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DEVELOPMENT OF INFRASTRUCTURE PROCUREMENT FRAMEWORK FOR PUBLIC HOSPITAL PROJECTS IN SOUTH-SOUTH NIGERIA

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Abstract

Public hospital projects in South-South Nigeria continue to experience persistent delays, cost overruns, and quality shortfalls, that seem traceable to weaknesses in procurement systems. This This study examined procurement practices, and public hospital project delivery. Two specific objectives leading to two research questions and hypotheses guided the study..The study population was 1545 procurement officers, project managers, engineers, and administrative personnel involved in public hospital infrastructure procurement, A sample of 865 was drawn, using stratified random sampling technique. Data were collected using well-structured reliable and face validated self-report questionnaire. The questionnaire items were built on a 5 point modified Likert scale. The resulting data were analyzed using descriptive statistics, and multiple regression analysis. Findings revealed that public hospitals rely predominantly on the traditional procurement method, which was the only practice with a mean significantly above the expected benchmark ($\mu = 3.0$). The regression results showed that traditional procurement had no significant relative influence on project performance ($\beta = .014$, $p = .953$). In contrast, several underutilized procurement options, including design-build, direct labour, labour-only contracting, PPP variants, and e-procurement, recorded significant positive relative influences on hospital project performance. The study proposes an innovative procurement framework grounded in Public Procurement Theory and the Resource-Based View, offering a structured roadmap for strengthening transparency, efficiency, and accountability in the healthcare construction sector. The study recommends full-scale adoption of e-procurement, diversification of procurement methods beyond the traditional model, strengthened regulatory oversight, improved competitive tendering, and targeted capacity-building for procurement personnel. The framework developed

provides actionable insights for policymakers, practitioners, and development partners seeking to reform procurement systems and improve public hospital infrastructure delivery in Nigeria.

1.0 Introduction

Infrastructure development is a critical aspect of socio-economic growth and progress in any region or nation. According to Rufus and Bufumoh (2017), infrastructure encompasses the construction and maintenance of essential facilities such as roads, bridges, airports, water Supply systems, and public buildings, including health and educational facilities which are crucial for the well-being and prosperity of communities. Authors and researchers (Oteh, 2010; Oyedele, 2012; Sanusi, 2012; Udoudoh, 2016) are unanimous in the view that there is acute shortage of public infrastructure in Nigeria. In other words, there is a wide difference between existing stock of infrastructure and the optimal amount required for efficient functioning of society. While this is recognized as a global phenomenon (World Economic Forum (WEF), 2014), the situation is more perceptible in developing countries (Llewellyn Consulting, 2014).

In many countries, government agencies have historically been responsible for the procurement of infrastructure projects (Khaertdinova *et al.*, 2021). Public procurement therefore is a critical aspect of the public sector and involves the acquisition of goods, services, infrastructure or works by a procuring entity using public funds (Jillo *et al*., 2024). In other words, construction procurement is the framework within which construction projects are brought about, acquired or obtained, and it is considered as key to improving construction performance (Ibrahim *et al*., 2010). It entails the overall methods employed by a client in order to arrive at a project tender figure including other activities leading to the selection of a suitable contractor to deliver the project within an agreed time, cost and quality (Onwusonye, 2005).

Various procurement methods have been deployed by the public sector in Nigeria to provide critical infrastructure including healthcare project (Aliu *et al*., 2022). Love *et al*. (2010) opined that determining the most effective procurement approach for infrastructure projects have become a complex and challenging task considering the wide array of procurement methods available. The public sector in Nigeria still prefers the traditional method of procurement despite being widely criticized for separating design and construction, and for often leading to adversarial relationships among project stakeholders (Aliu *et al*., 2022). According to Ibrahim *et al*. (2010), the review of construction performance of UK healthcare facilities identified the need to tackle adversarial relationships, supply chain integration, sustainability innovations and other inefficient procurement practices. It is therefore imperative to re-appraise the current procurement practices used for procurement of public hospital projects with a view to providing improvements.

Globally, public procurement has generated attention and discussions centred around reforms, restructuring and regulatory framework, as it constitutes a significant proportion of public expenditure (about 50%) of the budgets in developing countries (Jillo

et al., 2024). Public sector procurement is often bedeviled with numerous challenges and unethical practices, in developing countries like Nigeria (Aliu *et al*., 2022) and Kenya where 80% of graft happens in public procurement (Obiero and Senelwa, 2018). However, Organization for Economic Cooperation and Development (OECD) has contended that the situation is not peculiar to developing countries alone as the procurement environment is generally prone to graft due to the intricacy of the process and the large number of interested parties (Aliu *et al*., 2022). Consequently, together, these challenges have impeded the public sector from reaping the full benefit of the reforms in public procurement (Aliu *et al*., 2022). As such, understanding these challenges serves as a useful step in developing appropriate strategies for improving public procurement practices. This therefore calls for a profound enquiry into the challenges associated with existing procurement practices, especially in developing nations such as Nigeria. In addition, understanding the key performance indicators of hospital projects maybe worthwhile.

