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PUBLIC-PRIVATE PARTNERSHIP PROCUREMENT TRANSPORT INFRASTRUCTURE DELIVERY: ASSESSING THE MANAGERIAL CAPABILITIES OF PUBLIC-SECTOR ORGANIZATIONS IN AFRICA

Summary. The lingering imbalance between infrastructural services demand and supply poses serious threats to the fiscal budget balance from contingent liabilities of African countries. Despite the increasing private investment commitments and adoption of public-private partnership procurement (PPP) options to address the widening infrastructure gaps in Africa, the failure in the delivery of public infrastructure projects is yet a common phenomenon. This study therefore examined the managerial capabilities of public-sector organizations (PSOs), who steer the provisions of public infrastructure, to investigate their readiness to achieve the value for money from private funding and the benefits of PPP options. The study conducted a self-study structured questionnaire survey on professionals in PSOs in Africa, particularly Nigeria, who have been directly involved in the delivery of public infrastructure projects via PPP. The professionals were purposively sampled and the primary data obtained was subjected to descriptive and inferential analysis. The study revealed that the PSOs have internalized about 41 PPP-capabilities for the delivery of public infrastructure projects. Up to 40 PPP-capabilities were exhibited on an average score (41-60%) level, with mean score (MS) value range of $3.13 \leq MS \leq 3.70$, for the public projects procured. The study established the existence of significant interdependence of $p < 0.001$, which

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indicated sufficient correlation between 31 PPP-capabilities and explained the 10 main components of managerial capabilities possessed by the PSOs. Some of the components clustered around public infrastructure planning and adaptability to PPP programme, project delivery parameters and control, suitable public infrastructure procurement knowledge, public policy awareness and innovation, and governance. The study provides information crucial for public infrastructure delivery success towards sustainable national economic recovery and development.

Keywords: public-private partnership procurement, managerial capabilities, public infrastructure, public-sector organizations, Africa, private investment commitments

1. INTRODUCTION

The need for public infrastructure development projects to keep up with demand by 2030 is reinforced by a proactive forecast and advocacy for the implementation of increased numbers and sizes of public infrastructure development projects around the world. A global annual spending estimated at \$3.4 trillion from 2013 to 2030 on public infrastructure development is established to sustain global infrastructural stability. Africa alone accounts for up to 38% of the projected annual spending, that is \$200 billion-\$1.3 trillion, on infrastructural developments to achieve the Sustainable Development Goals (SDGs) by 2030 [41, 78].

A high commitment towards enhancing the public infrastructure developments in Africa is evident by the attraction of larger private investments commitments (PICs) and increasing adoption of PPP models as alternative infrastructure delivery options [113]. For example, about 26 projects which attracted \$5.2 billion of PICs were recorded across the Sub-Sahara Africa in the year 2021. Angola attracted Private Participation in Infrastructure (PPI) transactions worth \$190 million; Burkina Faso, \$112 million; Ghana, \$98 million; Uganda, \$230 million; and Nigeria, \$108 million. Nigeria, the giant of Africa, intensified her investment commitments to infrastructure development in the year 2021, through the launch of a ₦15 Trillion Infrastructure Corporation of Nigeria Limited (InfraCo) with an initial capital of ₦1 Trillion [11]. The seed capital was speculated to mature to \$37 Billion investment fund by 2030, to support private investments and investors in the country [101].

Closing the widening infrastructure gaps through increased investment commitments on alternative infrastructure delivery options in Africa have not yielded commensurate results, as the failure of public infrastructure projects delivery is yet a common phenomenon [79]. The efforts to solve infrastructure crises by the implementation of mega projects that attract private capital via PPP interventions are yet unsatisfactory [4]. Policy issues arising from a capability gap in the obligations of PSOs for public infrastructure development in Africa and politicization of resources have been attributed to the increasing results of unmet benefits of PPP interventions [4, 75]. A weak capability-set of the PSOs in defining sector policies for the PPP model is established as a major policy problem that has led to economic inefficiency, poor governance and accountability, and failure of PPP projects through severe cost overruns and benefit shortfalls [17, 41, 49]. The rising controversial issues and unsatisfactory results that characterize PPP projects in Africa, Nigeria for example, are correlated with the inadequacies of the PPP managerial capabilities of the PSOs [17, 79, 115]. These phenomena have continued to threaten the countries' fiscal budget balance from contingent liabilities [105].

Public-Sector Organizations play significant steering roles in policy formulations and implementation in PPP models from programme development through successful infrastructure projects delivery [55, 59]. Having the PPP managerial capabilities by PSOs to deal with the complexity of the PPP model, its susceptibility to contrasting participants' interests and opportunism bias, and the negative effects of over-reliance on perceived superior capabilities of PSOs. It is appropriate at a time like this, when all public infrastructure projects are PPP driven in Africa, particularly Nigeria, [35] and when gaining value for money (VfM) on infrastructure developments is of critical essence, to investigate the managerial capabilities of the principal actors (i.e., PSOs) in PPP infrastructural transactions. Research efforts of existing PPP studies concentrated on sustainability practices, critical success factors, capabilities development measures, risk factors, critical performance, and drivers and barriers, but did not give adequate attention to the managerial capabilities possessed by the PSOs in the delivery of PPP projects [4, 14, 15, 16, 69, 80, 82, 85, 86]. This study therefore seeks to (1) identify the managerial capabilities (MCs) demands from PSOs for successful PPP Public Infrastructure Delivery (PID), and (2) examine the MCs possessed by PSOs for PPP PID in the country. This is with a view to informing policymakers of the requisite PPP-capabilities for achieving the comparative advantages of PPP options for PID in Africa, towards a sustained national economic recovery and growth.

2. LITERATURE REVIEW

2.1. PPP approaches for public infrastructure developments

PPP arrangement is a veritable tool to alleviate the infrastructure gap in the global world, with heightened implementation in Europe and North America [103]. PPP is a long-term contractual arrangement by a consortium of public and private sectors to procure sustainable public infrastructure, where the strengths and opportunities of parties are maximized and inherent project development threats and risks are optimally minimized, by allocating obligations to the parties best able to manage them [10, 50]. Vaslavskiy and Vaslavskiy [107] asserted that PPPs are parameters that assure the greatest multiplier effects of public infrastructure developments on the national economic growth rate and increased savings on budget. PPP institutes a correlation ratio of public budget to private financing of public infrastructure at 1:3, and offers solutions to the problem of rising budget deficits as well as the attendant costs of servicing debts from the retrospective monopoly of infrastructure delivery by PSOs [94, 95]. Thus, PPP creates a viable pool of additional financial resources from private institutions for PSOs to sustain their core business of government in serving the public (the governed) through stable infrastructural developments and services delivery [28].

Canzanelli [28] and Forrer et al. [43] asserted that the approaches of PPP are basically aimed at bringing in parts or all of the technical and innovative skills set, financial support and management competences of private sectors to solving public policy difficulties. Private financing of public infrastructure projects is a significant feature of all PPP approaches, which has led to the increasing number of PPPs in developed and developing countries [22, 103]. PPP approaches are distinguished by the degree of assumptions of responsibilities and risks shared by the parties to the PPP contract. For example, in a service-based PPP approach, the public sector assumes the demand risks, which guarantees an enhanced innovative and creative PID by the private sector counterpart [86]. The approach is characterized by a fixed or variable payments regularly made by the public partner to the private partner for the PPP infrastructure

service rendered [28]. The service-based PPP approach is predominantly used for social infrastructure (i.e., hospital) and economic infrastructure (i.e., transport) in the U.K., USA, Hong Kong, Canada, and Australia [3, 108]. A finance-based PPP approach, where the private sector takes up the demand risks, is commonly practiced in South Africa and Nigeria [86]. A users' fee is usually charged for PPP infrastructure services enjoyed from the finance-based approach. Uzunkaya [105] added that finance-based PPP approach is the main contingency plan for public infrastructure developments in developing countries in the current era of financial constraints.

Variants of PPP approaches contractually establish a distinguishing level of bundling of construction and operation, and the extent of private ownership of the public asset over the contract period or in perpetuity [38, 58]. According to Boyer and Scheller [25], transport infrastructure is commonly developed by Design-Build (DB) variant, where the private sector only designs and constructs the assets; and/or by Design-Build-Finance-Operate and Maintain (DBFOM) variant, where the private partner is engaged from design through operation and maintenance, to the period of termination of agreement on private ownership of public asset. The determinants for any PPP variants adoption are the country's specific needs and supports, regulatory framework, and prevailing legislation for PPP infrastructure development [32]. The variants of PPP approaches, as implied by their names, are Build-Operate-Transfer (BOT), Build-Own-Operate (BOO), Build-Own-Operate-Transfer (BOOT), Build Lease (BL), Buy-Build-Operate (BBO), Operation License (OL), Finance Only (FO), Operation and Maintenance (OandM), Rehabilitate-Operate-Transfer (ROT), Design-Build-Operate-Transfer (DBOT), Concession, and Joint Venture (JV) [4]. Irrespective of the variants of PPP being employed, all private ownerships of public assets at the expiration of terms of ownership agreements are relinquished and the assets' ownerships eventually revert to the public authority. In contrast, BOO variant permits the private ownership of public asset in perpetuity, and the JV variant supports a shared ownership of public asset by contracting parties in perpetuity.

PPP approaches are established as crucial solutions to the domestic problem of deficient public finance for infrastructure development in the global south, particularly in Africa, where over 35% of the world PPP infrastructures are executed [44, 89, 103]. Over two decades since 1990, about 102 PPP public infrastructure projects worth US\$18,241 million were being implemented, including roads, railways, airport, hospitals, schools, electricity production and distribution, water supply, telecommunication, and water and waste management infrastructure services [39, 96, 102, 117]. Five countries in Africa have accounted for over 50% of successful PPP activities in social and economic infrastructure projects delivery, viz. South Africa, Morocco, Nigeria, Egypt, and Ghana [9]. Among the sectoral infrastructure projects developed were transportation, telecommunication, and water resource management [114]. Transport infrastructure development has gained the paramount prominence and experienced effective delivery via concession-based in Africa [68, 114]. Mass housing schemes and electricity, that is the National Integrated Power Projects (NIPPs), have also been largely procured via the PPP interventions, especially in Ghana and Nigeria [18, 31, 52].

