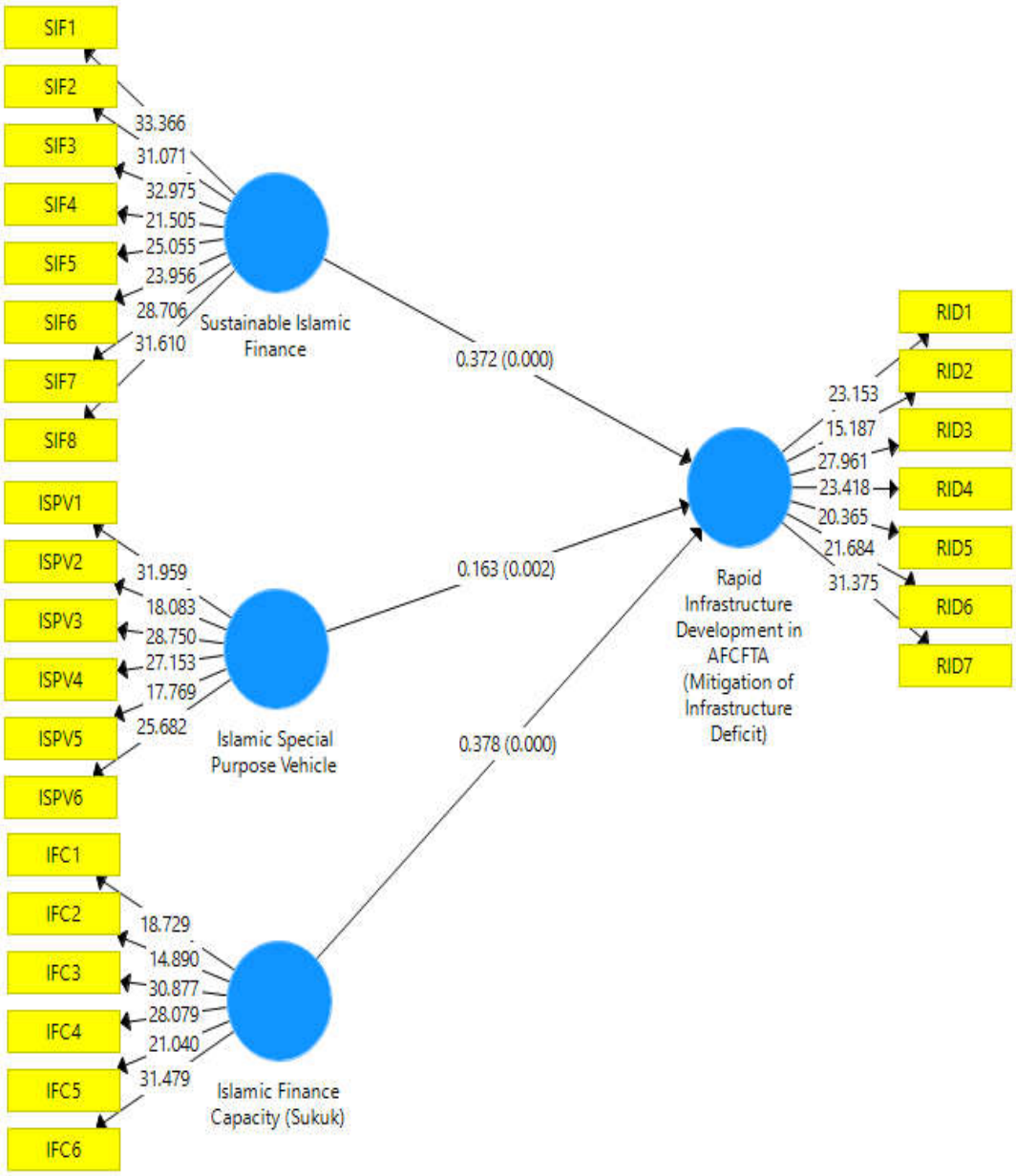
Table 5.3: Discriminant Validity

Variable		1	2	3	4
1	Rapid Infrastructure Development in AfCFTA (mitigation of deficit)	**0.765**			
2	Islamic Finance Capacity	0.785	**0.759**		
3	Islamic Special Purpose Vehicle	0.689	0.719	**0.774**	
4	Sustainable Islamic Finance	0.777	0.778	0.683	**0.805**

Source: Field Survey Data (2023) and computed by author using SmartPLS

5.3.6 Assessment of Significance of the Inner Model

Following the evaluation of the outer model, the study proceeds to analyze the inner model. We employ a standard bootstrapping procedure to ascertain the significance of the path coefficients. This focuses on the coefficients, P-values, R^2 value, predictive relevance (Q^2), and effect size (F^2). The procedure involves using 5,000 bootstrap samples and 412 cases. The insights derived from the structural model, including the assessment of significance through bootstrapping are illustrated in Figure 5.17.



Source: Field Survey Data (2023) and computed by author using SmartPLS.

Figure 5.17: Structural model/ Inner model – Hypotheses Testing

5.3.7 Direct Relationship

Figure 5.17 presents a visual representation of the regression coefficients (β) and t-values associated with the hypotheses of the study. Additionally, Table 5.4 details the standardized path coefficients (β), p-values, and confidence intervals, following the guidelines by [213]. Deducing from the Keynesian marginal propensity to consume (MPC) and investment multiplier principles, the paper obtains values of multipliers from the values of the partial leasts squares (PLS) for sustainable Islamic finance, Special Purpose Vehicle (SPV) and

Islamic finance (Sukuk) as 1.59, 1.19 and 1.61, respectively. The modest values of the multipliers reflect the fact that the Sukuk phenomenon is still relatively new in the continent.

Table 5.4: Examination of Direct Relationship

Hypothesis	Relationship	Beta	t-Value	p-Value	Findings/ Conclusion
1	Sustainable Islamic Finance -> Rapid Infrastructure Development in AfCFTA	0.372	5.508	0.000	Supported
2	Islamic Special Purpose Vehicle -> Rapid Infrastructure Development in AfCFTA	0.163	3.106	0.002	Supported
3	Islamic Finance -> Rapid Infrastructure Development in AfCFTA	0.378	5.561	0.000	Supported

Source: Field Survey Data (2023) and computed by author using SmartPLS

5.3.8 Test of Hypothesis

5.3.8.1 H_{01}: Sustainable Islamic finance (green) does not positively and significantly influence rapid infrastructure development for mitigation of infrastructure deficit in the AfCFTA.

