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RESEARCH ARTICLE

EXPLORING INNOVATIVE FINANCING MODEL FOR SUSTAINABLE PUBLIC PROCUREMENT IN NIGERIA: FOCUS ON PUBLIC PRIVATE PARTNERSHIP

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ABSTRACT

This study explores innovative financing model for sustainable public procurement in Nigeria with particular focus on public private partnership. The independent variables were blended financing, green bond, infrastructure investment funds and infrastructure debt securitization as the innovative financing models while the dependent variable was sustainable public procurement (SPP). Sample of 44 employees drawn from the Bureau for Public Procurement (BPP) in their state offices in the five states that make up South East Nigeria was drawn. The sample size was selected using the census enumeration method since the population was finite. The data were generated through structured questionnaire and analyzed using the multiple regression analysis technique after coding the responses. The results indicated that blended finance enhances sustainable public procurement in Nigeria but not significantly, green bond significantly decreased sustainable public procurement in Nigeria, increase in infrastructure investment funds significantly increased sustainable public procurement practices in Nigeria and infrastructure debt securitization exerted positive but not significant effect on sustainable public procurement in Nigeria. The study concluded that blended finance, green bonds, infrastructure investment funds and infrastructure debt securitization were the most effective innovative methods of PPP project financing in Nigeria. The study recommended that the Nigerian government should create a strategic combination of public, philanthropic, and private capital in order to create scalable and bankable solutions to complex development challenges and ensure sustainable public procurement financing in Nigeria.

Keywords: Public procurement, public-private partnerships, infrastructure debt securitization, innovative financing, environmental sustainability, government bond.

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1.0. INTRODUCTION

There is increased attention channeled towards generating new finance initiatives to help in ensuring sustainable procurement especially in the public sector. Moreover, from the public sector, there has been a greater use of financial instruments and mechanisms globally in ensuring smooth operation of public procurement practices. Innovative finance involves non-traditional forms of funding public projects through private mechanisms, solidarity mechanisms, public-private partnerships mechanisms, and catalytic mechanisms (Squires, 2020). However, Squires (2020) stressed that innovative finance in public procurement is not to be viewed as an alternative to traditional forms of finance but should been seen as complementary. Furthermore, innovative financing in public procurement are those measures and strategies through which financial support is provided to address one or more public project and ease government financing burden (Sievo, 2024).

According to Akinsulire, Idemudia, Okwandu and Iwuanyanwu (2024), the pressing need for increased funding of public projects in both developed and developing countries has prompted governments to explore innovative financing mechanisms, with Public-Private Partnerships (PPPs) emerging as a viable solution. Public-Private Partnerships (PPPs) leverages the strengths of both the public and private sectors by combining public sector regulatory and policy-making capabilities with the private sector's financial resources, expertise, and operational efficiency (Hodge & Greve, 2017). This collaborative approach allows for innovative financing structures, risk-sharing mechanisms, and enhanced project implementation, which can significantly improve the affordability and accessibility of public infrastructure.

By integrating private investment with public oversight, PPPs can facilitate large scale public projects, mobilize additional resources, and drive efficiency in project delivery (World Bank, 2019). Winch *et al.* (2022) explained that in some selected countries like Indonesia and India from the developing world, the governments attract private investors by providing financial assistance to limit the private party risk despite the certainty of the users paying for the facility. This is necessary because the cash flow from the users are not sufficient to augment the initial investment due to the political constraint in the charges to the users (Winch *et al.*, 2022).

Attah (2020) reported that in 2020, just 42.2% of infrastructure investment in Nigeria was financed by national governments. According to the African Development Bank (AfDB, 2022), it will cost between $130 billion and $180 billion annually to close the African continent's infrastructure gap, yet current funding falls short by $68 billion to $108 billion each year. According to AfDB (2022), the most critical needs emanating from top countries such as Nigeria include water and sanitation (41% of the gap), followed by electricity supply and transport access (28% each). Infrastructure spending by the Nigerian government is often constrained by limited revenue sources, volatile commodity prices, and debt sustainability concerns (Attah, 2020), underscoring the need for more sustainable and diversified financing models.

Globally, blended finance has gained attention as an innovative PPP financing model. The energy sector is the most active sector that makes use of the blended finance option in PPP financing, accounting for nearly one-third of deal activity and around 47% ($101 billion) of the total capital flow (Torfing, 2019).Multilateral development banks, philanthropic foundations and public sector agencies are some key players in a blended finance PPP model (Attah, 2020). Nigeria also established its Green Bond Advisory Group comprising stakeholders from local and international organizations like the

World Bank, UNEP, IFC, AfDB, and Climate Bonds Initiative (Babatunde, Perera, Zhou & Udeaja, 2021). Together, they played a pivotal role in developing the strategy and groundwork for Nigeria's debut sovereign green bond issuance in 2017 (Attah, 2020). Attah (2020) also acknowledged Infrastructure Investment Funds, Infrastructure Debt Securitization, Sukuk Islamic Bonds, Infrastructure-as-a-Service (IaaS) as other innovative ways of financing PPP projects towards ensuring sustainable public procurement in Nigeria.

The Nigerian public procurement system under the PPP framework is regulated by the Infrastructure Concession Regulatory Commission (ICRC) being the agency responsible for regulating public private partnerships in Nigeria (Ibem, 2020). The commission sets up the bidding process through a publication of request for quotation document, the bidders submit their queries and the government holds a pre-bidding meeting where they respond to queries etc. The technical proposals from bidders are evaluated by the government and the most technically and economically viable/comprehensive bids are accepted and the project financing commences through different stages of payments usually on installment bases (Ibem, 2020). The aspect of financing the project is the focus of this research as it takes a critical look at various innovative financing models that ensures sustainable public procurement in Nigeria.

Financing challenges remain a significant barrier to sustainable public procurement, especially in developing economy like Nigeria where funding is scarce, and access to innovative financial models is limited (Brent & Labuschagne, 2023). On one hand, the ability of blended finance to de-risk infrastructure projects is one of its strongest advantages; on the other hand, blended finance also faces some criticism as it is often suited for energy sector with 91% of blended finance deals directed toward clean energy, particularly solar (Attah, 2020). Other methods of financing PPP projects such as Green bond and Infrastructure Investment Funds (IIFs) align with long term infrastructural investments which are also associated with significant capital requirements (Attah, 2020). Given the activeness of these innovative financing models for sustainable public procurement (SPP) in Nigeria, there is still uncertainty on which one is most preferred by the government in executing public projects in Nigeria. This creates a problem for research and that is the major motivation for this present study.