In line with this, Liu *et al*. (2020) argued that there is no consensus on the key performance indicators (KPIs) for hospital projects. However, a few empirical studies have reviewed the performance of hospital projects in respect of the three key variables of cost, time and quality. For instance, Ling and Li (2019) observed that in southeast Asia, about 60% of public hospital projects experience delays and cost overrun, while Mittal *et al*. (2020) noted that delay is generally common in hospital projects due to their complexity. Similarly, Obiero and Senelwa (2018) observed that public hospitals in Kenya are in deplorable conditions, and that there are huge concerns with wastage of public funds during procurement of health sector projects. Ibrahim *et al*. (2010) noted that the reviews on performance of healthcare infrastructure in the United Kingdom (UK) has identified the need to tackle adversarial procurement practices, supply chain integration and sustainability innovations.

In Nigeria, despite government's efforts to improve healthcare delivery through various initiatives, the procurement processes for public hospital projects often suffer from delays, cost overruns, and substandard quality of work as noted by Okereke and Afolabi (2019). Consequently, there is limited access by Nigerians to health facilities (Nwakeze and Kandala, 2011). Limited resources, outdated facilities, and a lack of essential supplies could lead to suboptimal treatment and outcomes (Glickman *et al*., 2007), and patients may face higher risks of complications and adverse health outcomes due to inadequate healthcare infrastructure (Brauner *et al*., 2018). Insufficient facilities and resources can impede the ability to handle a surge in patients and provide timely emergency care (Siciliani *et al*., 2013). It could also compromise the quality of care and contribute to the spread of infections (Trzeciak and Rivers, 2003). There is therefore a need to appraise the procurement strategies adopted in public hospital projects in Nigeria.

Healthcare infrastructure are peculiar, their construction is complicated and challenging for the project stakeholders.

Unlike other types of infrastructure, hospital projects operate within a complex regulatory framework (Jillo *et al*., 2024). According to Mittal *et al*., (2020) large hospital projects involve complex construction works with multiple building and components which perform specific functions, are required to comply with certain codes and regulations, and require continuous technological innovations. Moreover, Liu *et al*. (2024) noted that numerous challenges are encountered in procurement of hospital projects (HPs) due to their complexity and peculiarity. Additionally, Ling and Li (2019) and Jillo *et al*. (2024) noted that the performance of public hospital projects is undermined by the ineffective procurement practices. The foregoing presents a unique challenge to stakeholders for the procurement of Public hospital projects, more importantly that there are no effective procurement frameworks for the projects. The foregoing suggest that procurement of public hospital projects present unique challenges to stakeholders. It is therefore essential to develop procurement frameworks tailored to the complexities of hospital projects in a bid to ensuring the timely cost-effective delivery of quality healthcare facilities.

Despite a few related studies, limited information and empirical research are available on the procurement practices and their effect on performance of hospital projects (Obiero and Senelwa, 2018). Particularly, Jillo *et al*. (2024) noted that existing studies on procurement practices tend to focus on the broader public institutions and private sector and this may not accurately reflect the peculiar challenges usually encountered in the procurement of public hospital projects. Aliu *et al*. (2019) also observed that no two projects are exactly the same as each project has specific requirements and peculiar characteristics in order to be adjudged as successful. Earlier, emphasis was laid on the unique nature of hospital projects and the challenges encountered in their procurement. This provides a compelling basis for examining the relationship between procurement practices and performance of public hospital projects as well as the development of an innovative framework for the procurement of public hospital projects.

Additionally, while there has been progress in understanding public procurement processes related to healthcare infrastructure delivery in Nigeria, notable deficiencies remain in empirical research on the challenges encountered in procurement of public hospital projects. The innovative strategies for improvement in the procurement of public hospital projects and the influence of procurement practices on performance of public hospital projects is lacking. Although, the adoption of Public-Private Partnerships (PPPs) has introduced new dynamics, and challenges such as budget constraints, lack of transparency, and regulatory inadequacies persist (Babatunde, 2010; Oteh, 2016). This highlights the urgent need for a tailored procurement framework that addresses the specific challenges faced by public hospitals in Nigeria. Addressing hospital infrastructure deficits is crucial for improving healthcare delivery, enhancing health outcomes, and promoting overall public well-being. It is against this background that this study is carried out to

develop a procurement framework for public hospital projects in South-South Nigeria.

