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Implementation of e-procurement in mitigating
corrupt practices in construcion project delivery
by G. Kelechi, B. Amadi, PhD,
and G. Okereke

Implementation of e-procurement in mitigating corrupt practices in construction project delivery [1]

Godson Kelechi[2], Benedict Amade, PhD[3] and Godson Okereke[4]

Abstract

This study investigated how e-procurement can reduce corruption in construction project delivery in Rivers State. The study followed a survey research design. We distributed one hundred and fifty-six questionnaires (156) to various professionals in both the public and private sectors, of which one hundred and twelve (112) returned and deemed valid for further analysis. The data collection and measurement instrument was a well-structured, standardised questionnaire based on Likert five-point scales and used to elicit responses from a variety of professionals. We analysed the major issues of the study using statistical tools (SPSS version 25.0) and Microsoft Excel software, which included factor analysis, mean item score (MIS), and relative importance index. According to the study's findings, there are several factors that contribute to corrupt practices in construction project delivery, including a lack of control mechanisms, poor record documentation, monopolies, and personal greed. The study also uncovered the use of various e-procurement tools and techniques, such as an internet-based tool, a web-based enterprise resource planning tool, an e-sourcing tool, an e-tendering tool, and others, to counteract corrupt practices in construction project delivery. Furthermore, the findings reveal that measures are in place to combat corrupt practices in construction project delivery, such as the government's commitment to open contracting, the establishment of a formal integrity framework, the implementation of construction work and process supervision throughout the project's lifecycle, and so on. The study recommends that the government, as a matter of policy, should be organizing periodic awareness and reorientation workshops and seminars via professional association platforms through web-based portals for both the public and private sectors, and enlightening them of the dangers of factors precipitating corrupt practices in construction project delivery. There is a need to implement all e-procurement tools and techniques in both public and private companies.

Keywords: E-Procurement, Implementation, Mitigation, Corruption, Construction projects.

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1. Introduction

The traditional procurement system that is adopted in the Nigerian public and private sectors and deals with a normal advertisement system, a normal bidding system, and also with respect to the selection of contracts for the award process is seriously challenged with lots of setbacks and various forms of corrupt practices, which include selective tendering process challenges, the absence of control mechanisms, the absence of an efficient and effective administrative system, and the and the absence of project anti-corruption. All of these challenges necessitated procurement reform, particularly in the public sector (Ajibike, 2019; Gastor, 2019). Using technology in areas like e-justice, e-commerce, and public procurement can reduce corruption, increase transparency, and save time and resources (Aboelazm, 2024). In general, electronic procurement encompasses all stages of the purchasing process, from demand identification to tendering, payment, and, of course, contract administration via the internet (Smith & Flanegin, 2014).

Port Harcourt, the capital of Rivers State, is one of the government sectors that has yet to adopt an electronic procurement system in Nigeria. Nonetheless, the traditional procurement system that has been practiced in Port Harcourt, the capital of Rivers State, is frequently challenged with the problems of personal greed, probity and integrity of the procurement process, accountability, transparency, kickbacks, embezzlement, fronting, conflict of interest, fraud, collusive tendering, poor legal framework, and the problem of political interference, and these problems have in one way or another drastically affected the efficiency. With respect to unravelling the issues of corruption, there is a need to implement electronic procurement in both the private and public sectors, which will ensure identifying and analysing the corrupt practices using e-procurement tools and techniques that provide a smooth process and ideas and enable project team members to meet up with the best practices in evaluating the impact of e-procurement implementation in mitigating corrupt practices to ensure probity and transparency. Previous research on e-procurement in construction focused on the strategic, opportunistic, and operational benefits of e-procurement (Eadie et al., 2010; Farzin & Nezhad, 2010); the state of e-tendering in Nigeria; and barriers to e-tendering adoption in Nigeria (Akintola and Oyediran, 2011; Bello & Iyagba, 2013). Few studies have focused on the implementation of e-procurement, particularly in Port Harcourt, the capital of Rivers State.

This study investigates the role of e-procurement in reducing corrupt practices in construction project delivery in Rivers State.

To achieve the study's goal, the following specific objectives were developed: investigate factors that contribute to corrupt practices in construction project delivery in Rivers State; evaluate e-procurement tools and techniques used in mitigating corrupt practices in construction project delivery in Rivers State; and develop measures used in mitigating corrupt practices in construction project delivery in Rivers State.