Hypothesis one was formulated as a null hypothesis, positing that sustainable Islamic (green) finance does not exert a positive and significant impact on bridging the infrastructure gap through rapid infrastructure development in the AfCFTA. The finding indicates a significant relationship between sustainable Islamic finance and rapid infrastructure development in the AfCFTA at the 1 percent level of significance. For example, based on the value of the investment multiplier obtained, a $1 million increase in investment in sustainable Islamic finance (green) will mitigate the infrastructure deficit by $1.59 million in Africa. This finding is in line with evidence reported by [56] posit that improving the efficiency of infrastructure spending will not only foster growth per capita but also increase the output multiplier of infrastructure investment. Therefore, the null hypothesis is rejected, leading to the conclusion that sustainable Islamic finance exerts a significant positive effect on addressing Africa's infrastructure gap.

5.3.8.2 H_{02}: Islamic special purpose vehicle does not positively and significantly influence rapid infrastructure development for mitigation of infrastructure deficit in the AfCFTA.

Hypothesis two was coined in null form, suggesting that the Islamic Special Purpose Vehicle (SPV) lacks a positive and significant impact on bridging the infrastructure gap through rapid infrastructure development in AfCFTA. The analysis demonstrates a significant relationship between the Islamic SPV and closing the infrastructure deficit in the continent at the 1 percent level of significance. This suggests that a unit change in Islamic infrastructure facilitation by the SPV will improve infrastructure development in the AfCFTA by 1.19 units. Further, in conventional finance, for instance, a bank establishes an SPV and transfers its assets from its balance sheet to the SPV which are collateralized and eventually securitized as debt instruments. However, in the case of Islamic finance securitization, the SPV simply

services the cash flows for security holders and does not take ownership of the assets. The SPV promotes a risk-sharing principle in line with asset-based finance and must also ensure no infringement on the prohibition of riba and haram as encapsulated under Islamic law. By and large, the null hypothesis is refuted, affirming that the Islamic SPV significantly and positively contributes to extenuating the infrastructure deficit in the AfCFTA.

5.3.8.3 H_{03}: Islamic finance (Sukuk) does not positively and significantly influence rapid infrastructure development for mitigation of infrastructure deficit in the AfCFTA.

Our hypothesis three was stated in a non-affirmative form that Islamic (Sukuk) finance does not positively and significantly influence rapid infrastructure development for deficit mitigation in the AfCFTA. The result reveals a positive and significant effect between Islamic finance and filling the infrastructure gap in Africa at the 1 percent level of significance. This denotes that a $10 million change in investment in Islamic finance capacity (Sukuk), for instance, will mitigate the infrastructure deficit by $16.1 million in the AfCFTA. Hence, we reject the null hypothesis and conclude that Islamic finance positively and significantly mitigates the infrastructure gap in Africa.

5.3.9 Assessment of Variance Explained in the Endogenous Latent Variable

Assessing the extent of variation in the endogenous latent variable explained by exogenous variables involves calculating the R-square value, a crucial metric for evaluating the structural model's validity. It is otherwise known as the coefficient of determination [182], the R-square value elucidates the proportion of variance in the endogenous variable explained by one or more exogenous latent variables [213]. While the acceptable threshold for the R-squared value varies depending on the specific context of the research [213], a baseline R-square value of 0.10 is generally considered the minimum acceptable level. However, a value of 0.50 is seen as moderate, suggesting a more substantial explanation of the dependent variable by the model.

Table 5.5: Variance Explained in the Dependent Latent Variable

Variables	**Variance explained (R-Square)**
Rapid Infrastructure Development in AfCFTA for Mitigation of Infrastructure Deficit	0.698

Source: Field Survey Data (2023) and computed by author using SmartPLS.

The analysis of the model's capacity to predict variations in the dependent variable yielded a significant finding: an R-square value of 0.698, which translates to 69.8%. In the specific context of this study, which focuses on understanding the variance in efforts to fill the infrastructure gap in Africa, the R-square value of approximately 69.8% falls into the moderate category according to Hair et al.'s classification.

5.3.10 Assessment of Effect Size (F2)

After verifying the hypotheses proposed in the study, another key measure to evaluate is the structural model's effect size (F^2), as outlined by [182]. The effect size quantifies the impact that a specific exogenous latent variable has on an endogenous latent variable, reflected

through changes in the R-square value [179]. This metric is determined by the change in R-squared for the latent variable to which a path is directed, in proportion to the amount of variance in the latent variable that remains unexplained [179]. [214] categorizes F^2 values as weak (0.02), moderate (0.15), and strong (0.35) effects.

Table 5.6: Assessment of Effect Size (F^2)

Independent variable	Dependent variable	F^2	Effect size
Islamic Finance (Sukuk)	Rapid Infrastructure Development in AfCFTA (deficit mitigation).	0.156	Moderate
Islamic Special Purpose Vehicle	Rapid Infrastructure Development in AfCFTA (deficit mitigation).	0.039	Weak
Sustainable Islamic (Green) Finance	Rapid Infrastructure Development in AfCFTA (deficit mitigation).	0.166	Moderate

Source: Field Survey Data (2023) and computed by author using SmartPLS

Table 5.6 presents the effect sizes for the latent variables in the structural model. It is evident that while Sukuk and Green Finance have moderate size effects, SPV has a weak size effect.

5.3.11 Assessment of Predictive Relevance

Further, we assess the predictive relevance of the model through Stone-Geisser's Q^2 (Geisser, 1974; Stone, 1974). This requires a resampling method where data for each indicator of endogenous constructs are systematically omitted and then predicted. This approach gauges the model's capability to predict or account for omitted cases ([179]; [215]), making it particularly useful for determining the predictive relevance of endogenous reflective constructs within the model. A $Q^2 > 0,$ indicates that the model possesses predictive relevance[215]. The outcomes of the cross-validated redundancy Q^2 test are detailed in Table 5.7.