2.2. Government policy for PPP infrastructure

PPP policy is deemed imperative to maintain public policies for collective benefits and welfare in the PID process, to ensure general acceptance by the public and performance of contracting partners [103]. The implementation of PPP policy is rather integral to infrastructure development process and project success because it identifies and resolves social problems while curtailing fiscal crisis [1, 110]. PSOs perform a 'conduct of conducts' of all actors at

the project and system levels in PPP contract through the implementation of PPP policy [103]. A clear government policy for PPPs defines the support of governments for PPPs which appeals to private investors; attracting private capital [109]. Therefore, possessing adequate managerial capabilities by PSOs, to formulate appropriate policy interventions for delivering PPP public infrastructure projects, within the context of the specific infrastructure needs at different levels of government is highly indispensable.

Vecchi et al. [108] advocated that PPP policy must be formulated to accommodate instruments well suited to address respective infrastructure, enhance accessibility to credit facilities, attract private capital and attract long-term investors for PID. These instruments are PPP cash flow tools, grants and subsidies policy tools, credit-enhancement tools, direct provision of debt and equity capital, availability-based PPP, and risk mitigation tools. The Junker Plan 2014, created by the Investment and Infrastructure Working Group (IIWG) of the G20 summit, is an example a risk mitigation instrument, that addressed the inflow of private capital for PID in Europe, during the period of economic crisis generated by Brexit [76, 108]. A demonstration of an in-depth understanding of PPP project and system policy tools and instruments, by possession of requisite PPP managerial capabilities by PSOs, is expedient in formulating PPP policy for clear-cut definitions of terms, agreements, and obligations.

Among other considerations in policy formulation is the incorporation of instruments of sustainability viz. indices of long-term performance, award criteria, contractual arrangements, end users' welfare, and incentives for penetration of new markets. These instruments are vital indicators that promote the mission of the global sustainable development [15, 24, 97]. For example, tax policy fuels the success rates of PPP projects in China [118], and the Viability Gap Fund (VGF) as well as project development fund in India [2]. Osei-Kyei and Chan [86] recommended that supportable measures for PPP policy formulation and implementation actions in Sub-Saharan Africa, particularly, South Africa, Nigeria, and Mozambique, must include guaranteed stable macroeconomies, transparent competitive bidding process, high local investors' participations, and effective stakeholders' management. Soeipto and Verhoest [98] further stressed that PPP policy objectives are achievable through political support and buy-ins, appropriate regulatory and legal structures, and dedicated PPP supporting arrangements.

About thirty countries in Africa have adopted PPP laws, where nearly over 20 countries did so in the past nine years [106]. In Nigeria, the Infrastructure Concession Regulatory Commission (ICRC), enacted by the ICRC Act of the year 2005, is saddled with the development of guidelines, procurement policies and process for all PPPs at all levels of government, to guide private participations in public service delivery [116]. However, there are other sector-specific laws and agencies that regulate different services as well. For example, the Nigerian Electricity Regulatory Commission (NERC) regulates private activities in the electricity and energy sector, and the National Communication Commission (NCC) regulates private participation in the telecommunication services. Such specific laws and agencies for transport services and facilities are unformed, as the instrument for this process, that is the National Transport Commission Bill 2015, still awaits the presidential approval [23].

2.3. Theoretical background and managerial capabilities of PSOs for PPP PID

The fundamentals of Resource-Based Theory (RBT) establish an affirmative underpinning that supports the indispensability of possessing distinctive managerial capabilities by PSOs for PID success [61, 90]. The theory emphasizes the imperatives of possessing heterogeneity of valuable, rare and inimitable capabilities by organizations in a competitive market for enhanced organizational performance, productivity, and survival sustenance. Possessing such a quality

set of capabilities by PSOs in the PPP market, where competition of interests abounds, calls for a serious attention towards competitive positivism, which advances the cause of sustainable infrastructural developments. Building on the RBT, Draft [33] stressed that a collection of skills, knowledge, and competences of any organization enhances her productivity towards satisfying all her stakeholders. Jackson and Roe [53] and Bryson, Ackermann and Eden [28] reinforced the relevance of the theory to producing public value by understanding the capabilities and resource demands of the public administration in the development of public projects like PPP infrastructure projects. A superior set of skills are essential skill-sets characterizing the internal workforce of organizations to meet the challenges of socio-economic development of a country [99].

Barney [20] averred that organizations sustain their competitive advantage by identifying, developing, deploying and preserving particular resources that distinguish them from their contracting parties. Richardson [92] observed that organizations often specialize on capabilities that offer them comparative advantage through the complementary skills of their management teams. Tilley et al. [100] described capability as the ability of any organization to accomplish its mandates, while managerial capabilities entail the exhibited skills of employees [51]. Barney [19] asserted that the managerial capabilities of an organization are crucial in appropriately dealing with team settings for sustenance of competitive advantage and survival. In the PPP parlance therefore, the managerial capabilities of PSOs for PPP infrastructure delivery characterize the expertise exhibited by them in effectively dealing with the PPP process, program, project, and parties [29, 180]. Possession of prerequisite PPP managerial capabilities by PSOs to build their competitive superiority in PPP transactions and secure an excellent grip of government's control on PID processes, for enhanced service provision in the best interests of the public, without jeopardizing the expected investment gains of the private partners.

Existing studies have identified some managerial capabilities required of PSOs for PPP infrastructure within the remits of the all-inclusive PPP units regarding management capacity, management expertise and management process (Table 1). These capabilities enable PSOs to oversee all the phases of a PPP project, from project origination to policy formulation, to project conceptualization and development, transaction design and evaluation, contract administration and management, to project close [75, 119]. Policy development expertise, project design and contract management experience, negotiation and bargaining ability, transaction management prowess, mediation skills, program audit prowess, communication skill, and political sensitivity are established to results in PID success in any nation [57, 91].

The risk management capabilities of PSOs are averred as important determinants for PID success of PPP water supply projects in Indonesia, using the Public Sector Comparator (PSC) measure at the bid evaluation stage [88]. The PSC measure enables the PSOs to ascertain VfM of water projects and facilitate risk negotiation procedures among parties. Ahadzi and Bowels [8] revealed that the possession of organizational and technical capabilities by PSOs in the United Kingdom significantly influences the efficiency of the contract negotiation process for PPP projects. The technical capabilities help the PSOs in writing very comprehensive service output specifications for projects. The organizational capabilities, characterized by team spirit and commitments to collaboration within the PSO's team and bureaucracy in the process of decision-making, rid the PPP negotiation process of variances that frustrate project progress.

An evaluation of theory-based PPP programs and projects in African developing countries reinforced the credibility of possessing technical, financial, economic and regulatory capabilities by PSOs for PID success [105]. These capabilities were established to be very crucial inputs for impactful feasibility and viability evaluation, well-defined and flexible contracts, sound procurement, proper risk allocation and management, effective contract

administration and management, clearly defined guidelines for conflict resolution, and unambiguous tariff and/or subsidy settings that ensure affordability. The critical factors that influence the credibility of PSOs' capabilities for PID success in the countries are political support and will. Using the Gross National Income (GNI) per capital and Human Development Index (HDI) to determine the characteristics of African developing countries and establish what triggers suboptimal mega projects delivery, Othman [87] affirmed that the insufficient managerial capabilities of the PSOs is highly consequential to the suboptimal public project delivery.

Tab. 1

The Requisite PPP-Capabilities for Infrastructure Delivery

PPP Capabilities	Knowledge Areas	Author(s)
<ul style="list-style-type: none"> • Project Assurance • Commercial • Project Delivery 	Policy and political environment knowledge; identification and definition of user's needs; description of outcome and contract terms; acumen of business and commercial activities; scenario analysis and planning; knowledge of procurement options; communication skills and feedback validation; strategic context understanding; risks knowledge and control; analysis, interpretation, and communication of financial data; market maturity knowledge; synergy and team spirit; suppliers' incentive understanding; government procurement policy, guidance and legal framework; negotiation strategy and deployment; bid evaluation and suitability determination; definition of time, cost, quality, and scope control limits; knowledge of contract mechanism for suppliers' engagement; choice of reasonable supplier to undertake task at optimal cost	[7, 59, 70, 71, 72, 111]
<ul style="list-style-type: none"> • Organizational • Financial • Technical 	Establish project parameters; preparation of output specifications of services; public sector team synergy; communication framework development and flexibility; bureaucratic drive in decision making; experience, financial expertise, and technical expert skill; procure financial grants; tax flexibility knowledge	[8, 45, 105]
<ul style="list-style-type: none"> • Relational • Contractual 	Opportunism control in transactional relationship at tendering and negotiation stages; contractual safety measures; relation-specific assets investment; knowledge sharing measures; management of complementary resources; relationship management	[13, 34]
<ul style="list-style-type: none"> • Governance 	Appropriate projects selection and notification to stakeholder; project administration and management to budget; integration of completed project with existing operations to generate intended benefits	[67, 110, 111]
<ul style="list-style-type: none"> • PPP-unit internalized structure 	Political will and support; advocacy; legitimacy; clear rationale; project development and monitoring; accountability and responsiveness measures; measures of transparency and fairness; balanced interest measures	[32, 54, 62, 64, 65]

<ul style="list-style-type: none"> • Supplementary 	Execution of technical, logical and service delivery tasks; strategy to relate and attract private sector; self-knowledge update and renewal; balanced diversity and coherence; change management methods; project programme management measures	[21, 94]
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The Economic Intelligence Unit [37] stressed that the African countries experience differing human capital challenges for PPP projects delivery pertaining to independent country's broader development level. The country's individual peculiarities, infrastructural needs' specificities, and organizational set-up influence the extent of managerial capabilities possessed by the PSOs [37, 60]. For example, the Egyptian PSOs buy in technical expertise such as financial modelling for PPP projects delivery, while the South African PSOs have strong public-sector skills-sets. The PSOs of Ghana, Zambia, Uganda, and Rwanda when compared to alternative procurement systems were found to encounter a greater shortage of qualified personnel with managerial capabilities for the implementation of PPP infrastructure [37]. Babatunde [17] stressed that the human capital challenges posed by the low-leveled capability maturity in PPP projects delivery are experienced by the Nigerian PSOs.