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2.   Literature Review

2.1   Corruption

Hawkins (2013) adopted Transparency International's (2013) definition of corruption, which is "the abuse of entrusted power for private gain." It is critical to understand that corrupt practices in public and private sector procurement processes lead to issues such as a lack of integrity in procurement processes, a lack of accountability, a problem with political interference and auditing, a lack of transparency and professionalism in bureaucracy, and many others. Inuwa (2015) observed that in the Nigerian construction industry, most projects fail due to corrupt activities on the part of the professionals on whom management and responsibility rests. In this work, it is critical to understand that corruption or corrupt practices lead to the abandonment of building projects, the loss of life and property, the delay in payment of workers' or contractors' salaries, the constant collapse of buildings, the exposure of workers to job insecurity, and poor quality project delivery. Corruption can also lead to a nation's backward development because people in positions of influence use it for personal gain and wealth accumulation rather than to deliver services.

2.2   E-Procurement and mitigation of corruption

In today's fast-paced digital age, procurement organisations must differentiate themselves by effectively eliminating intermediaries in order to dangers of fraud, and other human-related issues. The procurement process facilitated by new technologies in the era of Industry 4.0 is known as Procurement 4.0 (Govindan, Jain, Kr. Singh, & Mishra, 2024). It is important to note that unethical practices in public procurement processes have resulted in a range of issues, including transparency, probity, and integrity of procurement processes; accountability; political control or interference; auditing; personal greed; and a lack of professionalism in bureaucracy. Bertot, Jaeger, and Grimes (2010) stated that information and communication technology (ICT), one of the e-procurement tools and techniques, can play an important role in reducing corrupt practices and promoting good governance. However, developed countries such as Mexico and Korea have fully implemented e-procurement to drive new innovation and increase transparency in public procurement processes. E-procurement implementation will help to eliminate kickbacks, fronting, conflicts of interest, bribery, fraud, embezzlement, collusive tendering and bid rigging, favouritism in contract award, tribalism, unethical behaviour by various professionals, sole source contracting, and other issues.

2.3   Challenges with e-procurement implementation

Hawking (2004) outlined some of the challenges associated with electronic procurement implementation, including a lack of supplier electronic procurement solutions, high technology costs, a lack of a legal framework, a lack of technical expertise, and a lack of knowledge about

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electronic procurement. Ibem and Laryea (2015) identified additional challenges to electronic procurement implementation in construction electronic procurement processes, including unreliable and unequal access to IT infrastructure, cultural and security challenges, and a lack of understanding of how electronic procurement systems work among industry stakeholders. With regard to all of these challenges of electronic procurement, if they can be effectively addressed, both the public and private sector construction industries will undoubtedly benefit from electronic procurement, which will improve the probity and integrity of procurement processes.

2.4 Factors precipitating corrupt practices in construction project delivery

Globally, governments spend an estimated US$ 9.5 trillion in public contracts each year, with many developing countries, such as Ghana, Botswana, and Zambia, accounting for 15-22% of GDP. As a result of its high spending volume, public procurement is critical to the delivery of government services. Aside from its primary goal of value for money, public procurement can also achieve environmental or social objectives (Mukumba & Kajimo-Shakantu, 2024). According to Uwak (2016), corrupt practices or corruption in construction project delivery include embezzlement of public funds for personal gain, diversion of public funds for commercial purposes, and the payment of bribes in order to win or obtain contract awards, particularly in public offices. Most importantly, corrupt practices can lead to a nation's backward development because people in positions of power and influence often misuse them for personal gain and wealth accumulation rather than service delivery. According to Ayodele (2011), personal greed, poverty issues, godfatherism in contract award, unethical behaviour by various professionals in the Nigerian construction industries, and profit maximisation by various contractors are the root causes of corrupt practices in construction project delivery in Nigeria.

However, it is important to know that corruption or corrupt practices in Nigerian public and private sector procurement processes result in issues of lack of probity and integrity, inappropriate political interference or control, accountability and transparency, auditing, and the problem of weak professionalism in bureaucracy.

Table 2.1: Factors precipitating corrupt practices in construction project delivery

S/N	Factors	Sources
1	Complexity of the projects	Boyd and Padilla(2009).
2	Weak procurement / contractual structures	Moodley et al.(2008); Zarkada-Fraser and Skitmore (2000).
3	Flawed regulation system	Boyd and Padilla(2009); Moodley et al.(2008); King et al.(2008), King et al.(2008).
4	Absence of project anti-corruption systems	Shan et al.(2016), Boyd and Padilla (2009).
5	Lack of rigorous supervision	Boyd and Padilla(2009); Gunduz and O¨nder (2013); Shan et al.(2016).
6	Personal greed	Porter (1993); Moodley et al.(2008); King et al.(2008).
7	Deficiencies in rules and laws	Hartley (2009); Sohail and Cavill (2008); Shan et al.(2016).
8	Insufficient legal punishments and penalties	Sohail and Cavill (2008).