Table 5.7: Assessment of Predictive Relevance

Total	SSO	SSE	Q^2
Rapid Infrastructure Development in AfCFTA for Mitigation of Infrastructure Deficit	2,877.000	1,786.005	0.379

Source: Field Survey Data (2023) and computed by author using SmartPLS

Going by the result in Table 5.7, $Q^2 = 0.379$, which is above zero. This confirms the model's predictive relevance, thereby underscoring the robustness and validity of the overall model in predicting the rapid infrastructure deficit in the AfCFTA.

5.3.12 Multicollinearity Test

Multicollinearity occurs when two or more independent variables in a regression model exhibit a high degree of correlation ([216]; [217]; [218]). This study tests for the presence of any significant correlations among the independent variables, which could potentially skew the regression analysis outcomes. The findings, presented in Table 5.8, reveal that the

Variance Inflation Factor (VIF) for all variables falls below the threshold of 5.0, and the tolerance values surpass the minimum benchmark of 0.2 for all the independent variables. Moreover, the average VIF was found to be 2.682 which is yet less than the threshold value. These results indicate an absence of multicollinearity among the variables [213].

Table 5.8: Multicollinearity Test

Variables	VIP	Tolerance Value
Islamic Finance Capacity (Sukuk)	3.039	0.329
Islamic Special Purpose Vehicle	2.250	0444
Sustainable Islamic Finance	2.757	0.363
Mean VIF	2.682	

Source: Survey Data (2023) and computed by author using Smart-PLS

Overall, with strong loading for all the latent exogenous variables, i.e., Islamic finance (Sukuk), Islamic special purpose vehicle (SPV), and sustainable Islamic (green) finance ranging between 0.629 and 0.830, and strong marginal propensity effect of 0.372, 0.163, and 0.378, respectively. Furthermore, the analyses of the inner model and the test of hypotheses reveal that all the premises are supported by the robustness of the path coefficients and the size of the coefficient of determination. Thus, the findings attest to the role of Islamic finance in mitigating the infrastructure deficit in Africa, especially through issuances of Sukuk for both infrastructure and sustainable (green) development.

5.4 Test of Research Hypotheses

Having conducted the analyses of data using qualitative and quantitative tools, we proceed to test the research hypotheses stated in section one. Rejecting any of the non-affirmative hypotheses implies a fulfillment of a particular research objective. This is presented as follows:

i) The level of infrastructure gap in the African continent is insignificant.

Evidence on the extent of the infrastructure deficit in Africa abounds in the literature ([49]; [54]; [50]; [51] & [53]). Further, based on the analysis using the Africa Infrastructure Development Index (AIDI) developed by the AfDB, only eight (8) countries, in a group of fifty-four (54) recorded an AIDI above 50 percent in 2022. Down from the bottom, thirty-eight (38) had an AIDI score of less than 30 percent in the same year. In the West African region, for instance, twelve (12) out of seventeen (17) countries recorded less than 30 percent, including Nigeria in the same year.

Thus, based on these facts from AfDB, we reject the null hypothesis that the infrastructure gap in the continent is insignificant and accept the alternate hypothesis. This suggests that the infrastructure gap remains huge in the African continent.

ii) Adapting the unique Islamic legal (Shari'ah) regime is an unnecessary requirement for deploying infrastructure finance in Africa.

The hypothesis is tested based on the analysis of question four (4) in this section on whether the adoption of Islamic finance by countries in the AfCFTA would require a radical change in the national constitution and other legal/regulatory frameworks. A total of 72 percent of respondents (equivalent to 296 out of 411) either 'agree' or 'strongly agree' that countries wishing to adopt Islamic finance principles only need to adjust their legal and regulatory frameworks. For instance, with the United Kingdom leading in the adoption of Islamic finance in Europe and the top non-Muslim country in the world, this finding confirms what obtains in the real world.

The rejection of this hypothesis is further supported by the SmartPLS analysis which demonstrates a significant relationship between the Islamic SPV and closing the infrastructure deficit through rapid infrastructure development in the continent at the 1 percent level of significance. Although SPV is present in both Islamic and conventional infrastructure contract arrangements but is particularly unique in the former given its role in risk-sharing and maintaining the sanctity of the transaction under Islamic law. That is, the application of Shari'ah principles in the generation and utilization of funds – ethical investments.

Therefore, we reject the null hypothesis and accept the alternate hypothesis which is on adaptability or amenability of Islamic legal requirements for launching Sukuk for infrastructure development.

iii) The global trend of Islamic infrastructure finance is not robust.

This hypothesis is tested using analysis of question 15 in the research questionnaire which posits that the global Sukuk market for infrastructure development will continue to remain robust. The analysis based on the 5-Likert scale found that up to 92.5 percent (383 out of 414) of the respondents feel it is 'likely' or 'very likely' that the future of the global Sukuk market for infrastructure development will continue to remain robust. While only about 1 percent of the (4 out of 414) respondents feel it is very unlikely, the remaining about 7 percent of the respondents remain neutral.

In addition, analysis using SmartPLS reinforces findings based on the qualitative analysis which reveals a positive and significant effect between Islamic finance through issuances of Sukuk and filling the infrastructure gap in Africa at the 1 percent level of significance. Sukuk contracts have lower risk and reduced cost due to remaining asset-backed.

Thus, based on these findings, we reject the non-affirmative statement in favor of the alternate, affirmative one. The conclusion is that the future of the global sukuk market for infrastructure development remains robust in the future.

iv) The use of Islamic finance is unlikely to fill the infrastructure gap in the African continent.

To test this hypothesis, we use question 11 which contains six propositions. The propositions largely derive from the features of Islamic finance principles, that is, the absence of *riba*, ethical finance, asset-backed contracts, the absence of conditionalities, etc. The results from

the analysis of the question show that the average mean percentage of those who either 'agree' or 'strongly agree' is 87.9 percent which is equivalent to a mean of 362 respondents out of 412. This is in addition to the fact that some of the propositions were ranked highly by the respondents as well.