This study examined the managerial capabilities possessed by PSOs in the African largest city, Lagos, for PPP project delivery. Lagos, is among the top ten fastest growing cities in the world with an estimated population of 15.4–24 million and ranked as the fourth among the cities with the highest GDP in Africa [36, 56]. Lagos is a pioneering state at the forefront of PPP-based infrastructure and economic growth in Nigeria [6]. Several public infrastructure projects have been procured via the PPP model by PSOs in the state. These range from roads to railways, airports, markets, and housing, to independent water supply and solar power electrification; however, transport infrastructure ranks the highest among the PPP projects procured [73, 82]. Some examples of the PPP projects are the Blue Light Rail, Lekki-Epe road, Lekki-Ikoyi Interchange, Muritala Mohammed Airport (MMA 2), Tejuosho market, Lekki Deep Sea Port [26]. Some other proposed PPP projects that worth over US\$3 billion of private capital funding are in the pipeline (see Table 2) [46, 77]. The operation of PPP infrastructure delivery process in Lagos is via an existing PPP management structure; which is established to be essential for the efficient delivery of PPP projects [115, 120]. This PPP management structure constitutes the legal frameworks (i.e., the PPP Manual, Memorandum of Understanding (MoU), PPP law, PPP rules, and concession agreements), institutional frameworks (i.e., the PPP units, and PPP teams), technical management tools, and human capital and resource structure [120].

Tab. 2

PPP Infrastructural Operations in Lagos

PPP Projects in the Pipeline	Status of Projects
The Smart Health Information Platform(SHIP)	Proposed
The Medical Park Project	Expression of Interest
The Red Line Rail Project	On-going
Fourth Mainland Bridge (38km)	Selection/bidding process
Adjacent Real Estates to 4th MB	Selection/bidding process
Unified Fibre Infrastructure and Connectivity Project	Approved
Badagry Deep Sea Port	Approved
6,016-Bed Ultra-Modern Hostel, LASU, Ojo Campus	Signed BOT deal, via PPP policy

Ilubirin Estate Project, 28.6 hectares-Land Development, Ikoyi	On-going
Alaro City Development, 2,000 Hectare-Land Development, Lekki-Epe expressway	On-going
The Lekki-Epe Airport	Proposed
Jankara Market Development (6,793.2km ²)	Proposed

Source: [6, 46, 77]

3. METHODOLOGY

The study conducted a quantitative research statistic, through the administration of a well-structured, close-ended questionnaire to the sampled respondents, to obtain primary data and generalize the findings for PSOs in Africa, particularly Nigeria [74]. The requisite PPP-capabilities from PSOs for PID, that were reviewed from existing studies, formed the construct for the questionnaire design, which addressed the objectives of the study (the Part B section of the questionnaire). The Part A section addressed the information about the demographic characteristics of the respondents; the questionnaire was designed into two (2) parts.

The sampled respondents were key PPP players in the PSOs, who were at the management level and top decision makers in infrastructure procurement in Lagos State. The players constituted professionals who were in-house employees, contract staff, and consultants directly and indirectly affiliated to the PSOs. The PSOs surveyed were the Lagos State PPP office, New Town Development Authority (NTDA), Lagos State Ministry of Works and Infrastructure, Ministry of Physical Planning and Urban Development (PPandUD), Lagos State Ministry of Housing, Ministry of Aviation, Ministry of Transport, and Lagos State Property Development Corporation (LSPDC). The 8 focal PSOs are significant PSOs in Lagos in the saddle of the conceptualizations of public infrastructure through projects delivery [120].

The targeted population were engineers, architects, builders, accountants, quantity of surveyors, legal experts, public administrators, procurement specialists, consumer experts, and public budget officials in the PSOs. These professionals (10) were established to possess adequate knowledge about the construction and delivery of PPP projects in PSOs [12]. The database showing the statistical representations of the professionals with PPP-experience is unavailable in the Nigerian construction industry [83]. Thus, the sample size was derived by an initial identification of a PPP-expert from a PSO, who referred other experts from other PSOs, thus building up the referral chain of PPP-experienced professionals in all the surveyed PSOs. This informed a snowballing sampling approach, of a purposive sampling method, with at least two (2) each of the respondents representing each PSOs being sampled [93]. The sampling criterion for the respondents was also determined by their willingness to supply resourceful information for the purpose of the study. As a result, a total of 160 questionnaires were administered.

A total of 98 copies of the questionnaire (representing 61.3 per cent response rate) were retrieved and considered suitable for analysis because they were properly filled and completed by the respondents. The 61.3% response rate is within the range of response rates on PPP surveys in Africa, thereby justifying the adequacy of the data retrieved for the analysis [15, 80, 81]. The descriptive and inferential statistics were employed for data analysis using the Statistical Package for the Social Science (SPSS), that is the IBM SPSS Statistics 20, to analyze and establish the findings by the study. Frequency and mean score were the descriptive statistics

adopted for all the variables examined. Factor analysis and reliability analysis were the inferential statistics conducted on the examined variables on the PPP managerial capabilities possessed by the PSOs. The sample size subjected to factor analysis of variables was lower than the recommendations of the rule of thumb about a minimum sample size (N), that refers to ratio of sample size to variable (STV) of 5:1 and 10:1. But the STV for this study, $STV = 2.39:1$ (98 cases to 41 variables), agrees with some recommendations on the adequacy of STV of 2:1 or 3:1 for factor analysis [47]. Notwithstanding the statistical research on sample size adequacy for factor analysis, some studies stressed that the communalities of the loaded factors are very significant to the STV; the lower the communalities the more the sample size required [42, 63]. The studies recommended a perfect adequacy of sample size < 100 , where all the communalities of the loaded factors are > 0.60 .

In addition, the suitability of the data collected and results of factor analysis were verified through validity and reliability tests, which were conducted on the research instruments using Kaiser-Meyer-Olkin (KMO), Bartlett's test of sphericity, and Cronbach's Alpha (α) test. A recommendation of KMO values range of 0.5–1.0 for factor analysis is indicated as an acceptable and good value for a given sample size [42] and Cronbach's α value tending toward 1.000 indicates the reliability of scales from the factor analysis [48]. The KMO value for the study (KMO = 0.73) is > 0.5 and the values of Cronbach's α ($0.54 \leq \alpha \leq 0.85$) tends towards 1.000.

4. RESULTS

4.1. Background information of the respondents

Table 2 shows the profile of the respondents, indicating their academic qualifications, professional qualifications, the types of PPP projects and the rate of the professionals' involvements in their execution, and their years of work experience. The top management decision makers in the PSOs, who are responsible for the procurement of public infrastructure via PPP interventions, were captured. Their professional affiliations were 14.3% engineers and architects respectively, 13.3% builders and quantity of surveyors respectively, 11.2% accountants, including 8.2% consumer experts and 7.1% legal experts and public budget experts respectively. About 62.2% of the PPP professionals were in-house employers, while only 14.2% of them were consultants. The average year of work experience of the professionals in public service is 19 years. The professionals have had an average work experience of 11 years in the delivery of PPP-procured public infrastructure in Lagos. Transport infrastructure scored over 46% level of engagement of the professionals for its delivery. Housing infrastructure had 18% level of involvement of the professional in its delivery. Energy infrastructure (power) procured via PPP had the least percentage (9%) involvement of the professionals in its delivery. These characteristic attributes of the professionals justify the adequacy of the information supplied by the respondents for data analysis.

Tab. 3

The Respondents' Profile

Respondents' Profile	F	(%)	Respondents' Profile	F	(%)
<i>Name of PSO</i>			<i>Professional Qualification</i>		
Office of PPP	12	12.2	ACA/ACAN	16	16.3

NTDA	8	8.2	ARCON	16	16.3
Lagos State MWandI	13	13.3	CORBON	14	14.3
MPPandUD	13	13.3	COREN	17	17.3
Ministry of Housing	15	15.3	NBA	5	5.1
Ministry of Aviation	15	15.3	QSRBN	15	15.3
Ministry of Transport	11	11.2	Others (Unspecified)	15	15.3
LSPDC	11	11.2	<i>Work Experience in P/S</i>		
<i>Designation of Respondents</i>			1-5 years	0	0.0
Accountant	11	11.2	6-10 years	8	8.2
Architect	14	14.3	11-15 years	30	30.6
Builder	13	13.3	16-20 years	19	19.4
Consumer Expert	8	8.2	21-25 years	26	26.5
Engineer	14	14.3	26-30 years	15	15.3
Legal Expert	7	7.1	<i>Work Experience on PPP Project</i>		
Public Administrator	7	7.1	1-5 years	2	2.0
Public Budget Expert	5	5.1	6-10 years	33	33.7
Procurement Specialist	6	6.1	11-15 years	61	62.2
Quantity Surveyor	13	13.3	16-20 years	2	2.0
<i>Status of PPP Team Player</i>			<i>Types of Project</i>		
In-house Employee	61	62.2	Road	20	20.4
Contract Staff	12	12.2	Railways	9	9.2
Consultant	14	14.3	Airport	17	17.4
Consultant and Full Time Staff	11	11.2	Power	9	9.2
<i>Academic Qualification</i>			Market	15	15.3
BSc/BTech	51	52.0	Housing	18	18.4
MBA	10	10.2	Independent W/S	10	10.1
MSc	26	26.5			
PhD	9	9.2			
Others	2	2.0			
Total	98	100.0	Total	98	100.0

F=Frequency

4.2. The PPP - managerial capabilities possessed by PSOs in Africa

The results of the analysis of the examined managerial capabilities possessed by the PSO in PPP public infrastructure delivery were presented in Table 4, Table 5 and Figure 1. The PPP-capabilities variables examined were extracted from the existing studies on PPP projects delivery programmes in developing and developed countries. Table 4 captured 41 variables from literature, excluding duplications of some variables. The variables were assessed through Mean Score (MS) to identify the PPP capabilities internalized by PSOs in Africa. A five-point Likert scale of 5 to 1 ($1 < 2 < 3 < 4 < 5$); where 5 = very high, 4 = high, 3 = average, 2 = low, and 1 = very low; was employed to assess the level of capabilities possessed by the PSOs. The mean score calculation was based on the expression [121]:

$$MS = \sum(f \times s) / N \quad (1)$$

Where “s” is the score given to each PPP capabilities displayed on past PPP infrastructure procured by the respondents in the PSOs, ranging from 1-100% (1-20% = scale 1, very low; 21-40% = scale 2, low; 41-60% = scale 3, average; 61-80% = scale 4, high; 81-100% = scale 5, very high), “f” is the frequency of each rating (1-5) for each variable, and “N” is the total number of responses concerning the PPP-capabilities variables.