Again, most of the studies on innovative financing model for sustainable public procurement in Nigeria focused only on public private partnership as the only innovative financing model (Babatunde, Perera, Zhou, &Udeaja, 2021; Ibem, 2020; Ojelabi, Fagbenle, Amusan & Afolabi, 2019). It was observed that public private partnership is only one form of innovative financing that ensures sustainable procurement, other forms of innovative financing such as blended finance, Green Bond (Sukuk Islamic bond), Infrastructure Investment Funds/Infrastructure Debt Securitization and Infrastructure-as-a-Service (IaaS) have not been explored by any previous study. This evidence emanates from extensive literature exploration prior to this research. As a result, there appears to be problem of incomplete knowledge of the relevance of these afore-mentioned innovative financing strategies under the PPP model that ensures sustainable public procurement. Perhaps, this incomplete knowledge has led to problems of infrastructure delivery in Nigeria. This present research delves into these four financing models with a view towards ascertaining their relevance and extent of preference by the Nigerian government.

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1.1. Objectives of the Study

The aim of this research is to explore innovative financing models for sustainable public procurement (SPP) focusing on public private partnerships in Nigeria. The specific objectives are to:

1 Investigate the extent to which blended financing model affect sustainable public procurement in Nigeria.
2 Explore the relationship between Green Bond PPP financing model and sustainable public procurement in Nigeria.
3 Determine the relationship between Infrastructure Investment Funds and sustainable public procurement (SPP) in Nigeria.
4 Analyze the extent to which Infrastructure Debt Securitization affects sustainable public procurement (SPP) in Nigeria.

1.2. Research Hypotheses

Four hypotheses were tested in the course of the study. These hypotheses are stated in their null forms as follows:

H_{01}: There is no significant relationship between blended financing model and sustainable public procurement in Nigeria.

H_{02}: Green Bond method of financing a PPP project has not significantly affected sustainable public procurement in Nigeria.

H_{03}: Infrastructure Investment Funds has no significant relationship with sustainable public procurement (SPP) in Nigeria.

H_{04}: There is no significant relationship between Infrastructure Debt Securitization and sustainable public procurement (SPP) in Nigeria.

This study focuses on examining innovative financing models within PPP framework which ensures sustainable public procurement in Nigeria. The variables include the following innovative financing models which also double as the independent variables of the study: blended finance, Green Bond, Infrastructure Investment Funds and Infrastructure Debt Securitization. Also, sustainable public procurement is the dependent variable. The geographic scope is South East Nigeria and the study will focus only on the Bureau for Public Procurement (BPP) being the government agency that oversees issues concerning public procurement in Nigeria. Consequently, states offices of the agency in the five states that make up South East Nigeria constitute the geographic scope of the study. Furthermore, since this study is a survey research, the time scope is 2025 covering the time the researcher visited the agencies and administers the survey on them.

2.0. LITERATURE REVIEW

2.1. Conceptual Review

Public–Private Partnerships (PPP)

Public–private partnerships (PPP) are a popular procurement method for infrastructure projects across the globe that optimizes benefits for all the stakeholders involved (Kim, 2018). According to Fulbright (2023), A PPP is a long-term contractual arrangement for the delivery of public services where there is a significant degree of risk sharing between the public and private sectors. Fulbright (2023) further noted that PPP can be defined as the establishment of a long-term contractual

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partnership between public and private sector bodies where the private sector provides a significant portion of the financing, bears significant risks and takes substantial responsibility for designing, building, financing, operating and maintaining a major public infrastructure asset in accordance with an agreed output specification. This is usually in return for the right to recover some or all of the revenues derived from the asset, or in return for a fee based on the continued availability of the asset (i.e. the performance and/or demand for the use of the public asset or service), or a combination of both. The main features of a PPP according to Fulbright (2023) include:

Risk transfer: The key element of a PPP contract is the transfer of risk from the public to the private sector. The principle behind this risk transfer is that risk should be allocated to the party that can best manage it.

Long-term contract: A PPP usually follows a 'whole-of-life' approach to the development of the infrastructure, thus requiring the contract to be long term in nature. A PPP is typically for a period of 10 to 20 years – although there are some PPPs that may be of a shorter duration of, say, three to five years.

Partnership agreement: Key to this long-term contract between the public and private sectors is that it is viewed as a 'partnership', in that both parties have a mutual interest and a unified commitment. PPPs represent co-operation between the public and private sectors, drawing on the relative strengths of each party, in order to establish a complementary relationship between them.

Innovative Financing Models for PPP Projects

Public private partnerships (PPPs) are arrangements typified by joint working between the public and private sector.

Figure 1: Conventional procurement (Source: Fulbright, 2023)

As seen from Fig. 1, the government takes direct charge of financing and execution of public projects. However, for mega-projects that are considered too big to privately finance, the government has sought to address the interface management risk by "upskilling" itself, namely by taking on one or more "development partners". These developmental partners are engineering companies who effectively second a long-term team into the client and who are incentivized to manage the delivery of the project to achieve price and timeliness outcomes. In this situation, the government arranges the separate procurement of works and services required to develop and operate a new facility. It would also be responsible for integrating the works and services provided by different entities.

Under the model represented in Fig. 2 above, the government only enters into one long-term contract with a single private sector entity (usually a special purpose firm set up specifically to oversee the

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PPP project) which will provide all aspects of the project lifecycle - design, build, financing, operation and maintenance.

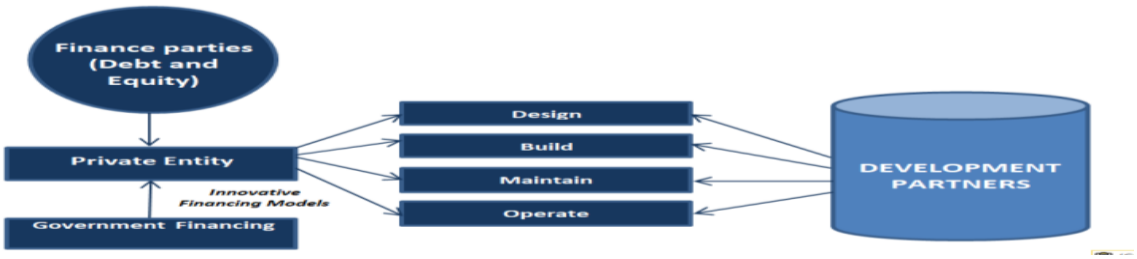

Figure 2: Public-Private Partnership and Innovative Financing (Adapted from: Fulbright, 2023)

The government retains control over the initial design and output specifications and the private sector entity manages the completion of the project, ensuring the specifications are met. In the broadest sense, PPPs can cover all types of collaboration across the interface between the public and private sectors to deliver policies, services and infrastructure. Where delivery of public services involves private sector investment in infrastructure, the most common form of PPP is the Private finance initiative.

