

**IMPLEMENTATION OF E-PROCUREMENT IN MITIGATING
CORRUPT PRACTICES IN CONSTRUCTION PROJECT
DELIVERY
IN RIVERS STATE.**

BY

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CERTIFICATION

I certify that this work "Implementation of E-Procurement in Mitigating Corrupt Practices in Construction Project Delivery in Rivers State" was carried out by **GODSON, KELECHI** [Reg. No.20204247078] in partial fulfillment for the award of the degree of Master of Science (M.Sc) in Project Management Technology in the Department of Project Management Technology of the Federal University of Technology, Owerri, Nigeria.



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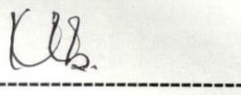
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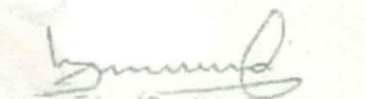


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DEDICATION

This project is dedicated to God Almighty, the giver of life, wisdom, knowledge and understanding.

And also to my parents Pastor Njoku Godson and Mrs. Godson Rose who took all the pains to make sure I am educated.

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ABSTRACT

This research focused on implementation of e-procurement in mitigating corrupt practices in construction project delivery in Rivers State. Specifically, the study examined the factors precipitating corrupt practices in construction project delivery, identify e-procurement tools and techniques used in mitigating corrupt practices in the delivery of construction projects, and as well as measures used in mitigating corrupt practices in construction project delivery. The study is guided by Transaction Cost Theory, e-Technology Perspective Theory, Institutional Theory. The research design method adopted for the study is a survey study. The instrument for data collection and measurement were well structured standardized questionnaire modeled in Likert five point scales were used in eliciting responses from various professionals in both private and public sectors in the construction industry in Rivers State and the sample size for this study is 156. Factor analysis, mean item score(MIS), and relative importance index were used in analyzing the major issues in the study with the aid of statistical tools in SPSS version 25.0 and Microsoft excel programmed software. The findings from this study shows that there are factors precipitating corrupt practices in construction project delivery such as close relationship, absent of project anti-corruption system, monopoly, inappropriate political interference, personal greed, subjecting workers to job insecurity, inadequate sanction etc. The findings of the study further revealed that there are E-procurement tools and techniques used in mitigating corrupt practices in the delivery of construction projects such as internet based tools, enterprise resource planning, e-sourcing tools, e-awarding tools, e-tendering tool etc. and also the result show that there are measures used in mitigating corrupt practices in construction project delivery. The study recommend that government as a matter of policy, should be organizing periodic awareness and reorientation workshops and seminars via professional associations platforms through a web based portals, for both public and private sectors and enlightened them of the danger of factors precipitating corrupt practices in construction project delivery. Furthermore, there is the need to implement all the e-procurement tools and techniques in both public and private companies to ensure transparency, accountability and competitive tendering process electronically during procurement processes which in turn hamper corruption.

Keywords: E-Procurement, Procurement, E-procurement implementation, Corruption, Construction projects, public procurement.

CHAPTER ONE

INTRODUCTION

1.1 Background Information

Traditional procurement system that is adopted in Nigerian public and private sector, that deals with normal advertisement system, normal bidding system and also with respect to selection of contract to the award process is seriously challenged with lots of setbacks and various forms of corrupt practices which include selective tendering process challenges, sole source contracting challenges, advertisement challenges, high incidence of vested interest challenges, and limited and ineffective public bidding challenges, and also in terms of retrospective award of contract challenges (Ajibike, 2019).

Electronic Procurement is defined as the application of ICT tools which transforms the traditional processes of acquisition, purchasing or supplying of goods and services into electronic processes which enhances competence and performance while enabling simplicity and automation (Philips & Piotrowicz, 2006). In general, it is essential to know that electronic procurement encompasses all the stages of the purchasing process, which ranges from demand identification process to tendering process, payment process, and invariably with respect to contract administration with the use of internet (Smith & Flanegin, 2014).