The study found that the PPP-capabilities exhibited by the PSOs in the delivery of the PPP public infrastructure was on the average (41-60% score) for 40 PPP-capabilities, having MS values range of $3.13 \leq MS \leq 3.70$ (Table 4). It is thus inferred that the PSOs have internalized all the examined PPP-capabilities for the delivery of PPP projects in Africa. The managerial capabilities included financial data modelling and economic analysis skills (MS=3.70), infrastructure project administration and contract management (MS=3.65), contract negotiation strategy and development (MS=3.57), infrastructure output specification development (MS=3.51). Conversely, the PSOs exhibited a low level (21-40% score) of PPP-capabilities in the delivery of public infrastructure on variation management (MS = 2.82) only.

Tab. 4

PPP Managerial Capabilities in African PSOs

PPP Managerial Capabilities in African PSOs	MS	Rank
Financial data modelling and economic analysis skills	3.70	1
Infrastructure project administration and contract management	3.65	2
PPP project programme audit	3.64	3
Risk knowledge, planning, evaluation and control skills	3.64	3
Legal advice expertise	3.64	3
Infrastructure Project parameter and evaluation benchmark development prowess	3.63	6
Creativity and innovation	3.62	7
Contract negotiation strategy and deployment	3.57	8
Bargaining, suitable private sector selection and project award	3.56	9
PPP infrastructure feasibility and viability studies	3.56	9
Public finance analysis ability	3.56	9
Users' satisfaction analysis ability	3.56	9
Infrastructure procurement policy development prowess	3.56	9
Human Relation Management Skill	3.56	9
Policy and political environment knowledge and predictability	3.56	9
Procurement of financial grants	3.54	16
Knowledge of procurement options	3.54	16
Infrastructure project outcome and contract terms description	3.54	16
Synergy and team spirit	3.52	19
Knowledge of the contract mechanism for suppliers' engagement	3.52	19
Ability to evaluate market demand for public services	3.52	19
Ability to use Public Sector Comparator	3.52	19
Knowledge of government procurement policies, guidelines, and legal framework	3.51	23
Infrastructure output specification development	3.51	23
Scenario analysis, planning, and adaptability to PPP	3.51	23
Communication skill and feedback validation	3.51	23

Market maturity knowledge	3.47	27
Predictability and management of opportunism in transactional relationship among partners	3.47	27
Incentive strategy and private sector attraction measures	3.47	27
Users' needs definition and appropriate project identification	3.47	27
Tax flexibility knowledge	3.45	31
Determination of project time, cost, quality, and scope limits	3.43	32
Determination of suitability of bids	3.43	32
Cost-benefit analysis ability	3.42	34
Infrastructure service integration and generation of expected benefits	3.42	34
Transparency, fairness, and trust	3.40	36
Accountability and responsiveness	3.38	37
PPP Knowledge and knowledge sharing attribute	3.38	37
Clear rationale and balanced interest control	3.22	39
Ability to balance diversity and coherence	3.13	40
Variation management	2.82	41

A further inferential analysis was conducted by the study on the internalized PPP-capabilities possessed by the PSOs using factor analysis. This was specifically carried out to explore and establish the correlation and existing significant interdependencies among the internalized PPP capabilities initially assessed using MS. Table 5 shows the results of the principal component analysis (PCA) by the orthogonal rotation (varimax) with Kaiser normalization, that was conducted on the initial 41 capabilities, which were reduced to eleven (11) components. The Kaiser-Meyer-Olkin measure verified the sampling adequacy for the analysis at KMO = 0.73 (good, according to Hutcheson and Sofroniou in [42]). All the KMO values for the individual capabilities' variables were > 0.70, which is well above the acceptable limit of 0.50 (Kaiser in [42]). The Bartlett's test of sphericity $\chi^2(820) = 2567.46$, $p < 0.001$, indicated that the correlations between the variables were sufficiently large for PCA. The initial analysis run to obtain the eigenvalues for the individual capabilities gave values > 1 (above Kaiser's criterion of 1) and in combination, the 11 components (that is, the PPP managerial capabilities) explained a 71.91% of the variance. The scree plot showed the inflexions that justified retaining the 11 components (Figure 1). Therefore, given the adequate sample size, exceedance of the Kaiser's criterion, and the convergence of the scree plot on the 11 components, the number of components retained in the final analysis was eleven (11).

Furthermore, the result of the reliability test that was conducted on the 11 components extracted by the PCA is presented in Table 5. Only 10 components were confirmed reliable, having a Cronbach's α values < 1. This ranged from $0.54 \leq \alpha \leq 0.85$. Out of the 10 reliable components, 9 components had high reliability ($0.64 \leq \alpha \leq 0.85$), while the 10th component (financial support initiation) had a relatively low reliability of Cronbach's $\alpha = 0.54$. The 11th component confirmed to be unreliable is, ability to balance diversity and coherence.

Tab. 5

Factor Analysis of the Managerial Capabilities possessed by the PSOs

Components	Eigen value	% of total variance	Cronbach's α	Loading	Communality
<i>Public Infrastructure Planning and Adaptability to PPP Programme</i>	12.14	29.60	0.85		
Scenario analysis, planning and adaptability to PPP				0.74	0.69
Infrastructure project outcome and contract terms description				0.73	0.69
Synergy and team spirit				0.72	0.66
Knowledge of contract mechanism for suppliers' engagement				0.62	0.79
PPP Knowledge and knowledge sharing attribute				0.59	0.75
Infrastructure output specification development				0.54	0.65
<i>Project Delivery Parameter and Control</i>	2.95	7.19	0.75		
Determination of project time, cost, quality and scope limits				0.74	0.73
Public finance analysis ability				0.70	0.63
Risk knowledge, planning, evaluation and control skill				0.69	0.76
<i>Suitable Public Infrastructure Procurement Knowledge</i>	2.64	6.45	0.74		
Cost-benefit analysis ability				0.74	0.74
Bargaining, suitable private sector selection and project award				0.71	0.71
Communication skill and feedback validation				0.58	0.60
<i>Public Policy awareness and Innovation</i>	2.09	5.10	0.73		
Creativity and innovation				0.79	0.77
Knowledge of government procurement policies, guidelines and legal framework				0.65	0.72
Market maturity knowledge				0.51	0.79

<i>Governance</i>	1.85	4.52	0.63		
Infrastructure service integration and generation of expected benefits				0.77	0.71
Infrastructure project administration and contract management				0.56	0.76
<i>Users' Needs Assurance and Delivery</i>	1.65	4.01	0.71		
Ability to evaluate market demand for public services				0.76	0.77
Users' needs definition and appropriate project identification				0.58	0.66
Users' satisfaction analysis ability				0.58	0.77
PPP infrastructure feasibility and viability studies				0.52	0.72
<i>PPP Project Contract Management</i>	1.38	3.36	0.66		
Variation management				0.85	0.82
Clear rationale and balanced interest control				0.69	0.64
<i>Organizational Prowess</i>	1.32	3.21	0.69		
Legal advice expertise				0.61	0.78
Knowledge of procurement options				0.60	0.64
Determination of suitability of bids				0.51	0.63
<i>Commercial Expertise</i>	1.27	3.10	0.64		
Infrastructure procurement policy development prowess				0.71	0.79
Incentive strategy and private sector attraction measures				0.70	0.65
<i>Financial Support Initiation</i>	1.20	2.91	0.54		
Procurement of financial grants				0.68	0.77
Transparency, fairness and trust				0.59	0.71
<i>Relational Capabilities</i>	1.01	2.46	-		
Ability to balance diversity and coherence				0.73	0.71
Total % of variance explained	71.91				
<i>Kaiser-Meyer-Olkin measure of sampling adequacy</i>	0.73				
<i>Bartlett's test of sphericity:</i>	$x^2 = 2567.46;$				
	$df = 820;$				
	$p = 0.000$				