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9	Low wage level	Boyd and Padilla(2009); Shan et al.(2016).
10	Insufficient transparency in the selection criteria for tenderers	Porter (1993); King et al.(2008).
11	Poor documentation of records	Fan and Fox (2009).
12	Lack of coordination among Government departments	Fan and Fox (2009).
13	Negative industrial and working conditions	Boyd and Padilla(2009); Gunduz and O̊nder (2013); Moodley et al.(2008).
14	Lack of pro-active steps by financers to limit corruption on projects	Tanzi (1998); Stansbury (2009).
15	Transition of governments	Shan et al.(2015) ;Hartley (2009).
16	Absence of efficient and responsible administrative systems	Hartley (2009); Shant et al (2016).
17	Delaying the payment of workers' salaries	Leetal.(2014);Stansbury(2009).
18	Inappropriate political interference	Hartley (2009); Porter (1993).
19	Nature of infrastructure projects	Shan et al.(2016), Porter (1993).
20	Absence of control mechanism	Browen et al (2012); Stansbury (2009).
21	Complexities of institutional roles and functions	Porter(1993), Hartley (2009).
22	Lack of standardized execution in construction	Bowen et al. (2012); Tabish (2011).
23	Poor professional ethical standard	Zhang et al.(2017); Brown and Loosemore (2015); Le et al. (2014).

Authors Compilation 2024

2.5 E-Procurement tools and techniques used in mitigating corrupt practices on construction project delivery.

The use of e-procurement tools and techniques in mitigating corrupt practices in construction project delivery, which aids in providing efficient bidding evaluation in a faceless environment with less human contact, is viewed as a 'tool' in mitigating corrupt practices (Neupane et al., 2012; Roman, 2012).

According to Buyse (2015), e-procurement includes a variety of tools and techniques, including: The electronic data interchange system (EDI), web-based enterprise resource planning, and internet-based tools. E-Sourcing Tools, E-Ordering Tools/E-Maintenance Repair Operations (MRO), E-Tendering Tools, E-Auctioning Tools, E-Submission Tools, E-Noticing Tools, E-Awarding Tools, Procurement Workflow, and Request Wizard Tools ICT-enabled anti-corruption tools Intelligent request generation and online bid advertisement tools, simple vendor award tools, and fast contract creation tools. If fully implemented in Nigeria's construction industries, it will go a long way towards mitigating corrupt practices by ensuring transparency, accountability, probity, and integrity of procurement processes, as well as ensuring value for money, all of which will help to reduce corruption in project delivery.

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3.   Methodology

This study investigated how e-procurement can reduce corruption in construction project delivery in Rivers State. The study followed a survey research design. We distributed one hundred and fifty-six questionnaires (156) to various professionals in both the public and private sectors, of which one hundred and twelve (112) returned and deemed valid for further analysis. The data collection and measurement instrument was a well-structured, standardised questionnaire based on Likert five-point scales and used to elicit responses from a variety of professionals. We analysed the major issues of the study using statistical tools (SPSS version 25.0) and Microsoft Excel software, which included factor analysis, mean item score (MIS), and relative importance index. According to the study's findings, there are several factors that contribute to corrupt practices in construction project delivery, including a lack of control mechanisms, poor record documentation, monopolies, and personal greed.

The study also uncovered the use of various e-procurement tools and techniques, such as an internet-based tool, a web-based enterprise resource planning tool, an e-sourcing tool, an e-tendering tool, and others, to counteract corrupt practices in construction project delivery. . Furthermore, the findings reveal that measures are in place to combat corrupt practices in construction project delivery, such as the government's commitment to open contracting, the establishment of a formal integrity framework, the implementation of construction work and process supervision throughout the project's lifecycle, and so on.

The study recommends that the government, as a matter of policy, should be organizing periodic awareness and reorientation workshops and seminars via professional association platforms through web-based portals for both the public and private sectors, and enlightening them of the dangers of factors precipitating corrupt practices in construction project delivery. There is a need to implement all e-procurement tools and techniques in both public and private companies.

4.   Results

Questionnaire distribution and responses

Respondents	Distribution	Responses	Responses (%)
Project Managers	20	15	75
Builders	16	10	63
Architects	24	17	71
Civil engineers	36	25	69
Quantity Surveyor	43	35	81
Clients	17	10	59
Total	156	112	72

Source: Field Data 2024

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From the table above One hundred and fifty-six questionnaires was administered to the respondents and one hundred and twelve were returned and considered valid for analysis.