The specific objectives of the study were

i) To assess current procurement practices in public hospital projects delivery in the study area.

ii) To determine the relationship between existing procurement practices and public hospital projects performance.

iii) To develop innovative procurement framework for public hospital projects delivery in the study area.

The study sought to provide answers to the following research questions.

(i) What are the levels of the current procurement practices in public hospital projects in the study area?

(ii) What is the relationship between existing procurement practices and performance of public hospital projects in the study area?

2.0 Research Methodology

The research employs a mixed-methods approach, integrating both quantitative and qualitative methods to offer a comprehensive analysis of procurement processes and stakeholder interactions. The area of the study was the South-South geopolitical zone of Nigeria. There are six States in the South-South geopolitical region of Nigeria comprising Akwa Ibom, Bayelsa, Cross River, Delta, Edo and Rivers States. The research population comprises 1545 staff of the state-owned general hospitals and teaching hospitals in the six states in South-South zone of Nigeria. The target respondents encompass individuals mainly those involved in the procurement and implementation of public hospital projects. These were made up of 389 (25.18%) procurement Staff and 1,156 (74.82%) technical (engineering) staff.. The distribution shows that 110 (14) procurements and 96 technical) are from Cross River State. 103 (15 procurements and 88 engineering/technical) from Akwa Ibom State, 160 (22 procurements and 138 engineering/technical) from Edo State Federal Health Institution. 197 (127 procurements and 70 technical) from Rivers State, 130 (18 procurements and 112 engineering/technical) from Delta State, 140 (19 procurements and 121 engineering/technical) from Bayelsa State, and 120 (17 procurements and 103 engineering/technical) from Edo State. Also, the distribution shows that 35 (15 procurements and 20 engineering/technical) from General Hospital, Calabar, Cross River State, 80 (25 procurements and 55 engineering/technical) from General Hospital, Uyo, Akwa Ibom State, 100 (32 procurements and 68 engineering/technical) from General Hospital, Yenegoa, Bayelsa State, 156 (47 procurements and 109 engineering/technical) from General Hospital, Asaba, Delta State, 117 (12 procurements and 105 engineering/technical) from General Hospital, Port Harcourt, Rivers State and 97 (26 procurements and 71 engineering/technical) from General Hospital, Benin, Edo State, potential respondents from the study area. To determine the minimum sample size that may

guarantee the external validity of research findings, Taro Yamene's (1967) formula was applied.To maximise the sample size the error margin was reduced to 2.5% . This gave a sample size of 865. The figures in Table 3.2 show that 62 respondents (8 procurement and 54 technical staff) will be drawn from Cross River State, 58 (8 procurement and 50 technical staff) from Akwa Ibom State, 90 (12 procurement and 78 technical staff) from Edo State Federal Health Institutions, 110 (70 procurement and 40 technical staff) from Rivers State, 72 (10 procurement and 62 technical staff) from Delta State, 78 (11 procurement and 67 technical staff) from Bayelsa State, and 67 (9 procurement and 58 technical staff) from Edo State Health Institutions. 20 (9 procurement and 11 technical staff) from Cross River State, 45 (14 procurement and 31 technical staff) from Akwa Ibom State, 56 (18 procurement and 38 technical staff) from Bayelsa State, 87 (26 procurement and 61 technical staff) from Asaba, Delta State, 66 (7 procurement and 59 technical staff) from Rivers State and 54 (14 procurement and 40 technical staff) from Edo State. This will give a total of 865 respondents, made up of 216 procurement staff and 649 technical staff.

To ensure that the data collection instrument was valid, the items were constructed by the researcher based on the conceptual and operational definition of the study variables. The item were 25 for each subscale and submitted to two experts in procurement and construction of hospital projects and one expert in measurement and evaluation. They were given the general and specific objectives of the study, the research questions and hypotheses, with instruction to use them in deciding the suitability of the items. In the process, some items were modified. Some were dropped while some dropped items were replaced. This reduce the number of items to between 20 and 24 per sub-scale. Thus, the instrument was considered face-validated and useable.

To determine the reliability of instrument, the Cronbach Alpha approach was applied. The instrument was administered on 60 procurement and technical staff of Benue State University Teaching Hospital, an equivalent population but outside the study area. The data generated were analyzed using SPSS (version 24.0) utilizing the "if item is deleted" option of the software. This component allows for an iterative computing of reliability each time an item was dropped. The products are used to determine the suitability of each item based on the resulting reliability estimate. An item was dropped if it reduced the reliability from the value when all the items were used. In the process, the items on current procurement practices were reduced to 15, and those of project performance (delivery) to 18. The Cronbach Alpha reliability coefficient for current procurement practice was .814 while that of hospital project performance was .846.