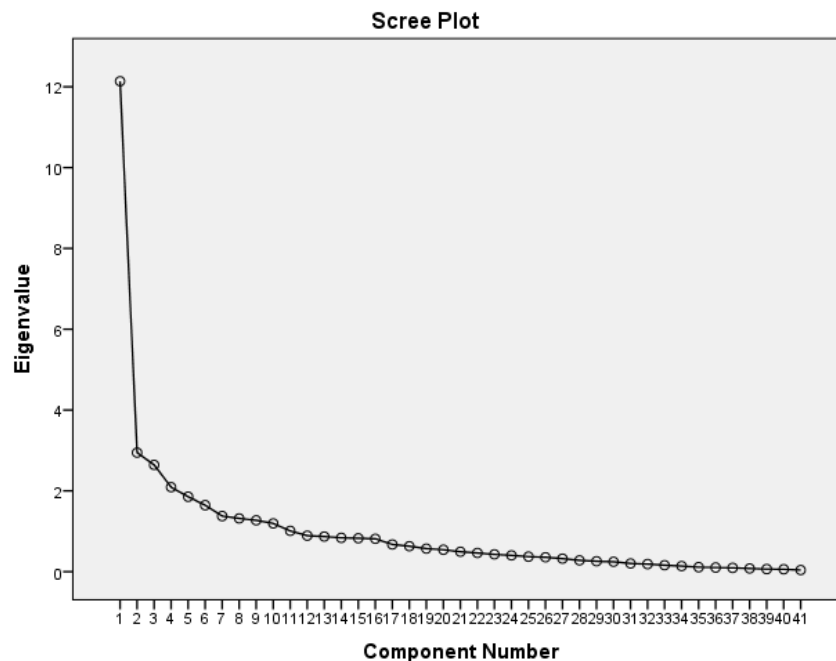


Fig. 1. Scree plot of the components

5. DISCUSSIONS

The study revealed that the PSOs in Lagos have human capital with professional experience for the delivery of PPP public infrastructure that cut across transport, housing and commercial markets, energy, water, and power infrastructure. The managerial capabilities of the PSOs in the delivery of transport infrastructure excels other types of infrastructure, which is consequential to the exponential growth of the transport network and its attendant boost to the economy of the State. Among the other types of infrastructure projects procured by the PSOs, transportation recorded the highest percentage level of engagement of the professionals in its delivery. In corroboration to the claim by [113] on transport sector's investment, this study upholds that assertion that transport procurement programmes have the leading historic trend in PPP projects delivery among the Sub-Sahara African countries.

This study established that the PSOs in Africa, particularly Lagos Nigeria, have internalized all the requisite PPP-capabilities in the delivery of public infrastructure projects as applicable to the projects of developed PPP markets in developed countries. But, the scale and/or strength of the capabilities possessed and exhibited by the PSOs on the past PPP projects delivered is rather on average. This study therefore deviates and improves on the assertion by [17] that the capability maturity level of the Nigerian PSOs is low. On the contrary, only a low-scale of PPP-capability is exhibited by the PSOs on the inability to effectively manage variations in public projects. This shortcoming in particular, among other political odds, is averred to have triggered the cases of controversies in PPP project awards and contracts' abrogations, court injunctions and litigations, time overrun and partial project completion in Africa [75, 80, 83].

The study further averred that out of the 41 internalized PPP-capabilities, only 10 components were established to have significant interdependencies among their capabilities' correlates. That is, the 10 components explain about thirty (30) capabilities that correlate to

having significant interdependencies. These components are public infrastructure planning and adaptability to PPP programme, project delivery parameter and control, suitable public infrastructure procurement knowledge, public policy awareness and innovation, governance, users' needs assurance and delivery, PPP project contract management, organizational prowess, commercial expertise, and financial support initiation. The other internalized managerial capabilities which did not correlate with significant interdependence and unloaded included financial data modelling and economic analysis; PPP project programme audit; infrastructure project parameter and evaluation benchmark development prowess; contract negotiation strategy and deployment; human relation management skills. Others were policy and political environment knowledge and predictability; ability to use the public sector comparator; predictability and management of opportunism in transactional relationship among partners; tax flexibility knowledge; and accountability and responsiveness.

5.1. Component 1: public infrastructure planning and adaptability to PPP programme

The first component is highly correlated with public infrastructure planning and adaptability to PPP programme. This component has an eigenvalue of 12.14 and explained 29.60% of the total variance of the PPP-capabilities possessed by the PSOs in Nigeria. The component is clustered with scenario analysis, planning, and adaptability to PPP (0.74); infrastructure project outcome and contract terms description (0.73); synergy and team spirit (0.72); knowledge of contract mechanism for suppliers' engagement (0.62); PPP knowledge and knowledge sharing attributes (0.59); and infrastructure output specification development (0.54). This component underscores the indispensability of having crystal-clear knowledge of the inflexible nature of PPP programme as against the traditional procurement programme [30, 40, 66]. The programmes' requirements of these procurement methods are distinct, but were earlier confused with each other. For instance, the haphazard pattern of infrastructure delivery in Africa, particularly in Nigeria (e.g., the Lagos-Ibadan highway project saga) is clear evidence of the confusion of traditional procurement method with PPP by the PSOs [5, 83]. Advances on sound knowledge of the nature of PPP by the PSOs is hereby verified by component 1. This fosters proper planning and adaptability of public infrastructure projects procurement with PPP programme, facilitates good definition of contract terms and project outcome indicators, simplifies the engagement of suppliers in contract administration, and encourages synergy among parties. These assuredly ensure that the benefits of the comparative advantages of PPP for infrastructure delivery are met.

5.2. Component 2: project delivery parameter and control

The second component explains 7.19% of the total variance of PPP-capabilities possessed by the PSO for infrastructure delivery. This component has a better correlation with the determination of project time, cost, quality, and scope limits (0.74), public finance analysis ability (0.70), and risk knowledge, planning, evaluation and control skill (0.69). The capabilities of this component guarantee the success of the finance-based PPP approach being adopted in Africa for infrastructure development [86, 105]. The component guarantees the adequacy of the users' fees being charged in a finance-PPP approach, to service the recoupment of private investments and ease contingency liabilities for the government, by obtaining value for money. The abilities of the PSOs to efficiently determine the parameters that expedite contingency plans following financial constraints and evaluate the determinants of project performance regarding time, cost, quality, scope, and risks control are expedient. The appropriateness of

component 2 is within the purview of achieving the benefits of mixed-financing of public infrastructure development via PPP, in the interests of both the private and public finance.

5.3. Component 3: adequate public infrastructure procurement knowledge

The third component is mostly correlated with adequate public infrastructure procurement knowledge, which explains 6.45% of the total variance of the analysis. The component has an eigenvalue of 2.64 and is loaded with cost-benefit analysis ability (0.74); bargaining, suitable private sector selection and project award (0.71); and communication skill and feedback validation (0.58). The developments of public infrastructure are deemed to give public value to the governed [27, 28]. The ability of the PSOs to make sound cost-benefit analysis for public infrastructure development is one of the critical success factors for projects delivery in Africa [84, 94]. Cost-benefit analysis ability is therefore a significant technical management expertise required at the pre-contract stage of public infrastructure procurement, to determine the direct and indirect socio-economic benefits derivable from project development. These benefits or public value are expected to outweigh the cost of the public infrastructure development. It is expedient that the PSOs possess a strong bargaining power in making suitable selection and award of contract to the appropriate private sector, to achieve the implementation of the public value from infrastructure development. Possessing communication skills and feedback validation skills by the PSOs control and confirm the implementation of the public values from the engagement of the private sector in public infrastructure development.

5.4. Component 4: public policy awareness and innovation

The fourth component that explains 5.10% total variance in the analysis is correlated with public policy awareness and innovation. The component has factor loadings of creativity and innovation (0.79); knowledge of government procurement policies, guidelines and legal framework (0.65); and market maturity knowledge (0.51). This component establishes the importance of assimilating the government procurement policy with PPP policy to sustain the collective benefits of PPP interventions in public infrastructure procurement for the good of the general public, the government and the private investors. Policy awareness and implementation is reinforced by Watt [110] as crucial to solving the social problem of infrastructure dearth while curtailing the consequences of fiscal crisis. The awareness, development, implementation, and marriage of a sound PPP policies with government policy inform proper definition of guidelines and legal framework, and development of mature PPP market, which attracts private investments for PID and meet the public needs. Component 4 is established as a critical success factor needed to control sound economic policy, regulate stable macroeconomic condition, manage political support, and guarantee transparency in favorable frameworks for sustained PPP infrastructure delivery agenda in Africa, particularly in Nigeria agrees [18].

5.5. Component 5: governance

The fifth component, which is mostly correlated with governance, explains 4.52% of total variance of PPP-capabilities possessed by the PSOs in Nigeria. The component is grouped with infrastructure service integration and generation of expected benefits (0.77), and infrastructure project administration and contract management (0.56). The possession and display of the capabilities in infrastructure administration and contract management by the PSOs help to

secure the generation of the expected benefits of PPP intervention. These capabilities must complement their private counterpart's capabilities in PPP public infrastructure procurement for project success. A high sense of commitment by the PSOs in regulating the delivery of PPP public infrastructure and the provision of public services by the private sector are indispensable to realize the innovative gains of PPP intervention. A good governance for PPPs is deemed to encompass the implementation of some principles in PPP projects administration and management viz. efficiency in the use of resources, accountability of political actors, transparency in decision-making, decency in rules' development and implementation, fairness to the public needs, and involvement of principal actors [104].

5.6. Component 6: users' needs assurance and delivery

The sixth component explains 4.01% of the total variance of PPP-capabilities possessed by the PSOs with an eigenvalue of 1.65. The component has factor loadings of ability to evaluate market demand for public services (0.76), user's needs definition and appropriate project identification (0.58), users' satisfaction analysis ability (0.58), and PPP infrastructure feasibility and viability studies (0.52). This component emphasizes the importance of these capabilities of the PSOs to establish the specific infrastructural demands of the citizens, that is the users, and to define project objectives with a view to satisfying the infrastructural needs of the users. The capabilities to carry out PPP infrastructure feasibility and viability studies inform the production of logical action plans towards the delivery of services that satisfy the expected demands of the users, government prospects and investment gains to the private sector. These capabilities are expedient to develop a "People First PPP", that guarantee the delivery of high standards of services quality, which are readily available and affordable by the users [68].

5.7. Component 7: PPP project variation management

The seventh component is correlated with PPP project variation management. The component has eigenvalue 1.38 and explained 3.36% of total variance of PPP-capabilities possessed by the PSOs. The component has factor loadings of variation management (0.85), and clear rationale and balanced interest control (0.69). Notwithstanding the small percentage of variance of this component among others, the capabilities of the PSOs to manage variation in the PPP projects executed have assuredly impacted the project delivery outcomes. Cases of variation occurrence throughout the lifecycle of PPP project is a matter of practical reality [122]. This implies that PPP projects are not immune from variation. The significant interdependence of the capabilities in this component therefore established the critical influence of clear, rational and balanced control of parties' interests via a well-defined PPP policy on effective variation management.