The major problem with respect to this study on implementation of electronic procurement in mitigating corrupt practices in construction project delivery in Rivers State is that, Port Harcourt, the capital of Rivers State is among the government sector that is yet to key into the implementation of electronic procurement system in Nigeria. Nevertheless, the traditional procurement system that is been practiced by Port Harcourt, the capital of Rivers State is often challenged

with the problem of accountability, transparency, kickbacks, embezzlement, fronting, , fraud, collusive tendering, conflict of interest, poor legal framework and corrupt practices, problem of political interference and with respect of unraveling the issues of corruption, there is need to implement electronic procurement in both private and public sector which will ensure in identifying, analyzing the corrupt practices using e-procurement tools and techniques which provides a smooth process, ideas and to 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 with respect to delivery of construction projects which will in turn hamper corruption. Implementation of electronic procurement will assists both the public and private sectors in Nigeria at large in mitigating corrupt practices by removing a considerable degree face-to-face interaction among various stakeholders in which most demands for kickbacks often emanate (Pictet & Bollinger, 2008). Nevertheless, in various construction industries in Nigeria in general, the use of electronic Procurement is yet be given adequate and proper attention both with respect of usage and well as with respect of research efforts (Ibem, 2016; & Aduwo, 2016). However, it is essential to know that the problem of implementation of electronic Procurement is evident in African countries, where it is being employed; the implementation of e-procurement is still at its formative stage in spite of benefits electronic Procurement in ensuring probity, effective and efficient delivery of construction projects delivery (Ibem & Laryea, 2015).

Hawkins (2013), adopted the definition of corruption as defined by Transparency International, (2013) as “The abuse of entrusted power for private gains”. Majority of professionals in the construction industries are seriously involve in corrupt

practices in terms of procurement processes such as the employer or beneficiary, engineers, quantity surveyors, architects, builders, estate surveyors and other professionals in the construction industries who are involved with respect to infrastructure delivery. It is essential to know that corruption or corrupt practices can lead to abandonment of building, loss of life and properties, incessant collapse of building, and poor quality project delivery.

According to (Sohail & Cavill, 2008; CIOB 2013; Legae & Adeyemi, 2017; Owusu, 2019) conclude that corruption with respect to delivery of construction projects happens or manifest in various forms which include: payments of bribes in order to gain advantage over others (that is bribery), (theft through misrepresentation of facts or false misrepresentation or concealment of facts for commercial gains (fraud), misappropriation of project funds for selfish gain or political gains (embezzlement), sweeteners or rewards for favourable decisions or illicit economic incentive or reward (kickbacks), unauthorized alteration of written documents or falsification of information in order to harm other people for personal gain (forgery), and finally, having of material benefits or obtaining of money from somebody by the use of illegal means (extortion) and these are forms of corrupt practices which manifest in construction project delivery.

1.2 Problem Statement

According to Uwak (2016), it is essential to note that corrupt practices or corruption with respect to construction project delivery results from embezzlement of public funds for personal gain, diversion of public fund for commercial purposes and also giving of bribes in order to win or obtain contract award especially in public offices. Most importantly, corrupt practices can also result to backward development of a Country whereby people occupying big and influential positions

usually misuse it with respect to their own personal gain and to accumulate wealth instead of call to service delivery. Ayodele in his own point of view in (2011), concludes that personal greed, issues of poverty, god-fatherism with respect of contract award, unethical behavior by various professionals in the construction industries in Nigeria and also profit maximization by various contractors are actually the root causes of corrupt practices with respect of delivery of construction projects in Nigeria.

According to (Sohail & Cavill, 2008; CIOB 2013; Legae & Adeyemi, 2017; Owusu, 2019) conclude that corruption with respect to delivery of construction projects happens or manifest in various forms which include: payments of bribes in order to gain advantage over others (that is bribery), (theft through misrepresentation of facts or false misrepresentation or concealment of facts for commercial gains (fraud), misappropriation of project funds for selfish gain or political gains (embezzlement), sweeteners or rewards for favourable decisions or illicit economic incentive or reward (kickbacks), unauthorized alteration of written documents or falsification of information in order to harm other people for personal gain (forgery), and finally, having of material benefits or obtaining of money from somebody by the use of illegal means (extortion) and these are forms of corrupt practices which manifest in construction project delivery.