Table 2.2: Communalities of factors precipitating corrupt practices

Communalities		
	Initial	**Extraction**
Complexity of the projects	1.000	.817
Weak procurement / contractual structures	1.000	.879
Flawed regulation system	1.000	.831
Absence of project anti-corruption systems	1.000	.894
Lack of rigorous supervision	1.000	.822
Personal greed	1.000	.891
Deficiencies in rules and laws	1.000	.772
Insufficient legal punishments and penalties	1.000	.717
Low wage level	1.000	.664
Insufficient transparency in the selection criteria for tenderers	1.000	.592
Poor documentation of records	1.000	.783
Lack of coordination among Government departments	1.000	.733
Negative industrial and working conditions	1.000	.915
Lack of pro-active steps by financers to limit corruption on projects	1.000	.690
Transition of governments	1.000	.605
Absence of efficient and responsible administrative systems	1.000	.618
Delaying the payment of workers' salaries	1.000	.769
Inappropriate political interference	1.000	.778
Nature of infrastructure projects	1.000	.839
Absence of control mechanism	1.000	.788
Complexities of institutional roles and functions	1.000	.814
Lack of standardized execution in construction	1.000	.813
Poor professional ethical standard	1.000	.870
Extraction Method: Principal Component Analysis.		

The average communality of these variables after extraction was 0.778, according to the table above. As a result, the extracted communalities strongly support the application of factor analysis to the variables. No item had extracted eigenvalues less than the 0.50 cut-off point, indicating that all variables are suitable for further analysis.

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Table 2.3: Extraction method: principal component analysis of factors precipitating corrupt practices

Total Variance Explained									
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.528	19.689	19.689	4.528	19.689	19.689	3.490	15.174	15.174
2	3.036	13.199	32.888	3.036	13.199	32.888	2.590	11.260	26.435
3	2.737	11.898	44.787	2.737	11.898	44.787	2.312	10.050	36.485
4	1.956	8.505	53.291	1.956	8.505	53.291	2.310	10.043	46.528
5	1.706	7.419	60.710	1.706	7.419	60.710	2.275	9.893	56.420
6	1.390	6.042	66.752	1.390	6.042	66.752	2.136	9.289	65.709
7	1.307	5.684	72.435	1.307	5.684	72.435	1.411	6.134	71.843
8	1.133	4.927	77.363	1.133	4.927	77.363	1.269	5.519	77.363
9	.907	3.944	81.306						
10	.832	3.618	84.925						
11	.657	2.857	87.782						
12	.472	2.054	89.836						
13	.433	1.884	91.719						
14	.402	1.746	93.465						
15	.336	1.459	94.924						
16	.321	1.394	96.319						
17	.258	1.120	97.438						
18	.184	.798	98.237						
19	.143	.623	98.859						
20	.085	.371	99.230						
21	.081	.352	99.582						
22	.064	.277	99.860						
23	.032	.140	100.000						
Extraction Method: Principal Component Analysis.									

The results in the table above yielded an eight-factor component solution that accounted for 77.363% of the variance. The first component explained 19.689% of the variance, the second component 13.199%, the third component 11.898%, and the eighth and final component 4.927%. The total variance explained exceeds the recommended minimum of 50%. The eight components were named after the factor with the highest load in the cluster. These are covered in greater detail in the discussion section.

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Table 2.4: Component matrix of factors precipitating corrupt practices

	Component matrix[a]							
	1	2	3	4	5	6	7	8
Weak procurement / contractual structures	.820							
Nature of infrastructure projects	.795							
Insufficient legal punishments and penalties	.758							
Lack of coordination among Government departments	.712							
Poor documentation of records	.650							
Lack of pro-active steps by financers to limit corruption on projects	.643							
Low wage level	.566							
Absence of project anti-corruption systems	.549							
Complexities of institutional roles and functions	.539							
Flawed regulation system		.671						
Absence of control mechanism		.658						
Inappropriate political interference			.719					
Complexity of the projects			.631					
Personal greed				.587				
Poor professional ethical standard					.745			
Absence of efficient and responsible administrative systems					.702			
Insufficient transparency in the selection criteria for tenderers						.578		
Lack of standardized execution in construction projects						.507		
Lack of rigorous supervision							.619	
Transition of governments							.599	
Delaying the payment of workers' salaries							.562	
Deficiencies in rules and laws								.672
Negative industrial and working conditions								.652
Extraction Method: Principal Component Analysis.								
a. 8 components extracted.								