Accordingly, we reject the non-affirmative statement in favor of the affirmative or alternative hypothesis and conclude that Islamic finance is very likely capable of filling the infrastructure gap in the African continent.

v) Sustainable (Green) Islamic finance is unlikely to boost infrastructure in Africa.

The hypothesis was formulated to how sustainable Islamic finance, green and environmental sustainability Sukuk are capable of boosting Africa's infrastructure in various ways. The question has a total of eight propositions that encompass different aspects of sustainable finance: 'Renewable energy sector', 'Social security–affordable housing, employment generation, and workforce diversity', 'SDGs–Financial inclusion, *awqaf* finance and *Takaful*, wealth redistribution and poverty reduction, and 'Education and human capital development'. Results show that all eight propositions were highly ranked with a mean score of 90.1 percent, which is equivalent to 373 out of 412 respondents who either 'agree' or 'strongly agree'.

Moreover, empirical analysis using SmartPLS strengthens these findings. The conclusion from hypothesis testing shows that sustainable Islamic finance (green) positively and significantly promotes the mitigation of the infrastructure deficit in the AfCFTA.

Therefore, we reject the null hypothesis and accept the alternative which implies that sustainable Islamic finance, when applied, can diminish the infrastructure deficit in the African continent and or the AfCFTA.

vi) Application of Islamic infrastructure financing in the African continent is unlikely to be inhibited by any factor.

The global Islamic finance industry and indeed the African Islamic finance markets are affected by both internal and external factors. We test this hypothesis based on responses to question fourteen (14) which is on factors that affected the nascent Islamic finance industry and Sukuk for infrastructure development. We identified ten (10) critical factors under the question.

Vastly, 82.1 percent (equivalent to 338 out of 412) of the respondents, on average, 'agree' or 'strongly agree' that all the issues are significant in shaping the future of Islamic finance and Sukuk in Africa. Only about 7 percent (25 respondents) either 'disagree or 'strongly disagree' with the propositions.

Consequently, we reject the null hypothesis and accept the alternative hypothesis and conclude that factors like 'Threat to global peace', 'Energy and commodity prices', 'Low-interest regime in developed countries', 'High liquidity in the Islamic finance industry',

'Huge infrastructure deficit in the African continent' and 'Yields/returns from Sukuk', etc., will continue to inhibit the growth of Islamic finance in the continent.

vii) Islamic finance portends no prospects for infrastructure development in Africa.

In testing this hypothesis, we employed responses received on question 15 in the questionnaire which assesses the level of perception of respondents on the robustness of the global Sukuk market for infrastructure development in the future. An overwhelming 92.5 percent (383 out of 414) of the respondents posit that it is 'likely' or 'very likely' that the global Sukuk market for infrastructure development will continue to remain robust.

Thus, based on these findings, we reject the non-affirmative statement in favor of the affirmative and conclude that the future of the global sukuk market for infrastructure development will continue to remain robust.

6.0 CONCLUSION AND RECOMMENDATIONS

6.1 Conclusions

This study on infrastructure deficit in Africa: Islamic finance as a gap-filler, an exploratory study, evaluates the catalytic role of Islamic finance in filling the infrastructure gap in the African continent. Our sample comprises countries within and outside the continent, that is, Egypt, Kenya, Morocco, Nigeria, and Saudi Arabia. The period of data collection was October to December 2023. Using a survey methodology, a total of four hundred and fourteen (414) questionnaires were collected from respondents across the sample. The study employed both non-parametric and structural equation modeling (SEM), which is appropriate for exploratory research, in the data analyses.

Broadly, the study aims to assess the catalytic role of Islamic finance in mitigating the infrastructure deficit in the African continent otherwise the AfCFTA. The study is structured into a number of specific objectives; appraising the level of infrastructure performance in the African continent, assessing the adaptability of the Islamic legal (Sharia'ah) regime necessary for deploying the infrastructure finance in Africa, and reviewing the global trends of Islamic infrastructure finance. Others include assessing the particular role of sustainable (green) Islamic finance in infrastructure development and the likely factors that could hinder the adoption of Islamic finance for infrastructure development in the African continent.

Preliminary investigation reveals a fair distribution of responses from research respondents across the sample except for Morrocco which had the least responses largely due to the devastating effect of the September 2023 earthquake. Further, evidence shows that the respondents were drawn transversely from Islamic finance practitioners, Shari'ah scholars, academics, and public and private sector investors. Background information demonstrates that the bulk of the respondents possess the right knowledge of the subject area covered in the questionnaire.

A critical analysis of infrastructure performance in the continent using the African Infrastructure Development Index (AIDI) developed by the AfDB reveals that only eight (8) countries recorded an AIDI above 50 percent in 2022. Bottoms, up to thirty-eight (38) had an

AIDI score of less than 30 percent in the same year. In the West African region, for instance, twelve (12) out of seventeen (17) countries recorded less than 30 percent, including Nigeria in the same year. While the global trends of Sukuk remained robust, there were glimpses of Sukuk application for infrastructure development in all the countries in the sample; Egypt, Kenya, Morocco, and Nigeria, and mammoth sovereign and quasi-sovereign Sukuk issuances in Saudi Arabia.

Findings show that adapting the Islamic legal (Shari'ah) regime was found be to a necessary requirement for infrastructure finance to thrive in Africa. Needfully, an adjustment in legal and regulatory frameworks is sufficient to attract Islamic finance. The adoption, for instance, made the United Kingdom the leading hub of Islamic finance in Europe and the top non-Muslim country in the world. Importantly, Islamic finance through the use of Sukuk was found to be a strong catalyst for mitigating the infrastructure deficit in Africa. For instance, a $10 million change in investment in Islamic finance (Sukuk) will, through a positive multiplier effect, mitigate the infrastructure deficit by $16.1 million in Africa. Similarly, the finding on sustainable (green) finance mimics Sukuk finance with an investment multiplier of 1.59.

The application of Islamic infrastructure financing in the African continent was found to be strongly affected by both internal and external factors. Threats to global peace – the Russia-Ukraine war and Israel war on Gaza; energy, and commodity prices; low-interest regime in developed countries; excessive liquidity in the Islamic finance industry; and huge infrastructure deficit in the African continent are among the factors shaping that will continue to shape the future of Islamic finance in the continent, and globally.