The instrument was administered on the sample using research assistants previously trained on the dos and don'ts of the exercise. The responses were coded and summarized using frequencies, simple percentages descriptive statistics correlation coefficients and multiple linear regression analysis. Statistical decisions were taken at .05 level of significance.

3.0 Results

Frequency analysis of responses made to items on current procurement practices

The responses made by respondents to items on current procurement practices, were analysed using frequency counts and simple percentages. The results were as shown in Table 1.

Table 1: Frequency analysis of responses made to items on current procurement practices

		No responds	Very low	Low	Moderate	High	Very high	Total
CPP1	N	12	30	78	264	282	198	864
	%	1.4	3.5	9.0	30.6	32.6	22.9	100.0
CPP2	N		114	228	312	168	42	864
	%		13.2	26.4	36.1	19.4	4.9	100.0
CPP3	N		156	138	348	180	42	864
	%		18.1	16.0	40.3	20.8	4.9	100.0
CPP4	N	18	42	204	348	228	24	864
	%	2.1	4.9	23.6	40.3	26.4	2.8	100.0
CPP5	N	6	42	270	378	120	48	864
	%	.7	4.9	31.3	43.8	13.9	5.6	100.0
CPP6	N		108	270	288	168	30	864
	%		12.5	31.3	33.3	9.4	3.5	100.0
CPP7	N	12	162	228	270	144	42	864
	%	1.4	18.8	26.4	31.3	16.7	4.9	100.0
CPP8	N		138	144	432	126	24	864
	%		16.0	16.7	50.0	14.6	2.8	100.0
CPP9	N	6	126	256	282	168	24	864
	%	.7	14.6	29.9	32.6	19.4	2.8	100.0
CPP10	N	12	138	192	270	248	6	864
	%	1.4	16.0	22.2	31.3	28.5	.7	100.0
CPP11	N		150	228	300	162	24	864
			17.4	26.4	34.7	18.8	2.6	100.0
CPP12	N	6	120	192	306	192	48	864
	%	.7	13.9	22.2	35.4	22.2	5.6	100.0
CPP13	N		96	198	288	234	48	864
	%		11.1	22.9	33.3	27.1	5.6	100.0
CPP14	N	12	84	198	306	234	30	864
	%	1.4	9.7	22.9	35.4	27.1	3.5	100.0
CPP15	N	6	102	204	300	216	36	864
	%	.7	11.5	23.6	34.7	24.0	4.2	100.0

The results in Table 1 indicates that for traditional approach (separate design and construction team) 12(1.4%) did not respond to the item, 30(3.5%) said very low, 78(9.0%) low, 264(30.6%) moderate, 282(32.6%) high and 198(22.9%) very high. For design build (item 2), 342(39.6%) responded low, 312(36.1%) moderate and 210(24.3%) high. For direct labour (item 3), 394(34.1%) said low, 348(40.3%) moderate and 202(25.7%) responded high. For management contracting (item 4), 18(2.1%) did not respond here, 246(28.5%) said low, 348(40.3%) moderate and 252(29.2%) high. For project management by agency (item 5), 6(.7%) abstained, 312(36.2%) said low, 378(43.8%) moderate and 168(29%) high. In terms of E-procurement (item 6), 378(43.8%) responded low, 288(33.3%) moderate and 198(22.9%) high. For private financing (PPP and PFI, concession (item 7) 12(1.4%) abstained, 390(45.2%) responded low, 270(31.3%) moderate and 196(22.3%) high. In terms of labour only contracting (item 8), 282(32.7%) responded low, 432(50.0%) moderate and 150(27.4%) responded high. In terms of non-adversarial procurement (item 9), 6(.7%) abstained, 384(44.5%) said low, 282(32.6%) moderate and 192(22.2%) said high. For design, build and manage (item 10), 12(1.4%) did not respond, 330(38.2%) said low, 270(31.3%) moderate and 252(29.2%) high. For design, build and finance (item 11), 378(43.8%) said low, 300(34.7%) responded moderate and 186(21.6%) said it was high. For design, build and operate (item 12), 6(.7%) did not respond, 312(36.1%) said low, 306(35.4%) moderate and 240(27.8%) high. With respect to build-own-operate and transfer (item 13), 294(34.0%) said low, 288(33.3%) moderate and 282(32.7%) high. For item 14 (BOO), 12(1.4%) abstained, 282(32.6%) said low, 306(35.4%) moderate and 264(30.6%) responded high. For item 15 (build-lease and transfer) 6(.7%) did not respond, 306(35.4%) low, 300 (34.7%) moderate and 352(29.2%) responded high.