Innovative Finance Options for a Sustainable Public Procurement (SPP)

Green Bonds: Green bonds are debt securities issued to raise capital specifically for projects with environmental benefits. These bonds have gained popularity as they allow governments and organizations to attract investment from environmentally conscious investors. For example, the New York Green Bank uses green bonds to finance renewable energy projects, demonstrating their potential to drive substantial investment in sustainability (Clark *et al*., 2018). Green bonds enable issuers to raise capital from investors who are committed to environmental sustainability. The proceeds from green bonds are typically used for projects such as renewable energy, energy efficiency, sustainable waste management, and climate adaptation.

Social Impact Bonds (SIBs): Social impact bonds are a type of pay-for-success financing where private investors fund social programs and are repaid by the government based on the achievement of predefined social outcomes. In the UK, SIBs have been used to finance interventions in areas like homelessness and prisoner rehabilitation, linking financial returns to social impact (Silverman, 2011). The government repays investors based on the achievement of predefined social outcomes. SIBs align financial returns with social impact, encouraging investment in initiatives that address social issues. In Nigeria, Attah (2020) observed that Sukuk Islamic bonds have gained wider acceptance as a strategic tool for financing critical infrastructure since its debut in 2017. Sukuk is a form of Social bond but with Islamic financial instrument structured to comply with Shariah law, which prohibits interest-based financing. Unlike conventional bonds that represent debt obligations, Sukuk bonds represent partial ownership in an asset, or a project, thus creating a link between financing and real economic activity (Attah, 2020). As observed by Squires (2020), the returns are generated through the performance of the underlying asset, thereby ensuring ethical use of funds.

Blended Finance: Blended finance involves combining public, private, and philanthropic funds to support projects with both social and environmental impacts. This approach leverages the strengths of each sector to mobilize resources for sustainable development. The Global Climate Partnership Fund, for example, uses blended finance to support energy efficiency and renewable energy projects in

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developing countries (GCPF, 2020). Blended finance has proven effective in mobilizing significant capital for projects that deliver both environmental and social benefits. By mitigating risks and providing financial incentives, blended finance models can attract private investment to sectors that are crucial for sustainable development but traditionally underfunded.

Infrastructure Investment Funds (IIFs): Infrastructure Investment Funds pool capital from institutional investors – including pension funds, insurance companies, and sovereign wealth funds – to finance infrastructure projects (Attah, 2020). These funds are tailored to align with the long-term nature of infrastructure investments, offering both investors and project developers a reliable means to address long gestation periods and the significant capital requirements often associated with infrastructure development (Adjei, 2023). The key advantage of IIFs is that they provide a structured mechanism for channeling private capital into public infrastructure projects and Attah (2020) noted that this not only supports government-led initiatives but also creates opportunities for private sector participation in critical areas such as transportation, energy, and utilities. Some examples of Infrastructure Funds in Nigeria as noted by Attah (2020) include the Chapel Hill Denham Nigeria Infrastructure Debt Fund (NIDF) which is the first listed infrastructure debt fund in Nigeria. The fund focuses on lending to projects in sectors such as energy, transport, and utilities. By providing debt financing, it plays a critical role in supporting long-term infrastructure development. Another example is the United Capital Infrastructure Fund which pools capital from institutional investors and strategically invests in a diverse portfolio of infrastructure projects across Nigeria, fostering economic growth and development. The third one is the TIB Infrastructure Fund which is an Infrastructure Bank aimed at channeling investment into strategic sectors and enhancing the quality of Nigeria's infrastructure network.

Infrastructure Debt Securitization: Infrastructure debt securitization involves pooling debt from infrastructure projects and issuing it as securities to investors (Attah, 2020). By converting these traditionally illiquid debt assets into tradable securities, Babatunde *et al* (2021) asserted that this model provides upfront capital for infrastructure while offering regular returns to investors, enhancing liquidity in the market. Cheung, Chan and Kajewski (2022) explained how the Infrastructure Debt Securitization works as follows: The cash flows generated by infrastructure assets – like toll roads or power plants – are used to pay interest and principal to investors holding the securitized debt. These securities are structured into tranches, ranging from low-risk, lower-return senior tranches to higher-risk, higher-return subordinated tranches, and can be traded on secondary markets.

According to Scott, Amajuoyi & Adeusi (2024) and Attah (2020), notable Infrastructure Debt Securitization initiatives in Africa include the African Development Bank (AfDB) and Emerging Africa Infrastructure Fund (EAIF) which has have driven infrastructure securitization, with AfDB participating in a $500 million fund for various projects and South Africa's Bayport Securitization Programme which has expanded from consumer loans to infrastructure financing, raising over ZAR 5 billion (~$350 million). These examples indicate growing potential for securitization as a credible financing tool for long term PPP infrastructure projects across the continent.

2.2. Theoretical Framework

Transaction Cost Economics (TCE) inspects how business partners who collaborate with each other shield one another from harmful subsidiary with differing relationships. (Klein 2015). The sourcing situation of a firm is likewise described as the make-or-buy decision of a firm (Klein 2015). The

procurement of infrastructure assets combines finance, engineering, construction and project management services into a single structure to deliver a unique product for a client. This result in a number of complex transactions between clients, financiers, consultants, contractors and statutory authorities, each bears the cost of searching, negotiating, entering into and sometimes renegotiating a contract. Understanding the economics and exploiting the information asymmetries underpinning these transactions can provide clients and contractors with a significant commercial advantage, allowing them to extract substantial financial benefits from projects.

In addition to the transaction cost economics theory, the public choice theory also explains the linkage between procurement from a different perspective. The primary concern of public choice theory is the creation of the idea of use of economic tools to deal with traditional problems of politics (Forsyth, 2016). In other words, the public choice theory uses the methods and tools of economics to explore how politics and government functions (Butler, 2012). The theory focuses on the maximization of self-interest as the central factor of both economic and social behavior. Thus, the public choice theory assumes that the people that make public actions and decisions are self-interested as anyone else (Forsyth, 2016).