Majorly, the twin analyses supported the significant role of Islamic finance through the instrument of Sukuk in infrastructure development in the continent.

6.2 Policy Recommendations

The urgent need to close the infrastructure gap for rapid economic development in Africa cannot be over-emphasized, and the role of Islamic finance in the undertaking either. This pioneering study and the findings therefrom have unveiled this fact. In consonance with studies in the literature, we draw recommendations cutting various stakeholders in the Africa infrastructure project. The African governments and institutions/agencies with investors' appetite within the continent; public and private pension funds, investment banks, sovereign wealth funds, corporate investors, and multilateral institutions within and outside Africa– AfDB, Afreximbank, AFC, ICA, IsDB, IILM, etc. The need for tapping from a variety of investor bases with an appetite for Islamic finance arrangements is also recognized. The recommendations are as follows:

i) African governments should create an enabling environment through adjustments in the legal and regulatory frameworks to pave the way for Islamic finance institutions to operate as strategic gateways to Islamic finance resources for infrastructure development in their jurisdictions.

ii) There is the need to create support institutions/units within existing structures in the Central Banks, Securities Commissions, Insurance Commissions, Capital Market, etc., and liaise with relevant institutions such as IFSB, AAOIFI, and IILM for human capital development and knowledge sharing on the mechanics of Islamic finance.

iii) African governments and regional economic groupings should launch international Sukuk for national and regional infrastructure development through linking up with multilateral institutions providing Islamic financial services and wide investor bases with appetite, especially in the Middle East and Asia.

iv) There is the need to launch domestic Sukuk to tap the excess liquidity in public and private pension funds, sovereign wealth funds, and financial institutions to deepen the capital market and widen the investor base.

v) Leverage country experiences in Asia and the Middle East on the application of Sukuk for rapid development of physical, social, and green infrastructure in their jurisdictions.

vi) To better net the global Islamic finance resources for infrastructure development for the continent, institutions such as the Afreximbank, AfDB, and AFC, should explore avenues for strategic relationships with the IsDB, IILM, IFSB, Accounting and Auditing Organization for Islamic Finance Institutions (AAOIFI), etc.

vii) For domestic Sukuk, we call on corporate and private Sukuk investors to take advantage of ethical Islamic finance to improve their portfolio mix stable returns by investing in Sukuk. launch Sukuk for the development of infrastructure in the continent.

viii) Islamic financial services and development support institutions such as *Takaful*, *Awqaf*, and *Zakah*, should partner with equivalent offshore institutions to support the social sector through Sukuk instruments.

ix) African governments need to cajole development partners and institutions including conventional finance institutions like the ODAs, IFC, and ICA to launch standard and ESG Sukuk for infrastructure development in the continent. The United Kingdom Islamic Finance Council (UKIFC), for instance, estimates that green and sustainable Sukuk could raise between $30 - $50 billion of capital for the SDGs by 2025.

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Appendix I

Differences between Conventional Bond and Sukuk

Conventional Bond	Sukuk
Ownership: A debt bond is characterized by a pure debt for the issuer.	Ownership: A Sukuk is characterized by the ownership of stakes in existing and or well-defined assets.
Issuers: Conventional bonds are issued with underwriters.	Issuers: Sukuk uses Special Purpose Vehicles (SPV) to be the trustee/issuer of the Sukuk
Principal: Bond investors are guaranteed the return on their initial investment/principal.	Principal: Sukuk investors (in theory) share the risk of the underlying asset and may not get all their initial investment (the face value of the sukuk) back. (The value payable to the Sukuk-holder on maturity should be the current market value of the assets or enterprise and not the principal originally invested, according to Usamani, 2002). they are also, in practice, issued with repurchase guarantees.
Pricing: Bond pricing is based on credit rating, i.e., the issuer's creditworthiness.	Pricing: The face value of a Sukuk is priced according to the value of the assets backing it.
Rewards and risks: Returns from bonds correspond to fixed interest. (Because most bonds' interest rates are fixed, most increase in value when the market interest rates fall.)	Rewards and risks: Sukuk can increase in value when the assets increase in value.
Bonds create a relationship between borrower and lender in the form of a contract for which the sole purpose is to earn interest.	The Sukuk contract is a contract founded on the lease or a defined undertaking of business between the Sukuk issuers and the Sukuk holders.

Compliance: Concerning bonds the condition of an underlying asset does not apply and bonds can be issued for purposes that are not legitimate.	Compliance: Concerning the underlying Sukuk asset, a project or business must be of the type such that its use is possible and permissible.
Sale: The sale of a bond fundamentally equates to the sale of debt.	Sale: When you sell sukuk, you are selling ownership in the assets backing them. (In instances where the certificate represents a debt to the holder, the certificate will not be tradable on the secondary market and instead should be held until maturity.)

Source: Adapted from Ahmed, Islam, Ariffin, & Moniruzzaman, (2013).