Descriptive statistics of responses made on current procurement practices

The responses made by respondents on current procurement practices were weighted as indicated on the questionnaire, very low = 1, low= 2, moderate = 3, high = 4, very high = 5.

The descriptive statistics – mean, standard deviation, standard error – were computed for each item. Population t-test was then applied to find out if the observed item mean was significantly different from the expected level. The results obtained were shown in Table 2.

Table 2

Descriptive statistics of responses made on current procurement practices

Name of variable	N	Mean	Std. Deviation	Std. Error Mean	Mean Difference	t-value	p-value
CPP1	864	3.583	1.122	.0382	.583	15.285	.000
CPP2	864	2.764	1.061	.036	-.236	-6.540	.000
CPP3	864	2.785	1.113	.0379	-.215	-5.683	.000
CPP4	864	2.924	.994	.034	-.076	-2.259	.024
CPP5	864	2.819	.948	.032	-.181	-5.597	.000
CPP6	864	2.701	1.029	.035	-.299	-8.534	.000
CPP7	864	2.646	1.393	.047	-.354	-7.476	.000
CPP8	864	2.715	.991	.034	-.285	-8.443	.000
CPP9	864	2.639	1.059	.036	-.361	-10.026	.000
CPP10	864	2.715	1.104	.038	-.285	-7.580	.000
CPP11	864	2.632	1.060	.036	-.368	-10.210	.000
CPP12	864	2.813	1.118	.038	-.188	-4.928	.000
CPP13	864	2.931	1.079	.037	-.069	-1.893	.059
CPP14	864	2.875	1.067	.036	-.125	-3.444	.001
CPP15	864	2.840	1.079	.037	-.160	-4.353	.000

The results in Table 2 show that the item mean for traditional approach (separate design and construction team) was highest ($\bar{x} = 3.583$) followed by build-own-operate and transfer ($\bar{x} = 2.931$) while the least was design-build-and fiancé ($\bar{x} = 2.632$), showing that only the traditional approach to procurement practice was higher than the expected level. All other practices were less than the expected level. Only the mean build-own-operate and transfer ($\bar{x} = 2.931$)was

not significantly different from the expected level (t=-1.893; p = .059). Only the mean traditional procurement practice was significantly higher than the expected mean ($\bar{x} = 3.583; t = 15.285; p = .000 < .05$). All other mean procurement practices ($2.632 \leq \bar{x} \leq 2.924$) were significantly less than the expected mean value ($-10.210 \leq t \leq -2.259$; $.000 \leq P \leq .024$). this made the traditional procurement practice in the south-south geo-political zone of Nigeria. **Frequency analysis of responses made to items on hospital project performance**

The responses made by respondents to items on hospital project delivery were analysed using frequency counts and simple percentages. The results were as shown in Table 3..

Table 3
Frequency analysis of responses made to items on hospital project performance

		No responds	Very low	Low	Moderately	High	Very high	Total
HPP 1	N	6	12	60	276	348	162	864
	%	.7	1.4	6.9	31.9	40.3	18.8	100.0
HPP 2	N		18	102	342	258	144	864
	%		2.1	11.8	39.6	29.9	16.7	100.0
HPP 3	N		12	174	306	306	66	864
	%		1.4	20.1	35.4	35.4	7.6	100.0
HPP 4	N	12	18	180	330	222	102	864
	%	1.4	2.1	20.8	38.2	25.7	11.8	100.0
HPP 5	N	6	30	78	384	228	138	864
	%	.7	3.5	9.0	44.4	26.4	16.0	100.0
HPP 6	N		12	162	318	234	136	864
	%		1.4	18.8	26.8	27.1	16.0	100.0
HPP 7	N		18	144	312	324	66	864
	%		2.1	16.7	36.1	37.5	7.6	100.0
HPP 8	N		12	138	396	264	54	864
	%		1.4	16.0	45.8	30.6	6.3	100.0
HPP 9	N	6	12	108	354	330	54	864
	%	.7	1.4	12.5	41.0	38.2	6.3	100.0
HPP 10	N		18	102	258	414	72	864
	%		2.1	11.8	29.9	47.9	8.3	100.0
HPP 11	N	12	12	72	324	300	144	864
		1.4	1.4	8.3	37.5	34.7	16.7	100.0
HPP 12	N		18	144	366	222	114	864
	%		2.1	16.7	42.4	25.7	13.2	100.0
HPP 13	N	12	18	132	366	282	54	864
	%	1.4	2.1	15.3	42.4	32.6	6.3	100.0
HPP 14	N		24	168	366	246	60	864
	%		2.8	19.4	42.4	28.5	6.9	100.0
HPP 15	N		12	144	348	294	66	864
	%		1.4	16.7	40.3	34.0	7.6	100.0
HPP 16	N	6	18	126	408	258	48	864
	%	.7	2.1	14.6	47.2	29.9	5.6	100.0
HPP 17	N		18	108	354	276	108	864
	%		2.1	12.5	41.0	31.9	12.5	100.0
HPP 18	N		24	234	282	258	66	864
	%		2.6	27.1	32.6	29.9	7.6	100.0