Furthermore, the Triple bottom line theory makes provision for a framework to measure business performance and success of the organization three lines: social, economic and environmental as declared by Gold, Seuring and Beske (2010). In summary, the triple bottom line framework is a visionary approach that encourages corporations to transcend traditional financial reporting metrics. Instead, it advocates for a more comprehensive and inclusive reporting paradigm that encompasses not only fiscal performance but also the organization's broader societal and ecological footprint. This multifaceted model is commonly encapsulated in the three interconnected pillars of Human Well-being, Financial Prosperity, and Environmental Stewardship (Sievo, 2024).

Integrating the transaction cost economics (TCE) theory, public choice theory and the triple bottom line (TBL) framework provides a comprehensive understanding of public private partnership innovative financing in sustainable procurement. This leads to the formulation of eclectic theory which is a combination of these three theories mentioned above. The three theories explain innovative financing for sustainable public procurement in the following ways:

- Transaction cost economics (TCE) highlights the importance of managing transaction costs to enhance efficiency.
- Public Choice Theory emphasizes the role of stake holder incentives and governance in shaping PPP outcomes.
- Triple bottom line (TBL) approach ensures that PPPs deliver balanced economic, social, and environmental benefits.

Renewable energy projects across the globe and in developing countries such as Nigeria are often implemented through PPPs, and these projects benefit from the integration of these frameworks. TCE helps manage costs, public choice theory addresses stakeholder dynamics, and TBL ensures that projects achieve sustainable outcomes. This integrated approach has led to successful public project execution that aligns with global sustainability goals (European Commission, 2021). Theories such as transaction cost economics, public choice theory, and the triple bottom line provide valuable insights into the complexities of PPPs and their role in sustainable procurement. By applying these

frameworks, policy makers and practitioners can design new ways of financing and managing PPPs more effectively, ensuring that they deliver economic, social, and environmental benefits.

2.3. Empirical Review

Ojelabi, Fagbenle, Amusan and Afolabi (2019) reviewed literature on Public-Private Partnership by buttressing on the expected roles of the government through the Governance theory concept. The study observed that social and economic infrastructures provision has been the sole responsibility of the government in the time past. However, due to the geometric demand in human infrastructures needs, the government supply capacity has been constrained. The inability of the government to close the infrastructural gaps is due to the inequality in financial capacity and the financial worth of social and economic infrastructures. They found that despite the paucity of the fund required for infrastructures provisions in government, the need for social and economic infrastructures cannot wait due to its relevance in nation-building.

Squires (2020) did a study on innovative financing model for public private partnerships in real estate development. Using the Systematic Literature Review (SLR) technique, the study observed that there is a momentum for places to generate new initiatives to help leverage private sector finance for real estate development, as well as meet the increasing demand for modern communications and services. According to the study, innovative finance for real estate development involves non-traditional forms of funding through private mechanisms, solidarity mechanisms, public-private partnerships mechanisms, and catalytic mechanisms. However, innovative finance for real estate development is not to be viewed as an alternative to traditional forms of finance but should been seen as complementary.

Vu, Sandanayake and Zhang (2023) explored the factors affecting the selection of public–private partnership schemes in infrastructure projects, with a particular focus on the differences between developed and emerging economies. The study opted for a comprehensive literature review and open-ended interviews to validate 25 critical factors affecting the optimum selection of PPP procurement for infrastructure projects. The findings of the study showed that “financial attraction of the project to investors” and “financial viability based on NPV and risk-adjusted PV” were the two most important factors for the selection of PPP schemes for privately financed projects, as the key motivation of these schemes is to bring private funding to public infrastructure services.

Liu, Clegg and Pollack (2023) studied the effect of public–private partnerships on innovation in infrastructure delivery in China. Data were collected on PPPs through open-ended, nondirective interviews with 36 senior Australian-based PPP experts. . Through thematic and semantic content analysis of the 25 first-order categories, the researchers found that PPP models provide an environment for innovation in pre-contract award but limit risk, thus inhibiting post-contract innovation. The dominant role of project finance in framing PPPs limits opportunities for innovation in the subsequent phases of infrastructure project delivery.

Akinsulire, Idemudia, Okwandu and Iwuanyanwu (2024) examined the frameworks, lessons, and models of PPPs for financing affordable housing, aiming to provide insights into their effectiveness and scalability. The study reviewed the various PPP models, including build-operate-transfer (BOT), design-build-finance-operate (DBFO), and lease-develop-operate (LDO), highlighting their structural differences and application contexts. Using Systematic Literature Review (SLR) method, the study

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found that key components of successful PPP frameworks include clear regulatory environments, transparent procurement processes, risk-sharing mechanisms, and robust stakeholder engagement.

Siemiatycki (2024) investigated strategies for effective procurement and public-private partnerships in the transport sector using case studies from Sri Lanka, South Africa, Singapore, Colombia, USA and Ecuador. The study observed that over the past 25 years, PPPs have grown in popularity and become the model of choice for delivering large transport projects in many countries. Analysis of the case studies revealed that PPPs have up front capital costs that are on average 24% higher than their directly procured counterparts, but the premium is offset by government avoiding similarly sized cost overruns on traditionally procured projects. The study came to a conclusion that while the transferring of construction risk to the private sector is standard in PPPs and can be particularly effective, transferring availability and demand risk in particular has resulted in contracts that are often inflexible and challenge the public interest.

Verdouw (2024) investigated the private financing component in public-private partnerships. The study stressed that many policy-makers and public-private partnership (PPP) practitioners view access to private financing as the main motivation for developing infrastructure projects through PPP contracts. Instead of using public money—which may or may not be available— to build a road or power plant, for example, using private money to finance infrastructure projects allows projects to be implemented without delays, possibly freeing up public resources for other projects. The study concluded that private debt financiers analyze the financial robustness of projects using sensitivity analysis to determine whether key debt coverage ratios are being met.

Vinogradov, Shadrina and Kokareva (2024) explored public procurement mechanisms for public-private partnerships and asked the critical question: Why do some countries (often developing and emerging economies) adopt special laws on PPP, whilst in others PPPs are governed by the legislation on public procurement and related bylaw? Using a contract-theoretical framework, they demonstrated how PPPs can enable projects that are not feasible through standard public procurement arrangements. They concluded that incentives for private partners are created through extra benefits (often non-contractible) from their collaboration with the government (e.g. risk reduction, reputational gains, access to additional resources, lower bureaucratic burden, etc.).