Appendix II

Definition of Terms

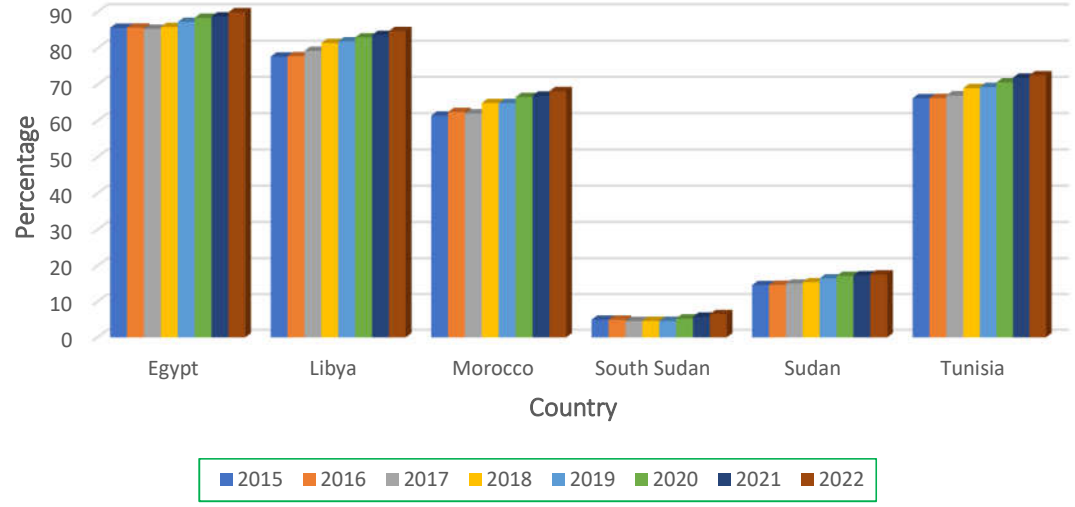
Name	Description
Islamic finance	Islamic Finance is a moral system of finance that emphasizes the balance between for-profit activities, justice, tolerance, risk sharing, and social good as well as not-for-profit activities. It derives from the principles and practices of the Islamic legal system of Shari'ah
Shari'ah Scholar	The Islamic Shari'ah scholar is an individual who is well-versed with the necessary knowledge of the Shari'ah teachings and principles.
Takaful	Islamic insurance is structured as a charitable collective pool of funds based on the idea of mutual assistance.
Wakalah	A contract of agency in which one party appoints another party to perform a certain task on its behalf.
Sukuk	An 'Arabic term for financial certificate. It is defined as "Certificates of equal value representing undivided shares in ownership of tangible assets, usufructs, and services or (in the ownership of) the assets of particular projects or special investment activity".
Al-Ijarah Sukuk	A Sukuk issued based on the principle of an Al-Ijarah contract, i.e., a lease contract for the buying and leasing of assets by the investors to the issuer. The Sukuk shall represent the undivided beneficial rights/ ownership/interest in the asset held by the trustee on behalf of the investors.
Istisna'a Sukuk	Sukuk issued based on the principle of the Istisna'a contract. Certificates of equal value are issued to mobilize funds to be employed to produce goods so that the goods produced come to be owned by the certificate holders. (This type of Sukuk has been used for the advance funding of real estate development, major industrial projects, or large items of equipment such as turbines, power plants, ships, or aircraft (construction/ manufacturing financing).
Mudarabah Sukuk	Sukuk issued based on the principle of the Mudarabah contract. These are certificates that represent projects or activities managed based on Mudarabah by appointing one of the partners or another person as the Mudarib for the management of the operation. (It is an investment partnership between two entities whereby one entity is mainly a provider

	of capital, and the other is mainly the manager)
Murabahah Sukuk	These are certificates of equal value issued to finance the purchase of goods through Murabahah so that the certificate holders become the owners of the Murabahah commodity. (It is a pure sale contract based Sukuk, which is based on the cost-plus profit mechanism).
Musharakah Sukuk	Sukuk issued on the principle of Mushrakah contract. Are certificates of equal value issued with the aim of using the mobilized funds for establishing a new project, financing a business activity etc., based on any of partnership contract so that the certificate holders become the owners of the project. (Musharakah Sukuk is an investment partnership between two or more entities which together provide the capital of the Musharakah and share in its profits and losses in pre-agreed ratios)
Salam Sukuk	Sukuk issued on the principle of Salam contract. They represent certificates of equal value issued to mobilize Salam capital/mobilizing funds so that the goods to be delivered based on Salam come to be owned by the certificate holders.
Corporate Sukuk	Is a Sukuk issued by a corporation as opposed to those issued by the government. It is a major way for companies to raise funds to expand their business or for a specific project.
Domestic Sukuk	A Sukuk issued in local currency.
Global Sukuk	Both international and domestic Sukuk.
Sovereign Sukuk	Are Sukuk issued by a national government. The term usually refers to Sukuk issued in foreign currencies, while Sukuk issued by national governments in the country's currency are referred to as government Sukuk.
Hybrid Sukuk	Hybrid Sukuk combine two or more forms of Islamic financing in their structure such as Istisna'a and Ijarah, Murabahah and Ijarah etc.
Quasi-sovereign Sukuk	Are Sukuk issued by a public sector entity that is like sovereign Sukuk. It may carry explicit or implicit government guarantees.
International Sukuk	A Sukuk issued in hard currency such as USD.

Source: Culled from the International Islamic Financial Market (IIFM) Sukuk Report 2023.