The results in Table 3.show that for project cost, 6(.7%) abstained, 72(8.3%) said low, 276(31.9%) moderately and 510(57.1%) responded high. For item 2, (project time/duration) 120(13.9%) responded low, 342(39.6%) moderate and 402(46.6%) responded high. For item 3 (quality standard), 186(21.5%) said it was low, 306(35.4%) moderate and 372(43.0%) responded high. With respect to item 4 (end users satisfaction), 12(1.4%) did not respond, 198(22.9%) said moderate but, 324(37.5%) said it was high. With respect to item 5 (clients satisfaction) 6(.7%) abstained, 108(12.5%) responded low, 384(44.4%) moderate and 366(42.4%) high. For item 6 (health and safety), 174(20.1%) responded low 318(36.8%) moderate and 372(43.1%) high. With resect to item 7 (sustainability), 162(18.8%) said it was low, 312(36.1%) moderate while 390(45.1%) said it was high. For item 8 (environmental impact) 150(17.4%) said it was low, 396(45.8%) moderate and 318(36.9%) said it was high. In terms of contractors satisfaction (item 9), 6(.7%) did not respond, 120(13.9%) said it was low, 354(41.0%) moderate and 384(44.5%) said it was high. In terms of consultants' satisfaction (item 10), 120(13.9%) responded low, 258(29.9%) moderate and 486(56.2%) said it was high. With respect to government expectation (item 11), 12(1.4%) abstained, 84(9.7%) responded low, 324(37.5%) moderate and 444(51.4%) said it was high. For item 12 (maintainability – ease of maintenance), 162(18.8%) responded low, 366(42.4%) moderate and 336(38.9%) high. For item 13(resource availability), 12(1.4%) said the respondents abstained, 150(17.4%) said low, 366(42.4%) moderate and 336(38.9%) responded high. For item 14 (regulatory compliance), 192(22.2%) said it was low, 366(42.4%) moderate and 306(35.4%) said it was high. With respect to item 15 (alignment with project goals), 156(18.1%) said low, 348(40.3%) said moderate while 360(41.6%) said it was high. For item 16 (public acceptance and support of the project), 6(.7%) did not respond 144(16.7%) responded low, 408(47.2%) moderate and 306(35.5%) said it was high. For item 17 (meeting construction standards), 126(14.6%) responded low, 354(41.0%) moderate and 384(44.4%) said it was high. For item 18 (meeting aesthetic standards) 258(29.9%) responded low, 282(32.6%) moderate and 324(37.5%) said it was high.

Hypothesis-by-hypothesis presentation of results

For each stated hypothesis, the procedures followed in testing it are described very briefly. The results are then presented and interpreted. All decisions to reject or retain a null hypothesis were taken at .05 level of significance, such that a null hypothesis was rejected if the p-value associated with the computed test statistics was less than .05 but retained if otherwise.

Significance of weighted item score for hospital project performance

The responses made by respondents were weighted such that for each item a:

Non response = 0 points, Very low =2points moderate = 3 points, high = 4 points, very high = 5 points The descriptive statistics –

mean, standard deviation, standard error were then computed for each item. The observed item means were compared to expected mean (μ=3.0) using one sample (population) t-test. The results were as shown in Table 4.