Evidence from the empirical literature reveals that not too many studies have been carried out on innovative financing model for sustainable public procurement in Nigeria. Since majority of the studies were carried out in other regions and other economies (Vinogradov, Shadrina and Kokareva, 2024; Liu, Clegg and Pollack, 2023; Vu, Sandanayake and Zhang, 2023; Squires, 2020; Siemiatycki, 2024), there is a yearning need for replication of similar study for Nigeria. Since innovative financing in public procurement studies is a relatively emerging area in procurement management in Nigeria, the need for empirical studies arises in order to provide guidance for future practices in procurement management.

Again, despite growing research on sustainable procurement, there is a conspicuous gap in knowledge in the area of exploring how financing models for PPPs can specifically contribute to sustainable public procurement (SPP). While studies have examined individual strategies and frameworks for effective procurement practices, innovative financing tools, such as green bonds, revolving funds, integrated financing models that combine multiple tools within PPP frameworks have received less attention from researchers both in Nigeria and globally. Moreover, most literature on PPPs in

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procurement focuses on project execution and risk-sharing rather than on innovative financial structures to achieve procurement sustainability. This present serves the function of filling this glaring gap in literature.

3.0. METHODOLOGY

The study area is a cross-sectional survey research design carried out in South East Nigeria. The South East region of Nigeria is the geographic location of the researcher and the research institution and this justifies the focus on the region. The region includes the states of Abia, Anambra, Ebonyi, Enugu and Imo States. This study, being a field survey, used the questionnaire as the major material or instrument for data collection. The questionnaire was divided into two sections, A and B (see appendix ii). Section A contains items 1-5 which are on the personal data or information of the respondents. Section B (items 6-34) comprise of close - ended items relating to innovative financing models. Section B (items 6-34) comprise of closed- ended items relating to the subject under study The response scale is weighted on a 4-point Likert scale as follows: Strongly Agree = 4 points, Agree = 3 points, Strongly Disagree = 2 points, and Disagree = 1 point.

The instrument was validated by project research experts in the Federal University of Technology Owerri. Their invaluable suggestions were duly incorporated in the final output. A pilot try-out of the instrument was conducted using staff of the Infrastructure Concession Regulatory Commission (ICRC) since they are very few in number numbering about 13 employees. The respondents' responses were appropriate, pointing to the fact that the items and instructions were clear. The period of ten minutes (on the average) which the respondents spent in filling the questionnaire was considered an appropriate duration. The instrument therefore needed no further modification.

The reliability test was computed with items 6-34 of the questionnaire using the Cronbach alpha coefficient In order to ensure accuracy of the computation, the SPSS statistical software v.21 was used in the computation of the Cronbach alpha reliability coefficient. The Cronbach alpha reliability coefficient obtained was 0.883 on the average for the four clusters. Thus, the reliability coefficient of 0.883 was considered high enough to permit the conclusion that the instrument was reliable.

The population of this study comprised all staff of the Bureau for Public Procurement in Abia, Anambra, Ebonyi, Enugu and Imo States numbering fifty one (51). In carrying out appropriate sampling for the study, the census enumeration technique is preferred since the population is not too large to be reached. Consequently, the study adopts 51 as the sample size which will be distributed randomly amongst the five selected states. The study employs both inferential (multiple regression analysis) and descriptive statistics (frequencies, percentage analysis and mean) to analyze the data with the aid of Statistical Package for Social Sciences (SPSS) for the analysis.

4.0. PRESENTATION OF RESULTS AND DISCUSSION

4.1. Presentation of Results

The data from the research survey are presented under this sub-section. Each of the question item is summarized using the mean score. The mean score is compared with the criterion mean of 2.5 and deductions are drawn based on the question item(s) with the highest mean score. Any mean score that is above the 2.5 criterion mean is adjudged to be a positive response while any mean score that is below the 2.5 criterion mean is a negative response.

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According to the data presented in Table 1, the participants disagreed that companies that give employment opportunities to disabled persons have higher chances of securing procurement contracts from the government. The percentage that disagreed to the question item 1 is 47.7 per cent while 9.1 per cent strongly disagreed hence the negative mean score of 2.45. About 52.3% of the respondents opined that the government considers companies whose manufacturing processes do not negatively impact on the environment (mean = 3.43). The next mean score is 2.59 which signify that the Government considers the economic viability of projects before financing. The other mean scores for question items 10 – 14 are all positive which indicates that Government prioritizes the financing of projects that are beneficial to future generations i.e. projects that have social, economic and future benefits.

Table 1: Summary of Responses on Sustainable Procurement

Question items	Strongly Agree	Agree	Disagree	Strongly Disagree	Mean	Decision
Companies that give employment opportunities to disabled persons have higher chances of securing procurement contracts from the government.	5 (11.4)	14 (31.8)	21 (47.7)	4 (9.1)	2.45	Negative
The government considers companies whose manufacturing processes do not negatively impact on the environment.	23 (52.3)	18 (40.9)	2 (4.5)	1 (2.3)	3.43	Positive
Government considers the economic viability of projects before financing.	11 (25.0)	7 (15.9)	23 (52.3)	3 (6.8)	2.59	Positive
Public-private partnership is one way of ensuring sustainable public procurement in Nigeria.	11 (25.0)	9 (20.5)	23 (52.3)	1 (2.3)	2.68	Positive
The working condition of publicly contracted construction workers is a factor that affects public procurement bids.	22 (50.0)	12 (27.3)	5 (11.4)	5 (11.4)	3.16	Positive
Companies that prioritize renewable energy have higher chances in a public procurement bid.	16 (36.4)	21 (47.7)	4 (6.8)	3 (6.8)	3.14	Positive
Government prioritizes the financing of projects that are beneficial to future generations.	9 (20.5)	28 (63.6)	5 (11.4)	2 (4.5)	3.00	Positive
Sustainable public procurement is the new normal.	34 (77.3)	10 (22.7)	0 (0.0)	0 (0.0)	3.77	Positive

Source: Field Survey (2025).