5.8. Component 8: organizational prowess

The eighth component which explains 3.21% of total variance of PPP-capabilities possessed by the PSOs is correlated with organizational prowess. The component is clustered with legal advice expertise (0.61), knowledge of procurement options (0.60), and determination of suitability of bids (0.51). These capabilities are indispensable at the pre-procurement phase of PPP project procurement. They partly agree with the technical capabilities exhibited by PSOs at the negotiation phase of PPP procurement in the United Kingdom. Different PPP infrastructure projects have recorded success with certain PPP variants [4]. Therefore,

the knowledge of different procurement options and capabilities to determination of suitable bids helps to secure innovative solutions that meet the objectives of infrastructure development.

5.9. Component 9: commercial expertise

The ninth component is correlated with commercial expertise, with eigenvalue 1.27. The commercial expertise explained 3.10% of the total variance of the PPP-capabilities possessed by the PSO, and is grouped with infrastructure procurement policy development prowess (0.71), and incentive strategy and private sector attraction measures (0.70). The main business of the government in business is the development of social benefits from infrastructural services supply that meet the needs of the public. Since the roles of the PSOs have shifted from the actual production of infrastructure to steering roles, it thus becomes pertinent that policies' developments contain bidders' incentivizing strategies that attract private investments and investors. These capabilities affirm the credibility of the commitment of the government to PPP contracts.

5.10. Component 10: financial support initiation

The tenth component explains 2.91% of the total variance of the PPP-capabilities possessed by the PSOs, and is correlated with financial support initiation. The component is loaded with procurement of financial grants (0.68), and transparency, fairness and trust (0.59). The procurement of public infrastructure projects entails huge financial commitments that the government alone cannot bear. The constraints of the financial capability of the government in infrastructure development is globally accepted to be addressed by the provisions of the PPP options. However, the onus is on the PSOs to develop transparent policies that attract private investments from the global construction market.

6. CONCLUSIONS AND RECOMMENDATIONS

The study examined the managerial capabilities possessed by PSOs for PPP public infrastructure delivery in Africa. It was established that the PSOs have internalized 41 PPP-capabilities, which were demonstrated at an averaged-level (among 40 capabilities) in the discharge of their obligations on public projects' procurements. A low-level managerial capability was displayed in the management of variations in PPP projects by the PSOs. From this capability set, about 31 capabilities exhibited significant interdependencies that explained a 71.49% variance, which were loaded under ten (10) main components. These interdependent capabilities, which correlated with the 10 components of the managerial capabilities possessed by the PSOs were significant at $p < 0.001$. The components of the managerial capabilities possessed were public infrastructure planning and adaptability to PPP programme capabilities, project delivery parameter and control capabilities, adequate public infrastructure procurement knowledge, public policy awareness and innovation, and governance. Others were users' needs assurance and delivery capabilities, PPP project variation management capabilities, organizational prowess, commercial expertise, and financial support initiation capabilities.

The realization of the sustainable infrastructure developmental gains from PPP interventions theoretically implies that, the PSOs possess inimitable managerial capability set which is similar and superior to that of their private sector counterparts [61, 79]. However, the possession of an average-leveled managerial capability set by the PSOs in Africa did not satisfy

the theoretical requirements of RBT for public infrastructure delivery success. This implies that the PSOs have not developed their requisite PPP managerial capabilities to a high level of competitive superiority in PPP transactions, which guarantee an excellent governmental control of public projects development for PID success. Thus, the managerial capability set possessed by the PSOs to eliminate opportunistic tendency of their private party counterparts and uphold competitive positivism, to sustain the cause of sustainable infrastructural developments is inadequate.

The PSOs steer the provision of public infrastructure in PPP transaction, their inadequate managerial capabilities for project delivery economically implies that, the increased pool of PICs for infrastructure developments in Africa is highly susceptible to unsatisfactory results. Thus, the achievement of the projected SDGs on global infrastructure development by 2030 is unfeasible. This is averred because Africa takes up to about 38% of the projected spending for global infrastructural development by 2030, which consequently constitutes up to 38% of the total percentile of sustainable infrastructure development goals by 2030. Likewise, a ripple effect of the inadequate managerial capability sets of PSOs in Africa, particularly Nigeria, is deemed expected to undermine the future benefits from her intensified investment commitments on infrastructure development, for stable infrastructural services provision. Furthermore, the speculated maturity of ₦1 Trillion investment commitment on InfraCo to \$37 Billion investment fund by 2030 for public infrastructure development via PPP is impracticably achievable. These thus pose serious economic threats to the fiscal budget balance from contingent liabilities in Nigeria.

This study therefore recommends an urgent proactive implementation of capability development measures for PPP programmes at the organizational levels of PSOs in Africa, which are implemented as policy-mandated requirements for public infrastructure delivery. This is highly critical to scale up the PPP managerial capabilities of PSOs to a high-levelled capability set, in order to achieve the comparative advantages of PPP options for PID, to obtain value for money from the intensified investment commitments on public infrastructure developments in Africa, and to attain the constituted infrastructural growth quota of Africa towards the projected global sustainable infrastructural growth by 2030. The implementation of the PPP capability development measures established by Olojede et al. [80] is therefore recommended by this study.

References

1. Asian Development Bank. 1999., *Public-Private Partnerships in the Social Sector*, Executive Summary Series of Proceedings No. S07/99, ADB Manila.
2. Asian Development Bank. 2011., *Public-Private Partnership Infrastructure Projects: Case Studies from the Republic of Korea*. Available at: <http://www.adb.org>.
3. Abdel Aziz A.M. 2007. „Successful delivery of public-private partnerships for infrastructure development”. *Journal of Construction Engineering and Management* 133(2): 918-931.
4. Adama O. 2018. „Urban imaginaries: funding mega infrastructure projects in Lagos, Nigeria”. *GeoJournal*. DOI: 10.1007/s10708-016-9761-8.
5. Adegoke O.J., A. Olaleye, F.M. Araloyin. 2010. „An examination of the need for public-private partnership in the provision of urban infrastructure in Lagos metropolis”. *Ife Journal of Environmental Design and Management* 4(1): 76-109.

6. THIS DAY. „Boosting Lagos infrastructure through PPP”. Available at: <https://www.thisdaylive.com/index.php/2020/06/02/boosting-lagos-infrastructure-through-ppp/>.
7. Adukpo S.E., R. Leiringer. 2016. „Development of public sector client capabilities within the context of new public management”. *The 2016 Engineering Project Organisation Conference (EPOS 2016)*: 1-11. 28-30 June, 2016. Seattle, WA.
8. Ahadzi M., G. Bowles. 2004. „Public-private partnerships and contract negotiations: an empirical study”. *Construction Management and Economics* 22: 967-978.
9. AfDB. „Supporting public private partnerships in Africa: African Development Bank ready to scale up”. Available at: <https://www.afdb.org/en/news-and-events/press-releases/supporting-public-private-partnerships-africa-african-development-bank-ready-scale-37804>.
10. AfDB. „Study on programme for infrastructure development in Africa (PIDA): Africa infrastructure outlook 2040”. Available at: <http://www.pidafrica.org/Africa%20Infrastructure%20Outlook%202040.pdf>.
11. Akande L. 2021. „President Buhari approves formation of trillion-naira company to address infrastructure deficit”. Statehouse Press Release: Office of the Vice President.
12. Al-Shareem K.M., N. Yusof, E.M. Kamal. 2015. „External factors influencing the readiness for implementing public-private partnerships among public and private organizations in Yemen”. *Journal of Science and Technology Policy Management* 6(1): 56-75.
13. Argyres N., K.J. Mayer. 2007. „Contract design as a firm capability: An integration of learning and transaction cost perspective”. *Academy of Management Review* 32(4): 1060-1077.
14. Babatunde S.O., D. Ekundayo, C. Udejaja, U.O. Abubakar. 2022. „An investigation into the sustainability practices in PPP infrastructure projects: a case of Nigeria”. *Smart and Sustainable Built Environment* 11(1): 110-125.
15. Babatunde S.O., D. Ekundayo, C. Udejaja, U.O. Abubakar. 2020. „Stakeholder perceptions of drivers for and barriers to the incorporation of sustainability in PPP infrastructure projects in Nigeria”. Open House International. Available at: <https://www.emerald.com/insight/0168-2601.htm>.
16. Babatunde S.O., S. Perera, O. Adeniyi. 2019. „Identification of critical risk factors in public-private partnership project phases in developing countries: A case of Nigeria”. *Benchmarking: An International Journal* 26(2): 334-355.
17. Babatunde S. 2015. „Developing public-private partnership strategy for infrastructure delivery in Nigeria”. *PhD thesis*. Newcastle upon Tyne: Northumbria University.
18. Babatunde S.O., A. Opawole, O.E. Akinsiku. 2012. „Critical success factors in public-private partnership (PPP) on infrastructure delivery in Nigeria”. *Journal of Facilities Management* 10(3): 212-225.
19. Barney J. 2005. „Looking inside for competitive advantage”. *Academy of Management Executive* 9: 49-61.
20. Barney J.B. 1991. „Firm resources and sustained competitive advantage”. *Journal of Management* 17(1): 99-120.
21. Baser H. P. Morgan. 2008. “Capacity, change and performance”. In: *European Centre for Development Policy Management, Discussion Paper No 59B*, April 2008. Edited by: Bolger J., Brinkerhoff, D., Land, A., Taschereau, S., Watson, D., Zinke, J. Netherlands: Maastricht Publication.