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The aforementioned results demonstrate that eight decision matrix components can classify 23 factors that contribute to corrupt practices in construction project delivery. However, the effectiveness analysis later identified eight principal components. In the first component, 9 factors load positively maximally; in the second component, 2 factors load positively maximally; and in the third component, 2 factors load positively maximally. In the fourth component, one factor loads positively and maximally. In the fifth, sixth, seventh, and eighth components, factors 2, 2, 3, and 2 loads positively and maximally. Based on this result, the components that emerged could be the dominant underlying factors determining the factors precipitating corrupt practices in construction project delivery.

Table 2.5: E-procurement tools and techniques used in mitigating corrupt practices in construction project delivery

Descriptive Statistics							
	N	Minimum	Maximum	Mean		Std. Deviation	Variance
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Statistic
E-Noticing Tools	112	3.00	5.00	4.6250	.04767	.50448	.255
E-Sourcing Tools	112	2.00	4.00	2.7768	.05185	.54871	.301
Using Internet-based Tools	112	3.00	5.00	4.6429	.04722	.49968	.250
The Use of ERP Tools & System	112	2.00	5.00	3.0446	.06264	.66290	.439
Intelligent Request Generation & Online Bid Advertisement	112	2.00	5.00	3.6607	.06658	.70460	.496
Easy Vendor Awards	112	2.00	5.00	4.6250	.05093	.53902	.291
E-Submission Tools	112	1.00	5.00	3.9286	.07255	.76775	.589
ICT-Enabled Anticorruption Tools	112	2.00	5.00	3.7857	.05733	.60670	.368
E-Auctioning Tools	112	2.00	5.00	4.5982	.05595	.59214	.351
The Implementation of EDI System	112	2.00	5.00	2.8661	.07341	.77687	.604
E-Awarding Tools	112	1.00	5.00	2.0179	.07394	.78249	.612
E-Ordering Tools	112	3.00	5.00	4.5536	.05205	.55083	.303
Quick Contract Creation	112	2.00	5.00	3.7054	.05174	.54753	.300
E-Tendering Tools	112	1.00	4.00	2.6786	.05413	.57287	.328
The Procurement Workflow & Request Wizard	112	2.00	5.00	3.6786	.04947	.52358	.274
Valid N (listwise)	112						

The above-mentioned results show the 15 e-procurement tools and techniques used in Rivers State to combat corrupt practices in construction project delivery. After applying the mean item score (MIS), the table shows that using Internet-based tools had the highest MIS value (4.64). Easy Vendor Awards came next, with a MIS value of 4.63, followed by E-Noticing Tools at 4.63, E-Auctioning Tools at 4.60, E-Ordering Tools at 4.55, E-Submission Tools at 3.93, and E-Awarding Tools at 2.02.

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5. Conclusion

This study is on the use of e-procurement to reduce corruption in construction project delivery found evidence of widespread corruption in Nigeria's public and private construction industries, despite the Public Procurement Act and ancillary codes of conduct for industry professional bodies. Nevertheless, corrupt officials in positions of influence within the government represent the industry's largest and most prominent client, particularly in terms of construction project delivery. Contractors are more concerned with bribing these officials to ensure business survival than with adhering to procurement rules and laws. A survey of practitioners in the construction industry revealed that kickbacks, bribery, tender rigging and collusion, and conflict of interest are the most serious corrupt practices, primarily occurring during the bid evaluation and tendering phases of project development. We must improve the transparency and accountability of public procurements throughout the project development phases, including strict enforcement of the Public Procurement Act (Act 663), to address these challenges. This will help to create an environment conducive to fair competition, allowing contracts to be won and awarded based on merit. The study examines factors precipitating corrupt practices in construction project delivery, such as close relationships, complexity of the project, poor documentation of records, etc.; e-procurement tools and techniques used in mitigating corrupt practices in construction project delivery, such as internet-based tools, e-sourcing tools, e-tendering tools, etc.; and measures used in mitigating corrupt practices in construction project delivery, such as ensuring government commitment. This study recommends that government should organise awareness and reorientation workshops and seminars for both the public and private sectors, using professional associations and web-based portals, to educate them on the risks of corrupt practices in construction project delivery.

 Implementing e-procurement tools and techniques in public and private companies promotes transparency, accountability, and competitive tendering while reducing corruption. Urgently implement anti-corruption measures throughout public procurement and contracting processes.

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