Table 2 shows that the respondents are of the opinion that Nigerian government appreciates philanthropic project financing. About 31.8 per cent strongly agreed while 29.5 per cent agreed. However, question item 16 returned negative mean of 2.27 < 2.50. This is an indication that the respondents disagreed on the position that the use of blended financing method is on the rise in PPP projects in Nigeria. In other words, blended finance is not on the rise in Nigeria. Further, a greater percentage agreed that public projects in Nigeria do not deliver social and environmental benefits

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(mean = 2.73 > 2.50) while greater percentage agreed that public projects in Nigeria do not attract private and philanthropic individuals in the financing (mean = 2.95 > 2.50).

Table 2: Summary of Responses on Blended Financing Method of Financing PPP Project

S/N	Question items	Strongly Agree	Agree	Disagree	Strongly Disagree	Mean	Decision
9.	The Nigerian government appreciates philanthropic project financing.	14 (31.8)	13 (29.5)	13 (29.5)	4 (9.1)	2.84	Positive
10.	The use of blended financing method is on the rise in PPP projects in Nigeria.	5 (11.4)	8 (18.2)	25 (56.8)	6 (13.6)	2.27	Negative
11.	Public projects in Nigeria do not deliver social and environmental benefits.	7 (15.9)	21 (47.7)	13 (29.5)	3 (6.8)	2.73	Positive
12.	Public projects in Nigeria do not attract private and philanthropic individuals in the financing.	14 (31.8)	22 (50.0)	0 (0.0)	8 (18.2)	2.95	Positive
13.	Blended finance in PPP project is not popular in Nigeria.	32 (72.7)	9 (20.5)	2 (4.5)	1 (2.3)	3.64	Positive

Source: Field Survey (2025)

Excerpts from the Table 3 reveals that the mean with the highest frequency is in question item20 (mean = 3.39). This is seen in the greater percentage (68.2%) who strongly agreed that Nigeria's sovereign green bond for financing PPP projects will ensure quality infrastructure delivery.

Table 3: Summary of Responses on Green Bond Method of Financing PPP Projects

S/N	Question items	Strongly Agree	Agree	Disagree	Strongly Disagree	Mean	Decision
1.	Nigeria's sovereign green bond for financing PPP projects will ensure quality infrastructure delivery.	30 (68.2)	3 (6.8)	9 (20.5)	2 (4.5)	3.39	Positive
2.	Green bonds are gaining significant traction as an effective means of financing sustainable projects in Nigeria.	11 (25.0)	21 (47.7)	9 (20.5)	3 (6.8)	2.91	Positive
3.	Channeling funds from green bonds into renewable energy and afforestation initiatives is a good strategy.	9 (20.5)	13 (29.5)	21 (47.7)	1 (2.3)	2.68	Positive
4.	The Nigerian government has raised significant funds to finance public projects through green bonds.	20 (45.5)	24 (54.5)	0 (0.0)	0 (0.0)	3.45	Positive
5.	Green bonds have paved the way for private and public entities to participate in sustainable finance of public projects in Nigeria.	19 (43.2)	23 (52.3)	1 (2.3)	1 (2.3)	3.36	Positive

Source: Field Survey (2025)

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Again, 54.5% and 52.3% of the respondents agreed that the Nigerian government has raised significant funds to finance public projects through green bonds (mean = 3.45 > 2.50) and that Green bonds have paved the way for private and public entities to participate in sustainable finance of public projects in Nigeria (mean = 3.36 > 2.50).

Table 4: Summary of Responses on Infrastructure Investment Fund (IIF) in PPP Projects

S/N	Question items	Strongly Agree	Agree	Disagree	Strongly Disagree	Mean	Decision
1.	Pension funds, insurance companies, and sovereign wealth funds are involved in public project financing in Nigeria.	6 (13.6)	11 (25.0)	23 (52.3)	4 (9.1)	2.43	Negative
2.	Nigeria has effectively utilized IIF to significantly raise capital requirements for infrastructure development.	12 (27.3)	8 (18.2)	18 (40.9)	6 (13.6)	2.59	Positive
3.	The IIF has enabled private sector participation in critical areas such as transportation, energy, and utilities in Nigeria.	33 (75.0)	7 (15.9)	2 (4.5)	2 (4.5)	3.61	Positive
4.	The long-term extended payback periods in IIF financing will discourage private sector participation.	31 (70.5)	7 (15.9)	4 (9.1)	2 (4.5)	3.52	Positive
5.	IIFs will lead to transformative opportunity to close the public infrastructure gap in Nigeria.	41 (93.2)	3 (6.8)	0 (0.0)	0 (0.0)	3.93	Positive

Source: Field Survey (2025)

Excerpts from the Table 4 shows that the respondents disagreed that Pension funds, insurance companies, and sovereign wealth funds are involved in public project financing in Nigeria. However, other mean values are positive indicating that greater percentage of the respondents agreed that Nigeria has effectively utilized IIF to significantly raise capital requirements for infrastructure development (mean = 2.59 > 2.50). The mean for this question item 26 is close to the criterion mean meaning that the respondents exhibited doubt on this particular question with almost half split between agreeing and disagreeing. Other question items revealed that the IIF has enabled private sector participation in critical areas such as transportation, energy, and utilities in Nigeria.

Table 5 summarizes the responses on Infrastructure Debt Securitization (IDS) as an innovative method of financing public-private partnership (PPP) projects in Nigeria. 75% of the respondents were of the opinion that IDS method of PPP financing gives government greater access to large capital while 61.4% were positive that the varying regulatory environment in Nigeria presents a challenge to this method of PPP project financing. However, 61.4% disagree to the opinion that issuing infrastructure debt as securities to investors will discourage private sector participation in public projects.