22. Bildfell C. 2018. „P3 infrastructure projects: a recipe for corruption or an antidote?” *Public Works Management Policy* 23(1):34-57.
23. Vanguard. „Transport Bill fails again as Buhari declines assent”. Available at: <https://www.vanguardngr.com/2022/07/transport-bill-fails-again-as-buhari-declines-assent/>.
24. Bragança L., M. Ricardo, K. Heli. 2010. „Building sustainability assessment”. *Sustainability* 2(7): 2010-2023.
25. Boyer E.J., D.S. Scheller. 2017. „An examination of state-level public-private partnership adoption: Analyzing economic, political and demand-related determinants of PPPs”. *Public Works Management and Policy*: 1-29, DOI: 10.1177/1087724X17729097.
26. Port Technology. „Lekki port completes work to become Nigeria’s first deep seaport”. Available at: <https://www.porttechnology.org/news/lekki-port-completes-work-to-become-nigerias-first-deep-seaport/>.
27. Bryson J.M., F. Ackermann, C. Eden. 2007. „Putting the resource-based view of strategy and distinctive competencies to work in public organizations”. *Public Administration Review* 67(4): 702-717.
28. Canzanelli. G. 2013. “Public Private Partnership: from the contractual to the multi-stakeholders cooperative model”. In: *ILS LEDA*. Paper n. 23, August 2013.
29. Chan A.P., P.T. Lam, D.W. Chan, E. Cheung, Y. Ke. 2009. „Drivers for adopting public-private partnerships—Empirical comparison between China and Hong Kong special administrative region:”. *Journal of Construction Engineering and Management*. DOI: 10.1061/(ASCE)CO.1943-7862.0000088.
30. Cheung E., A.P.C. Chan, S. Kajewski. 2012. „Factors contributing to successful public-private partnership projects: comparing Hong Kong with Australia and the United Kingdom”. *Journal of Facilities Management* 10(1): 45-58.
31. Damoah I.S., A. Ayakwah, K.J. Aryee, P. Twum. 2020. „The rise of PPPs in public sector affordable housing project delivery in Ghana: challenges and policy direction”. *International Journal of Construction Management*. DOI: 10.1080/15623599.2020.1763897.
32. Delhi V.S.K., A. Mahalingam. 2012. „Institutional issues related to project governance of infrastructure PPP Projects in India”. *Construction Research Congress 2012, (c)ASCE*: 1481-1490.
33. Daft R. 1983. *Organization theory and design*. West Publishing, St. Paul Minnesota: New York.
34. Dyer J.H., H. Singh. 1998. „The relational view: cooperative strategy and sources of inter-organizational competitive advantage”. *Academy of Management Review* 23(4): 660-679.
35. Vanguard. „All infrastructure projects now PPP driven-FG”. Available at: <https://www.vanguardngr.com/2021/05/all-infrastructure-projects-now-ppp-driven-%E2%80%95fg/>.
36. Guardian. „Some of the most populous cities in Africa”. Available at [guardian.ng/life/some-of-the-most-populous-cities-in-africa/](https://www.guardian.ng/life/some-of-the-most-populous-cities-in-africa/).
37. EIU. „The 2015 Infrascope: Evaluating the environment for public–private partnerships in Africa”. Available at: https://www.eiu.com/public/topical_report.aspx?campaignid=AfricaInfrascope2015.

38. ECON. „Public private partnerships: When and how”. Available at: <http://www.econ.uchile.cl/uploads/publicacion/c9b9ea69d84d4c93714c2d-3b2d5982a5ca0a67d7.pdf>.
39. EIB. „The guide to guidance, how to prepare, procure and deliver PPP Projects”. Available at: <http://www.eib.org/epec/resources/guide-to-guidance-en.pdf>.
40. Eversdijk A.W.W., A.F.A. Korsten. 2009. „Concessionele Publiek-Private Samenwerkingsrelaties: Feiten en ficties bij op DBFM gebaseerde Infrastructurele Projecten”. *Bestuurswetenschappen* 63(3): 25-44.
41. Flyvbjerg B. 2014. „What you should know about megaprojects and why: An overview”. *Project Management Journal* 45(2): 6-19.
42. Field A. 2009. *Discovering Statistics Using SPSS*. 3rd ed., Sage, London.
43. Forrer J., J.E. Kee, K.E. Newcomer, E. Boyer. 2010. „Public-private partnerships and the public accountability question”. *Public Administration Review* 70(3): 475-484.
44. Freund B. 2010. „Is there such a thing as a post-apartheid city?”. *Urban Forum* 21(3): 283-298.
45. Gbadegesin J.T., B.T. Aluko. 2014. „Public-private partnerships/private finance initiatives for financing infrastructure in public tertiary institutions in Nigeria”. *Built Environment Project and Asset Management* 4(2): 199-215.
46. Guardian. „Lagos government adopts PPP in projects’ development”. Available at: <https://guardian.ng/property/lagos-government-adopts-ppp-in-projects-development/>.
47. Glas A.H., C. Raithel, M. Essig. 2019. „Risk perception in performance based contracts and the influence of experience”. *International Journal of Productivity and Performance Management* 68: 6. DOI: 10.1108/IJPP-03-2018-0123.
48. Hair, J.F., W.C. Black, B.J. Babin, R.E. Anderson, R.L. Tatham. 2006. *Multivariate Data Analysis*. Vol. 6. Pearson Prentice Hall: Upper Saddle River, NJ.
49. Sadcpppnetwork. „Public-private partnerships: Reference guide version 1.0”. Available at: <http://www.sadcpppnetwork.org/wp-content/uploads/2015/01/Public-Private-Partnerships-Reference-Guide.pdf>.
50. Hellowell M., A.M. Pollock. 2009. „The private financing of NHS hospitals: politics, policy and practice”. *Economic Affairs* 29(1): 13-19.
51. Hitt M., C. Miller, A. Colella. 2006. „Organisational Behaviour: A strategic approach. NJ: John Wiley and Sons.
52. Ibem E.O. 2010. „An Assessment of the role of government agencies in public-private partnerships in housing delivery in Nigeria”. *Journal of Construction in Developing Countries* 15(2): 23-48.
53. Jackson H.E., M.J. Roe. 2009. „Public and private enforcement of securities laws: Resource-based evidence”. *Journal of Financial Economics* 93(2): 207-238.
54. Epos Society. „Capacity, legitimacy, and interest”. Available at: http://www.epossociety.org/LEAD2009/Jooste_Levitt_Scott.pdf.
55. GPC. „The Impacts of infrastructure PPPs on public sector capacity”. Available at: https://gpc.stanford.edu/sites/default/files/cp031_0.pdf.
56. STATISTA. „Largest cities in Africa 2022, by number of inhabitants”. Available at: [statista.com/statistics/1218259/largest-cities-in-africa/](https://www.statista.com/statistics/1218259/largest-cities-in-africa/).
57. Kettl D.F. 2011. *Sharing power: Public governance and Private markets*. Brookings Institution Press.
58. Kwak Y.H., Y. Chih, C.W. Ibbs. 2009. „Towards a comprehensive understanding of public-private partnerships for infrastructure development”. *California Management Review* 51(2): 51-78.

59. LEGCO. 2014. „Report of the Select Committee to Inquire into the Background of and Reasons for the Delay of the Construction of the Hong Kong section of the Guangzhou-Shenzhen-Hong Kong Express Rail Link. Hong Kong”. Issued on 15 April, 2014.
60. Liu J., P.E.D. Love, J. Smith, M. Regan, E. Palaneeswaran. 2015. „Review of performance measurement: Implications for public-private partnerships”. *Built Environment Projects and Asset Management* 5(1): 35-51.
61. Lockett A., A. Wild. 2013. „A penrosean theory of acquisitive growth”. *Business History* 55(5): 790-817. DOI: 10.1080/00076791.2013.790370.
62. Longdu'ut D.T. 2013. „The burden of public-private partnership in Nigeria: Sharing, shifting or shirking?” *An International Journal of Arts and Humanities* 2(2): 349-363.
63. MacCallum R.C., K.F. Widaman, S. Zhang, S. Hong. 1999. „Sample size in factor analysis”. *Psychological methods* 4(1): 84.
64. Mahalingam A., V. Kapur. 2009. „Institutional capacity and governance for PPP projects in India”. Paper Presented at the LEAD 2009 Conference on Leadership and Management in Construction, Lake Tahoe, CA, USA, Oct. 2009.
65. Matos-Castano J., G. Dewulf, A. Mahalingam. 2012. „The Complex Interplay Between The Institutional Context and PPP Project Outcomes”. Working Paper Proceedings. Engineering Project Organisations Conference, Rheden, The Netherlands, July 10-12, 2012.
66. McCann S., G. Aranda-Mena, P.J. Edwards. 2014. „Managing partnership relations and contractual performance in the operating phase of public-private partnership: Interview findings”. *International Public Management Review* 15(2): 111-132.
67. Merrow E.W. 2011. *Industrial megaprojects: concepts, strategies, and practices for success*: John Wiley and Sons.
68. Mourgues T., C. Kingombe. 2017. „How to support African PPPs: The role of the enabling environment”. *The emerald handbook of public-private partnerships in developing and emerging economies*: 269-310.
69. Muhammad Z., F. Johar. 2018. „Critical success factors of public-private partnership projects; a comparative analysis of the housing sector between Malaysia and Nigeria”. *International Journal of Construction Management*. DOI: 10.1080/15623599.2017.1423163.
70. NAO. „Assurance for major projects”. Available at: <http://www.nao.org.uk/major-projects-assurance-2012>.
71. NAO. „Assurance for high risk projects”. Available at: <http://www.nao.org.uk/high-risk-projects-2010>.
72. NAO. „Commercial skills for complex government projects”. Available at: <http://www.nao.org.uk/commercial-skills-for-complex-governerment-projects>.
73. NIAF. „PPP Manual for Lagos State; Office of public-private partnership”. Available at: https://ppp.worldbank.org/public-private-partnership/sites/ppp.worldbank.org/files/documents/Lagos%20State_PPPManualFinal.pdf.
74. Nasila M., C. Cloete. 2018. „Adoption of building information modelling in the construction industry in Kenya”. *Acta Structilia* 25(2): 1-38.
75. Nsasira R., B.C. Basheka, P.N. Oluka. 2013. „Public-private partnerships (PPPs) and enhanced service delivery in Uganda: Implications from the energy sector”. *International Journal of Business Administration* 4(3): 48-60.
76. OECD. 2015. „Mapping of instruments and incentives for infrastructure financing: A Taxonomy”.