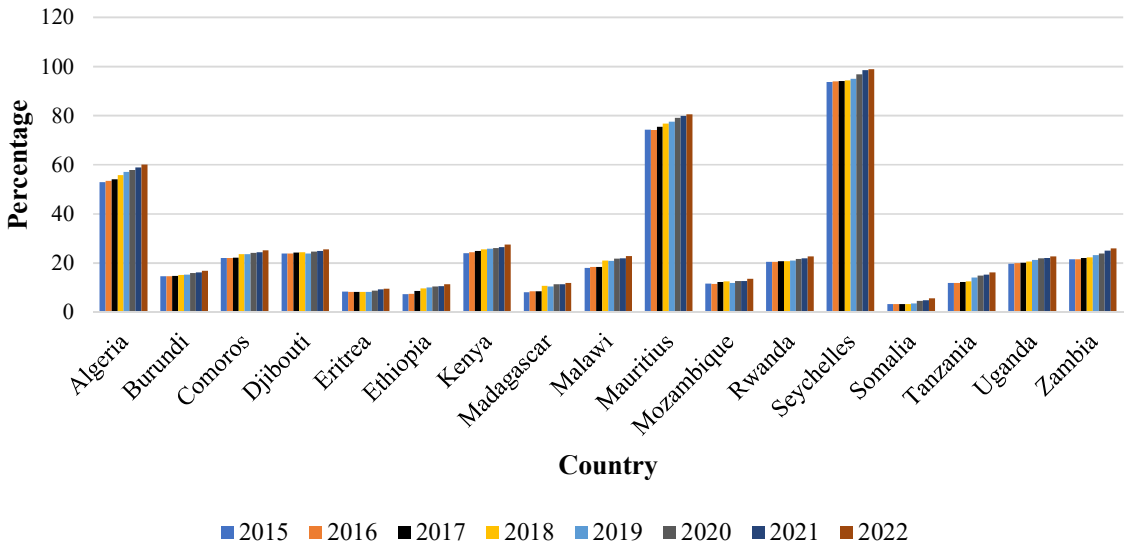
Appeendix III

Chart 3.2: Northern Africa Infrastructure Development Index (NAIDI) Index



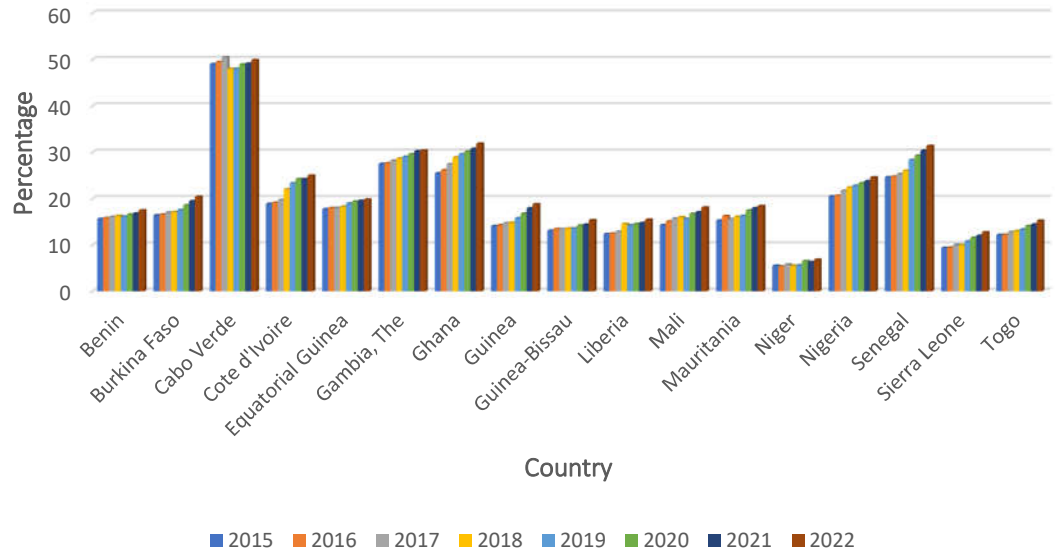
Source: AfDB (2022b) Africa Infrastructure Development Index (AIDI)

Chart 3.3: East Africa Infrastructure Development Index (EAIDI) Index



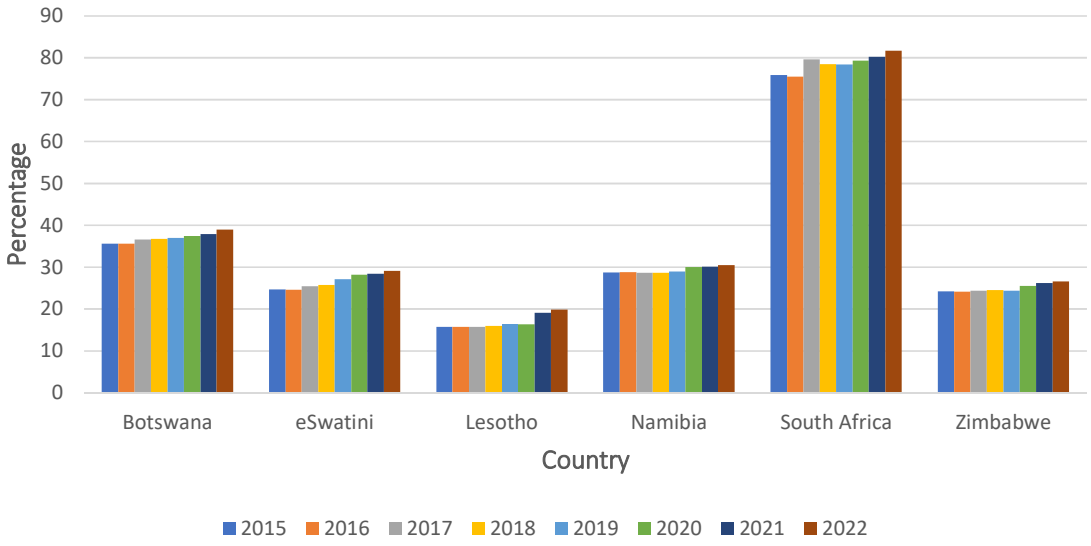
Source: AfDB (2022b) Africa Infrastructure Development Index (AIDI)

Chart 3.4: West Africa Infrastructure Development Index (WAIDI) Index



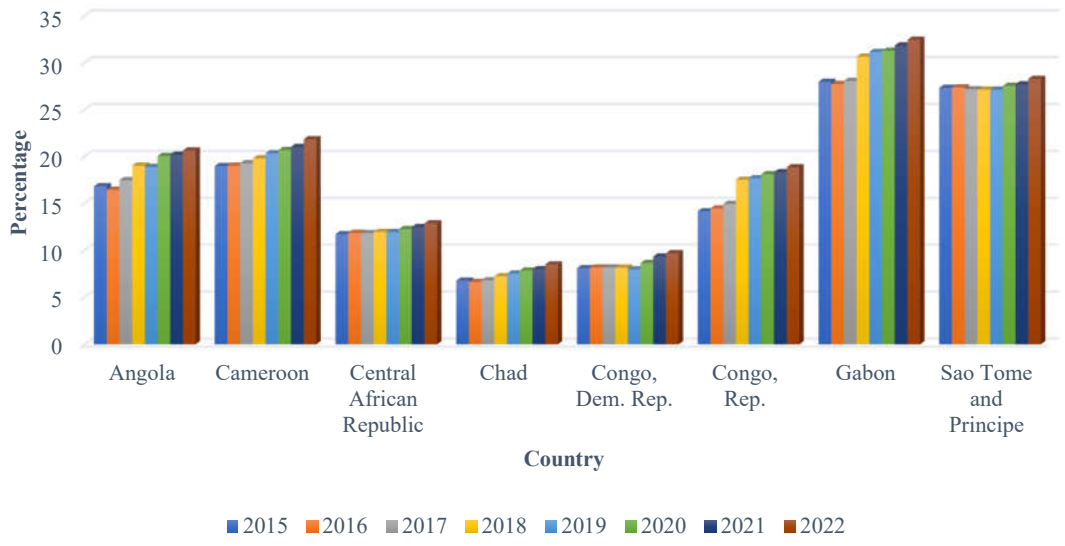
Source: AfDB (2022b) Africa Infrastructure Development Index (AIDI)