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Table 5: Summary of Responses on Infrastructure Debt Securitization (IDS) in PPP Project

S/N	Question items	Strongly Agree	Agree	Disagree	Strongly Disagree	Mean	Decision
1.	This method of PPP financing gives government greater access to large capital.	33 (75.0)	10 (22.7)	0 (0.0)	1 (2.3)	3.70	Positive
2.	The varying regulatory environment in Nigeria presents a challenge to this method of PPP project financing.	22 (50.0)	5 (11.4)	15 (34.1)	2 (4.5)	3.07	Positive
3.	Issuing infrastructure debt as securities to investors will discourage private sector participation in public projects.	1 (2.3)	7 (15.9)	27 (61.4)	9 (20.5)	2.00	Negative
4.	There is growing potential for securitization as a credible financing tool for long term infrastructure projects in Africa.	42 (95.5)	2 (4.5)	0 (0.0)	0 (0.0)	3.95	Positive
5.	The Nigerian government should consider this method of PPP project financing.	36 (81.8)	8 (18.2)	0 (0.0)	0 (0.0)	3.82	Positive

Source: Field Survey (2025)

4.2. Test of Hypotheses

Table 6: **Summary of Hypotheses Test:**

Variables	t-statistic	*p-value*	*Decision*
H_{01}: There is no significant relationship between blended financing model and sustainable public procurement in Nigeria.	1.200	0.237	No significant relationship exists between blended financing model and sustainable public procurement.
H_{02}: Green Bond method of financing a PPP project has not significantly affected sustainable public procurement in Nigeria.	-5.324	0.011	There is significant negative relationship between green bond and sustainable public procurement.
H_{03}: Infrastructure Investment Funds has no significant relationship with sustainable public procurement (SPP) in Nigeria.	3.730	0.019	Infrastructure Investment Funds has a significant positive relationship with sustainable public procurement.
H_{04}: There is no significant relationship between Infrastructure Debt Securitization and sustainable public procurement (SPP) in Nigeria.	0.358	0.722	There is no significant relationship between Infrastructure Debt Securitization and sustainable public procurement.

Source: *Extracted from SPSS Result*

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The t-statistic in Table 6 represents the t-statistic of individual sample from the multiple regression analysis. The coefficient shows that there is a positive relationship between blended finance, Infrastructure Investment Funds, Infrastructure Debt Securitization and sustainable public procurement in Nigeria. However, the null hypothesis two and three (H01 and H04) are accepted since their *p-values* 0.237 and 0.722 are greater than 0.05 critical value. The study therefore concludes that there is no significant relationship between blended financing model, Infrastructure Debt Securitization and sustainable public procurement in Nigeria. However, the null hypotheses two and three (H02 and H03) are rejected (*p-values = 0.011* and *0.*019) meaning that there is significant relationship between green bond, Infrastructure Investment Funds and sustainable public procurement in Nigeria.

Test of Model Fitness: The R-squared measures the strength of the relationship between the innovative PPP project financing models and sustainable public procurement. The R-squared value of 0.573 implies that the innovative PPP project financing models (blended finance, green bond, infrastructure investment fund, infrastructure debt securitization) account for up to 57.3% of the changes in sustainable public procurement in Nigeria. This shows an average coefficient of determination.

4.3. Discussion of Findings

The study explored innovative financing models for sustainable public procurement (SPP) focusing on public private partnerships in Nigeria. In specific terms, the study Investigate the extent to which blended financing model, green bond, Infrastructure Investment Funds and Infrastructure Debt Securitization affect sustainable public procurement in Nigeria. These innovative financing models in a PPP project framework were adequately conceptualized in the conceptual review while also giving a discussion of the theoretical anchor for the study. The study stressed the importance of managing transaction costs to enhance efficiency in public procurement (Lyons 2019), emphasizes the role of stakeholder incentives and governance in shaping PPP outcomes (Mengiste, 2020) and also upholds the view that PPP projects should deliver balanced economic, social, and environmental benefits to the public (Garba *et al.*, 2021). Consequently, theories such as the Transaction Cost Economics, Public Choice Theory, and the Triple Bottom Line provide valuable insights into the complexities of PPPs and their role in sustainable procurement in Nigeria.

The study went ahead to sample 44 staff from the Bureau for Public Procurement located in South East Nigeria. Their opinion was sought on the different innovative models of financing PPP projects and how they affect sustainable public procurement. The findings are discussed in line with the specific objectives of the study as follows:

Blended Financing and Sustainable Public Procurement

This first objective sought to ascertain the extent to which blended financing affect sustainable public procurement in Nigeria. Data from the respondents revealed that the Nigerian government appreciates philanthropic project financing and 56% of the respondents disagreed on the position that the use of blended financing method is on the rise in PPP projects in Nigeria. Further inquiry showed that greater percentage agreed that public projects in Nigeria do not attract private and philanthropic individuals in the financing while 72.7% of the respondents strongly agreed that blended finance in PPP project is not popular in Nigeria.

The findings are sustained by the assertion by Attah (2020) who opined that blended finance leveragesthestrengthsofeachsectortomobilizeresourcesforsustainabledevelopment and the poor strength of these sectors in Nigeria makes it problematic for the Nigeria. Further evidence from the inferential statistics (multiple regression analysis) revealed that there was a positive but no significant relationship between blended financing model and sustainable public procurement in Nigeria. This indicates that even though blended finance enhances sustainable public procurement in Nigeria, its

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effect has not been significantly in public procurement practices in Nigeria. The study of Akinsulire *et al* (2024) found no significant presence of blended finance model in ensuring availability of affordable housing in Nigeria.

Relationship between Green Bond PPP Financing Model and Sustainable Public Procurement

Furthermore, the second objective of the study sought to explore the relationship between Green Bond PPP financing model and sustainable public procurement in Nigeria. The responses from the questionnaire revealed that Nigeria's sovereign green bond for financing PPP projects will ensure quality infrastructure delivery, and it has helped the Nigerian government to raise significant funds to finance public projects. Also, the respondents were of the opinion that Green bonds have paved the way for private and public entities to participate in sustainable finance of public projects in Nigeria. The hypothesis concluded that Green Bond method of financing a PPP project has significantly affected sustainable public procurement negatively in Nigeria. Thus, green bond exerts a significantly negative effect on sustainable public procurement in Nigeria. Clark *et al.* (2018) also found that Green bonds enable issuers to raise capital from investors who are committed to environmental sustainability. Ojelabi, Fagbenle, Amusan and Afolabi (2019) made similar finding that innovative approach to meeting the social and economic infrastructures is engineered through the adoption of a Public-Private Partnership (PPP) procurement option and that the procurement option is a sure route through which infrastructural provision can be sustained.