77. PUNCH. „Lagos government plans development projects through PPP”. Available at: <https://punchng.com/lagos-govt-plans-development-projects-through-ppp/>.
78. Okwumbu-Imafidon R. 2020. „What Nigeria is not getting right with PPPs”. Available at: <https://nairametrics.com/2020/05/31/what-nigeria-is-not-getting-right-with-ppps/>.
79. Olojede B.O., A. Opawole, G.O. Jagboro, O.O. Alao. 2021. „Examination of roles performed by public sector organizations in the procurement of public-private projects”. *International Journal of Building Pathology and Adaptation*.
80. Olojede B.O., A. Opawole, G.O. Jagboro. 2020. „Capability development measures adopted by public sector organizations in PPP projects delivery in developing countries”. *Journal of Public Procurement* 20(2): 145-161.
81. Opawole A. 2015. „Assessment of parties’ obligations in concession-based projects in southwestern Nigeria”. *PhD thesis*. Ile-Ife, Nigeria: Obafemi Awolowo University.
82. Opawole A., G.O. Jagboro, K. Kajimo-Shakantu, B.O. Olojede. 2019. „Critical performance factors of public sector organisations in concession-based public-private partnership projects”. *Property Management* 37(1): 17-37.
83. Opawole A, G.O. Jagboro. 2017. „Factors affecting the performance of private party in concession-based PPP projects in Nigeria”. *Journal of Engineering, Design and Technology* 15(1): 44-57.
84. Osei-Bonsu N. 2014. „Qualitative analysis of managerial capabilities and internationalization of manufacturing SMEs – Empirical evidence from developing countries”. *Journal of Management Research* 6(3): 114-140.
85. Osei-Kyei R., A.P.C. Chan. 2016. „Developing Transport Infrastructure in Sub-Saharan Africa through Public–Private Partnerships: Policy Practice and Implications”. *Transport Reviews* 36(2): 170-186.
86. Osei-Kyei R., A.P.C. Chan. 2016. „Implementing public-private partnership (PPP) policy for public construction projects in Ghana: critical success factors and policy implications”. *International Journal of Construction Management*. DOI: 10.1080/15623599.2016.1207865.
87. Othman A.A. 2013. „Challenges of mega construction projects in developing countries”. *An International Journal of Organization, Technology and Management in Construction*: 730-746. DOI: 10.5592/otmcj.2013.1.10.
88. Pangeran M.H., K.S. Pribadi, R.D. Wirahadikusumah, S. Notodarmojo. 2012. „Assessing risk management capability of public sector organizations related to PPP scheme development for water supply in Indonesia”. *Civil Engineering Dimension*, 14(1): 26-35.
89. Pieterse E., K. Hyman. 2014. “Disjuncture between urban infrastructure, finance and affordability”. In: *The Routledge handbook on cities in the global south*. Edited by: S. Parnell, S. Oldfield. London: Routledge Publications.
90. Pitelis C.N. 2007. „A behavioral resource-based view of the firm: The synergy of Cyert and March (1963) and Penrose (1959)”. *Organisation Science* 18(3): 478-490.
91. „Public-Private Partnership Units: Lessons for their Design and Use in Infrastructure”. Sustainable Development Department in East Asia and Pacific. Available at: <http://documents.worldbank.org/curated/en/220171468332941865/Public-private-partnership-units-lessons-for-their-design-and-use-in-infrastructure>.
92. Richardson G.B. 1972. „The organization of industry”. *The Economic Journal* 82(327): 883-896.

93. Salganik M.J., D.D. Heckathorn. 2004. „Sampling and estimation in hidden populations using respondent-driven sampling”, Paper presented at the 2003 Sunbet International Social Network Conference, 2003 American Sociological Association Annual Meeting and the 2003 Statistical Meeting.
94. BIB. „Management Models for Public-Private Partnership Projects. Available at: <https://bib.irb.hr/datoteka/686738>.
95. Sergi B.S. (Ed.). 2018. *Exploring the future of Russia's economy and markets: Towards sustainable economic development*. Bingley: Emerald Publishing.
96. Sharma C. 2012. „Determinants of PPP in infrastructure in developing economies. *Transforming Government: People, Process and Policy* 6(2): 149-166.
97. Shen L., V.W.Y. Tam, L. Gan, K. Ye, Z. Zhao. 2016. „Improving sustainability performance for public-private-partnership (PPP) projects”. *Sustainability* 8(3): 1-15.
98. Soecipto R.M., K. Verhoest. 2018. „Contract stability in European road infrastructure PPPs: how does governmental PPP support contribute to preventing contract renegotiation?”. *Public Management Review*. DOI: 10.1080/14719037.2018.1428414.
99. Szymaniec-Mlicka K. 2014. „Resource-based view in strategic management of public organisations – A review of the literature”. *Management* 18(2): 19-30.
100. Tilley H., S. Hadley, C. Long, J. Clarke. 2015. „Sustaining Public Sector Capability in Developing Countries”. Overseas Development Institute (ODI). *Working Paper* 432: 1759-2917.
101. Vanguard. „InfraCorp begins projects consideration, commences operation”. Available at: <https://www.vanguardngr.com/2022/04/infracorp-begins-projects-consideration-commences-operations/>.
102. UN. „Public-private partnership alliance programme for capacity-building in infrastructure development and provision of basic services”. Available at: <http://www.un.org/esa/devaccount/projects/2006/0607D.html>.
103. UNPCDC. „Capacity development: Empowering people and institution”. Available at: http://www.unpcdc.org/media/8651/pn_capacity_development.pdf.
104. UNECE. 2008. „Guidebook on Promoting Good Governance in Public-Private Partnerships”. United Nations.
105. Uzunkaya M. 2017. „Theory-based evaluation of Public-Private Partnership projects and programmes”. In: *The Emerald Handbook of Public-Private Partnerships in developing and emerging economies*. DOI: 10.1108/978-1-78714-493-420171022.
106. BLOGS. „PPP laws in Africa: confusing or clarifying”. Available at: <https://blogs.worldbank.org/ppps/ppp-laws-africa-confusing-or-clarifying>.
107. Vaslavskiy Y., I. Vaslavskiy. 2019. „Infrastructure public-private partnership projects: budget consolidation policy in Russia and government expenditures' efficiency increase”. *Modeling Economic Growth in Contemporary Russia*: 203-232.
108. Vecchi V., M. Hellowell, R. Croce, S. Gatti. 2017. „Government policies to enhance access to credit for infrastructure-based PPPs: an approach to classification and appraisal”. *Public Money and Management* 37(2): 133-140.
109. Verhoest K., et al. 2014. „Policy commitment, legal and regulatory framework, and institutional support for PPP in international comparison: indexing countries' readiness for taking up PPP”. Paper presented at the PPP Conference 2013.
110. Watts W. 2004. „Resource curse? Governmentality, oil and power in the Niger Delta, Nigeria”. *Geopolitics* 9(1): 50-80.

111. Winch G.M., R. Leiringer. 2016. „Owner project capabilities for infrastructure development: A review and development of the “strong owner” concept”. *International Journal of Project Management* 34(2): 271-281.
112. Winch G.M. 2014. „Three domains of project organizing”. *International Journal of Project Management* 32(5): 721-731.
113. PPISTG. „Private Participation in Infrastructure, PPI, 2021 Annual Report”. Available at: https://ppistg.worldbank.org/content/dam/PPI/documents/PPI_2021_Half-Year-Report.pdf.
114. PPISTG. „Private participation in infrastructure (PPI). H12019_PPI-report”. Available at https://ppistg.worldbank.org/content/dam/PPI/documents/H12019_PPI-report_small.pdf.
115. World Bank. 2015. „World Bank group support to public-private partnerships: Lessons from experience in client countries”. FY02-12. Washington, DC: The World Bank Publications.
116. PPISTG. „Towards better infrastructure conditions, constraints, and opportunities in financing public-private partnerships: evidence from Cameroon, Cote D' Ivoire, Ghana, Kenya, Nigeria, and Senegal”. Available at: <http://www.ppiaf.org/sites/ppiaf.org/files/publication>.
117. WDS. „The effects of infrastructure development on growth and income distribution”. The World Bank Policy Research Working Paper 3400. Available at: <http://www-wds.worldbank.org/external/default/WDSContentPDF>.
118. Yang T., R. Long, W. Li. 2018. „Suggestion on tax policy for promoting PPP projects of charging infrastructure in China”. *Journal of Cleaner Production* 174: 133-138.
119. Yuan, J., A.Y. Zeng, M.J. Skibniewski, Q. Li. 2009. „Selection of performance objectives and key performance indicators in public–private partnership projects to achieve value for money”. *Construction Management and Economics* 27(3): 253-270.
120. Olojede B.O., G.O. Jagboro, A. Opawole, K. Kajimo-Shakantu. 2019. „Examination of management structure of public sector organizations for public-private partnership projects delivery in Southwestern Nigeria”. In: *Proceedings 13th Built Environment Conference „Technology, Theory, Truth: Constructing a Sustainable Built Environment*: 142-150. ASOCSA 2019-063. 2-3 September 2019, Durban, South Africa. ISBN: 978-0-6399855-1-0.
121. Cheung E., A.P.C. Chan, S. Kajewski. 2010. „Suitability of procuring large public works by PPP in Hong Kong”. *Engineering, Construction and Architectural Management* 17(3): 292-308.
122. Harris S. 2004. “Public-private partnerships: Delivering better infrastructure services”. In: *Recouping Infrastructure Investment in Latin America and the Caribbean: Selected Papers from the 2004 IDB Infrastructure Conference Series*: 77-98. Edited by: Benavides J.

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