Table 4

Descriptive statistics of weighted item score for hospital project performance

Name of variables	N	Mean	Std. Deviation	Std. Error Mean	Mean Difference	t-values	p-values
HPP1	864	3.6597	.95189	.03238	.65972	20.372	.000
HPP2	864	3.4722	.97199	.03307	.47222	14.280	.000
HPP3	864	3.2778	.91678	.03119	.27778	8.906	.000
HPP4	864	3.2014	1.05193	.03579	.20139	5.627	.000
HPP5	864	3.4028	1.01657	.03458	.40278	11.646	.000
HPP6	864	3.3750	1.00664	.03425	.37500	10.950	.000
HPP7	864	3.3194	.91075	.03098	.31944	10.310	.000
HPP8	864	3.2431	.84415	.02872	.24306	8.463	.000
HPP9	864	3.3333	.87451	.02975	.33333	11.204	.000
HPP10	864	3.4861	.88232	.03002	.48611	16.194	.000
HPP11	864	3.5278	1.00019	.03403	.52778	15.510	.000
HPP12	864	3.3125	.96858	.03295	.31250	9.484	.000
HPP13	864	3.2153	.94456	.03213	.21528	6.699	.000
HPP14	864	3.1736	.91591	.03116	.17361	5.572	.000
HPP15	864	3.2986	.88306	.03004	.29861	9.940	.000
HPP16	864	3.2014	.87911	.02991	.20139	6.734	.000
HPP17	864	3.4028	.93089	.03167	.40278	12.718	.000
HPP18	864	3.1250	.98570	.03353	.12500	3.728	.000

The results in Table 4. show that the item mean for item one ($\bar{x} = 3.660$) was the highest (ie project cost) followed by that of item 2 ($\bar{x} = 3.472$) while the least was that of item 18 ($\bar{x} = 3.125$). All the item mean values ($3.125 \leq \bar{x} \leq 3.660$) were greater than the expected mean (μ=3.0). The results of the t-test showed that all the item means were significantly higher than the expected mean level ($3.728 \leq t \leq 20.372$; $P = .000 < .05$). This means that the entire hospital project performance was significantly higher than expected.

Current procurement practices have no significant collective and individual relative influence on hospital project performance.

To test this hypothesis, multiple linear regression analysis was applied with

the 15 current procurement practices as independent variables and hospital project performance as dependent variable. The F-ratio test was used to test for the significance of the overall influence model while t-test was used to the test for the significance of the relative contribution of each of the current procurement practices in the model. The results were as shown in Table 5

Table 5

Multiple regression of project performance on current procurement practices

R-value	R- Square	Adjusted R Square	Std. Error	
.534	.286	.273	7.415	
Source	SS	Df	Mean Square	F-value	p-value
Regression	18641.446	15	1242.763	22.603	.000
Residual	46625.888	848	54.983		
Total	65267.333	863			
Predictor variable	Unstandardized Coefficients		Standardized Coefficients	t-value	p-value
	B	Std. Error	Beta		
(Constant)	47.311	1.607		29.445	.000
CPP1	.014	.242	.002	.059	.953
CPP2	.552	.262	.067	2.106	.036
CPP3	.968	.292	.124	3.319	.001
CPP4	-.713	.287	-.081	-2.483	.013
CPP5	-1.176	.308	-.128	-3.823	.000
CPP6	1.814	.303	.215	5.997	.000
CPP7	.652	.209	.104	3.118	.002
CPP8	1.410	.349	.161	4.041	.000
CPP9	-1.930	.317	-.235	-6.078	.000
CPP10	-.751	.352	-.095	-2.135	.033
CPP11	.877	.350	.107	2.504	.012
CPP12	1.542	.317	.198	4.869	.000
CPP13	-.833	.299	-.103	-2.782	.006
CPP14	2.039	.310	.250	6.580	.000
CPP15	.161	.321	.020	.500	.617

significant at .05 level P < .05

The results in Table 5 show that an R-value of .534 was obtained, giving an R-squared value of .286. This means that about 28.6% of the total variation in hospital project

performance was accounted for by the 15 current procurement practices collectively. The p-value (.000) associated with the computed F-value (22.603) was less than .05. As such, the null hypothesis was rejected. This means that current procurement practices have significant collective influence on hospital project performance with the regression constant (47.311) and coefficients for design-build (.552) direct labour (,968) management contacting (-.713) project management by agency (-1.176) E-procurement (1.814), private financing (.652), labour only contracting (1.410), non-adversarial procurement (-1.930), design, build and manage (-.751), design – build and finance (.877) design-build and operate (1.542), build-own-operate and transfer (-.833) and build-own and operate (2.039) making significant relative contribution on the influence model ($2.106 \leq /t/ \leq 25.445$; $.000 \leq p \leq .036$). The relative contribution of traditional approach (.014) and build-lease and transfer (.161) in the model were not significant (t = .059 and .500; P = .953 and .617 respectively. The influence model may be written mathematically as:

$y = 47.311 + .014\, x_1, + .552x_2, .968x_3 - .713x_4 – 1.176x_5 + 1.814x_6 + .652x_7 + 1.410x_8 – 1.930x_9 - .751x_{10} + .877x_{11} + 1.542x_{12} - .833x_{13} + 2.039x_{14} + .161x_{15}$

where x_1 = traditional approach x_{13} build-own-operate and transfer x_2 = design build x_{14} = build-own operate x_3 = direct labour x_{15} = build-lease and transfer

x_4 = management contracting x_5 = management by agency, y = project performance x_6 = E-procurement x_7 = Private financing x_8 = labour only contracting x_9 = non-adversarial procurement x_{10} design-build and manage, x_{11} design-build and finance x_{12} design-build and operate

4.0 Discussion of Findings

Examining Current Procurement Practices Used in Public Hospital Projects i

Traditional procurement recorded the only mean significantly above the expected value ($\mu = 3.0$) All other 14 procurement methods, design-build, direct labour, management contracting, project management by agency, e-procurement, PPP variants, and collaborative models, recorded means significantly below the expected level ($2.632 \leq$ mean ≤ 2.924) and were therefore underutilized The regression also showed that traditional approach did not significantly influence performance ($\beta = .014$, $p = .953$). The dominance of the traditional procurement method in this study aligns with Murdoch and Hughes (2008), and Ashworth and Perera (2018), who noted that the traditional method is deeply entrenched in public projects due to bureaucratic preferences and perceived control. However, the result that this method was overused and yet statistically insignificant in explaining project performance challenges its suitability for modern hospital projects. This evidence supports Chan et al. (2001) and Molenaar et al. (1998), who argue that traditional procurement results in prolonged timelines, fragmented communication, and low flexibility - factors incompatible with the complex needs of healthcare infrastructure. Moreover, the underuse of design-build,

DBF, DBO, labour-only contracting, private financing, and PPP models, despite their significant positive regression coefficients (e.g., DB: $\beta = .552$, $p = .036$; Direct labour: $\beta = .968$, $p = .001$; E-procurement: $\beta = 1.814$, $p = .000$) contradicts global trends that promote integrated procurement for efficiency (Laryea & Watermeyer, 2016; Gordon et al., 2007). This confirms the assertion of Wells & Hawkins (2010) that developing countries often fail to adopt innovative procurement models due to lack of capacity, resistance to change, and weak institutional frameworks. Therefore, the findings show a misalignment between practice and modern global expectations, revealing an urgent need for procurement modernization in the region

Examining the Influence of Current Procurement Practices on Hospital Project Performance

Regression for current practices produced $R = .534$, $R^2 = .286$, indicating only 28.6% of performance variation is explained collectively. Several practices had significant positive contributions: design-build, direct labour, e-procurement, labour-only contracting, etc. Some practices had negative significant effects: management contracting, project management by agency, non-adversarial procurement, DB+Manage. The moderate R^2 value (28.6%) indicates that although procurement practices matter, other external factors—funding, political influence, and regulatory environment, also heavily shape hospital project performance. This supports Iyer & Jha (2005), who found that procurement methods significantly affect cost, time, and quality but operate within broader institutional constraints. The significant contributions of design-build, direct labour, e-procurement, and collaborative methods align with integrated delivery literature (Molenaar et al., 1998; Ling et al., 2006**)**, showing improved coordination and reduced delivery time; and digital procurement research (Vaidya et al., 2006; Neupane et al., 2014), which highlights transparency and efficiency gains. The negative effects of some practices, particularly management contracting and non-adversarial procurement, fit Flyvbjerg et al. (2003), who warned that poorly structured or poorly supervised procurement routes often lead to delays and cost overruns. In essence, the findings validate the argument that not all procurement routes are suitable for hospital projects, and effectiveness depends on both method selection and institutional capability

5.0 Conclusion

From the findings, it is concluded that procurement practices in public hospital projects in South-South Nigeria remain heavily dependent on the traditional method, despite its weak contribution to project performance. The application of the various procurement strategies was significantly above expected mean level. Theses strategies had significant collective influence on hospital project performance

6.0 Recommendations

Based on the findings and conclusions, the following recommendations are made:

1. **Reduce Overreliance on Traditional Procurement.** Public hospital administrators and procurement regulators should diversify procurement methods by adopting alternatives such as design-build, DBF, PPP, and project-managed delivery systems. These methods, shown to have significant positive performance impacts, should be integrated into procurement planning frameworks.
2. **Implement Full-Scale E-Procurement Across All Public Hospitals,** Given its strong predictive influence on performance, governments should institutionalize e-procurement platforms to enhance transparency, reduce manual bottlenecks, curb corruption, and ensure real-time monitoring of procurement activities.

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