Relationship between Infrastructure Investment Funds and Sustainable Public Procurement

The third objective determined the relationship between Infrastructure Investment Funds and sustainable public procurement (SPP) in Nigeria. Attah (2020) defined Infrastructure Investment Funds as the process of pooling capital from institutional investors – including pension funds, insurance companies, and sovereign wealth funds – to finance infrastructure projects. However, when subjected to opinion of the sampled respondents, they disagreed to the proposition that Pension funds, insurance companies, and sovereign wealth funds are involved in public project financing in Nigeria. However, more than 50% agreed that Nigeria has effectively utilized IIF to significantly raise capital requirements for infrastructure development while 75% of the respondents agreed that the IIF has enabled private sector participation in critical areas such as transportation, energy, and utilities in Nigeria. The hypothesis test revealed a positive and significant relationship between Infrastructure Investment Funds and sustainable public procurement. Thus, increase in Infrastructure Investment Funds significantly increases sustainable public procurement practices in Nigeria. Adjei (2023) posited that the long-term nature of infrastructure investments offers both investors and project developers a reliable means to address long gestation periods and the significant capital requirements often associated with infrastructure development projects. Attah (2020) emphasized the relevance of the Infrastructure Investments Fund in ensuring sustainable public procurement in Nigeria by giving examples of the funds which includes Chapel Hill Denham Nigeria Infrastructure Debt Fund (NIDF), United Capital Infrastructure Fund and The Infrastructure Bank Plc.

Relationship between Infrastructure Debt Securitization and Sustainable Public Procurement

The fourth objective of the study analyzed the extent to which Infrastructure Debt Securitization affects sustainable public procurement (SPP) in Nigeria. Responses from the respondents on this innovative financing model showed that 75% of them noted that IDS method of PPP financing gives government greater access to large capital while 61.4% were positive that the varying regulatory environment in Nigeria presents a challenge to this method of PPP project financing. However, 61.4% opined that issuing infrastructure debt as securities to investors will discourage private sector participation in public projects. What this implies is that it will encourage private sector participation in public projects rather than discourage them. On the overall, the respondents agreed that there is growing potential for securitization as a credible financing tool for long term infrastructure projects in Africa and that the Nigerian government should consider this method of PPP project financing.

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These findings from the respondents give the positive impression that Infrastructure Debt Securitization is widely accepted by the government of Nigeria in ensuring sustainable public procurement.

On sustainable public procurement, the participants disagreed that companies that give employment opportunities to disabled persons have higher chances of securing procurement contracts from the government. The percentage that disagreed was 47.7 per cent while 9.1 per cent strongly disagreed hence the respondents opined that the government considers companies whose manufacturing processes do not negatively impact on the environment. Also, Government considers the economic viability of projects before financing. Thus, sustainable procurement as it relates with infrastructure debt securitization indicates that Government prioritizes the financing of projects that are beneficial to future generations i.e. projects that have social, economic and future benefits.

The hypothesis test revealed that there was no significant relationship between Infrastructure Debt Securitization and sustainable public procurement (SPP) in Nigeria. Thus, Infrastructure Debt Securitization exerted a positive but not a significant effect on sustainable public procurement in Nigeria. Vinogradov, Shadrina and Kokareva (2024) supported this finding in their study that in a well-developed institutional environment, the benefits of infrastructure debt securitization are implicitly guaranteed. The positive but insignificant effect of Infrastructure debt securitization also aligns with the conclusion of Vu, Sandanayake and Zhang (2023) where-in they stated that PPP projects in developed economies are often scrutinized with higher standards and requirements and more comprehensive legislation systems, while in emerging economies, there is an absence of competition and transparency which affects the securitization of these debts.

5. CONCLUSION AND RECOMMENDATIONS

The conclusion emanating from the research is that even though blended finance enhances sustainable public procurement in Nigeria, its effect has not been significantly in public procurement practices in Nigeria, Green Bond method of financing a PPP project has significantly affected sustainable public procurement negatively in Nigeria, increase in Infrastructure Investment Funds significantly increases sustainable public procurement practices in Nigeria and that Infrastructure Debt Securitization exerted a positive but not a significant effect on sustainable public procurement in Nigeria.

In order to make the conclusion to be more precise, blended finance, green bonds, Infrastructure Investment Funds and Infrastructure Debt Securitization are the most innovative methods of PPP project financing in sustainable project procurement practices in Nigeria. However, the most potent innovative financing that has sustainably enhanced SPP in Nigeria is the Infrastructure Investment Funds (IIF). The study observed that the main advantage of IIFs is that they provide a structured mechanism for channeling private capital into public infrastructure projects while also supporting government-led initiatives for private sector participation in critical areas such as transportation, energy, and utilities. Thus, public procurement in Nigeria has tolled this path but efforts need to be intensified to diversify and amplify other innovative financing methods.

This study makes the following recommendations:

1 Blended finance model should be vigorously pursued in public procurement financing in Nigeria. The Nigerian government should create a strategic combination of public, philanthropic, and private capital in order to create scalable and bankable solutions to complex development challenges and ensure sustainable public procurement financing in Nigeria.

2 With green bonds significantly decreasing sustainable procurement practices in Nigeria, it is recommended that the recent launch of the sovereign green bond should be intensely followed up with intensification of projects that have positive environmental or climate benefits, such as renewable energy, clean transportation, or afforestation. These projects will attract more capital

especially foreign private investment which will pave the way for private and public entities to participate in sustainable finance of green infrastructure in Nigeria.

3 Nigerian government has shown great strides in Infrastructure Investment Funds by pooling capital from institutional investors – including pension funds, insurance companies, and sovereign wealth funds – to finance infrastructure projects. However, Governments should provide stability, incentives, and transparency in project selection to attract private investment in this long term method of financing PPP projects.

4 Infrastructure debt securitization should be made to have significant impact on sustainable project procurement in Nigeria by mobilizing private capital and enhancing market liquidity. This can be done by increasing the loan amount available from this innovative financing method and also strengthening the regulatory framework to attract private sector.

The relevance of this research to specific sustainable development goals (SGDs) are outlined below:

1. The sustainable development goal number seven which emphasizes the provision of affordable and clean energy is mostly impacted by this present study. This is by way of ensuring that projects that are environmentally friendly are financed through public-private partnership through the sovereign green bond issuance. However, the significantly negative effect of the green bond on sustainable project procurement may not augur well for green financing in Nigeria and as a result, government needs to intensify efforts in public projects financing through green bonds so as to ensure eco-friendly infrastructure that will guarantee affordable and clean energy.
2. Sustainable goals number nine which is on industry, innovation and infrastructure is also directly impacted by this study. Innovative financing of PPP projects will drive this goal while also making infrastructure available to the public for the purpose of enhancing production.
3. The drive for safe climate which is the goal number thirteen is projected by the f Infrastructure Investment Funds which aims at boosting economic growth by funding projects that improve connectivity, energy access, and quality of life.

Competing Interest

The authors have declared that no conflicting interest exist in this manuscript.

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