Chart 3.5: Southern Africa Infrastructure Development Index (SAIDI) Index



Source: AfDB (2022b) Africa Infrastructure Development Index (AIDI)

Chart 3.6: Central African Infrastructure Development Index (CAIDI) Index



Source: AfDB (2022b) Africa Infrastructure Development Index (AIDI)

Appendix IV

Islamic Banking and Finance Indices

Country	Islamic Bank	Other Institutions	Sukuk Issuance
Egypt	✓ 14 Islamic Banks license by the Central Bank of Egypt (CBE) ✓ **3 full-fledged Islamic banks:** • Faisal Islamic Bank of Egypt, • Al Baraka Bank Egypt, • Abu Dhabi Islamic Bank – Egypt. ✓ **A total of 260 Bank Branches offering Islamic Banking as of 2023**	✓ **11 Takaful Companies – some include the following:** • Arab Orient Takaful Insurance Co. • Egyptian Saudi Insurance House • Egyptian for Takaful Insurance Company (Life) • Egyptian for Takaful Insurance Company (Non-Life) • Nile Family Takaful • Nile General Takaful • Solidarity for Family Takaful Insurance • Wethaq Takaful Insurance Co. ✓ **17 Shari'ah-compliant Funds**	✓ Egypt started issuing its first sovereign bonds on Tuesday, February 21, 2023, valued at US$1.5 billion ✓ Sukuk reached EGP60 billion (US$1.94 billion in 2023. ✓ 6 Sukuk were issued in 2023 alone by the end of September 2023 worth EGP 12.8 billion (US$413,77 million).
Morocco	✓ **5 - Islamic Banks** • Umnia Bank • Bank Al Karam • Bank Al Yousr • Bank Assafa • Al Akhdar Bank ✓ **3 - Islamic Windows** • BMCI – Najmah • Crédit du Maroc – Arreda • Société Générale – Dar Al-Amane	✓ **Takaful companies** • Takafulia Assurance • Wafa Takaful • Al Maghribia Takaful • Taawounyiate Taamine Takafuli ✓ **Islamic Microfinance Banks 0** ✓ **Shariah-compliant investment funds 0**	• Morrocco issued its 1st 5-year Sovereign Sukuk in October 2018 worth MD1.1bn ($116m) ✓ Private Sukuk = 0
Kenya	✓ **3 Fully Fledged Islamic Banks** • Gulf Bank • Premier Bank • Dubai Islamic Bank ✓ **Window Model** • KCB Bank • Absa bank • National Bank	✓ Takaful Company • Takaful Insurance of Africa ✓ Investment Fund • Standard Investment Bank (SIB) ✓ Islamic Microfinance • Tijarah Microfinance • Sahal Microfinance • Salam Microfinance	✓ Sukuk issued by First Community Bank in June 2015 valued at Kshs 150 million ✓ Sukuk issued by Linzo Finco Trust in October 2023 Kshs 3

		• Momentum Sahih Microfinance	billion
Nigeria	✓ **Islamic Banks in Nigeria – 4** • Jaiz Bank • Taj Bank • Lotus Bank • Sterling Bank ✓ **Islamic Banking Window - 1** • Suntrust Bank	✓ Takaful Firms in Nigeria – 4 • Jaiz Takaful • Noor Takaful • Cornerstone Takaful • Slama Takaful ✓ Islamic Microfinance Banks – 3 • TijarahMFB • Halal Credit MFB • I-Care MFB ✓ 5 Fund Managers • Lotus Capital • One17 • Trustbanc • Marble • D'namaz ✓ 12 Halal/Ethical Mutual funds: • FBNQuest, Halal Fund, Lotis Halal, Lotus Fixed Income, Lotus ETF, IBTC Imaan, IBTC Fixed Income, United Capital Sukuk Fund, Norrenberger IF & Capitaltrust, etc. ✓ 3 Corporate Investment Advisers/ Issuing Houses • Buraq • Lotus • Marble ✓ Islamic-REIT - 1 (Chapel-Hill N-REIT)	✓ **Sovereign and Sub-sovereign Sukuk issuances** • 6 FGN Sovereign Sukuk issuances valued at N742.56 billion from 2017-2022. • 1 N11.4 billion Sukuk Al-Ijarah -2013 by Osun State Govt. ✓ **Private Sukuk Issuances** • 1 Private Sukuk by Lotus Capital in Ikoyi Lagos worth $27.4 million. • 2 Family Homes Sukuk - N10 Billion. • 1 TAJ Bank Sukuk valued at N100 billion with 5year Tenor.
Saudi Arabia	✓ 5 Full-fledged Islamic banks in Saudi Arabia namely: • Al-Rajhi Bank • Al Jazeera Bank • Al-Bilad Bank • Alinma Bank. • Saudi Investment Bank ✓ Several conventional banks have Islamic banking windows.	✓ **14 Licensed Takaful operators (SAMA), and** ✓ **37 According to Statistica. For instance,** • Al-Rajhi Takaful • Arabian Malaysian Takaful • Buruj Cooperative Insurance Co. • Gulf Union Coop. Insurance Co. • Tawuniya, • Bupa Arabia, and • MedGulf. ✓ Islamic Microfinance	✓ In 2023, the total value of issued Sukuk reached USD 84.7 billion. ✓ This included: • Sovereign Sukuk: Over USD 45 billion issued by the Saudi government. • Private Sector Sukuk: Over USD 39 billion issued by various companies and institutions.

		Bank – 5 ✓ Over 200 registered Shariah-compliant investment funds	• IsDB leads with 2 quasi-sovereign Sukuk issuances in 2022 valued at $1.6 billion and $1 billion (IIFM, 2023).