The construction sector in particular has been described as an inherently dishonest industry (Transparency International 2005, 2011, 2013) and corrupt practices occur at all stakeholder levels and phases of project development (Brown & Skitmore 2015; de Jong et al. 2009; Shakantu, 2006). These malpractices include fraud, fronting, bribery, kickbacks, conflict of interest, collusion and bid-rigging, nepotism and other unfair/ unethical conducts (Brown & Skitmore 2015; Le et al. 2014;

Bowen et al. 2012; Tabish & Jha 2011; Zarkada-Fraser & Skitmore 2000; Sohail & Cavill 2008). The repercussions of corruption include stifled economic development, absence of competition in prices and quality and poor workmanship (Sohail & Cavill, 2008; Uneke 2010). The industry's susceptibility to corruption is attributed to its inherently idiosyncratic characteristics such as: the size, uniqueness and complexity of constructed products; lengthy and sophisticated construction processes; fragmented structure with multiple contractual relationships; adversarial culture; and poor professional ethical standards (Sohail & Cavill 2008; Transparency International 2013; Shan et al. 2015).

However, it is important to know that corruption or corrupt practices in Nigerian public and private sectors procurement processes results to the issues of lack of probity and integrity, inappropriate political interference or control, problem of accountability and transparency, problem of auditing and the problem of weak professionalism of bureaucracy. In order to unravel these problem of corrupt practices in the delivery of construction projects, ICT as one of the electronic procurement tools and techniques can be used as a gate way in reducing corrupt practices and enhancing better governance (Bertot, Jaeger & Grimes, 2010). However, the implementation of e-procurement will provide a smooth process thereby identifying corrupt practices using e-procurement tools and techniques and also providing preventive measures in mitigating corrupt practices in order to enhance effective and efficient procurement processes for a successful delivery of construction projects. To this end therefore, it is essential to examine the implementation of electronic procurement in mitigating corrupt practices in construction project delivery.

1.3 Aim

The aim of this study is to examine the implementation of e-procurement in mitigating corrupt practices in construction project delivery in Rivers State with a view to achieve efficiency.

The objectives are:

1. To examine the factors precipitating corrupt practices in construction project delivery.
2. To assess E-procurement tools and techniques used in mitigating corrupt practices in the delivery of construction projects.
3. To evolve measures for mitigating corrupt practices in construction project delivery.

1.4 Research Questions

This work is set to answer the following questions:

1. What are the factors precipitating corrupt practices in construction project delivery?
2. What are the E-procurement tools and techniques used in mitigating corrupt practices in the delivery of construction projects?
3. What are the measures for mitigating corrupt practices in construction project delivery?

1.5 Justification of the Study

This work, implementation of E-procurement in mitigating corrupt practices in construction project delivery in Rivers State, will assist both public and private sectors with respect to award of various contract which will enhance a successful project delivery. Tsuma and Kanda (2017) studied the factors affecting the adoption of e-procurement systems among international NGOs in Kenya. The study adopted

factor analysis to analyze factors affecting the adoption of e-procurement systems among international NGOs in Kenya. This research based its objectives on four procurement related factors on e-procurement; organization factors, innovation related factors, supply factors and strategic factors. The organizational factors influence e-procurement up to 82% of e-procurement, 93.5% the results indicated that innovation related factors influence the adoption of technology on procurement operations, 94% NGO managers find strategic factors to influence adoption of e-procurement among international NGOs and over 72% found the influence to be at great extent and even beyond.

The findings of this study will benefit the government sector, private sector and various stakeholders to acknowledge the importance of implementing electronic procurement in their various system and also in terms of contract award since it has proven in mitigating corrupt practices in the delivery of construction projects thereby ensuring transparency and integrity of procurement processes.

Scope of the Study

This work is carried out in Rivers State. This study examine factors precipitating corrupt practices in construction project delivery. This study also examines e-Procurement tools and techniques used in mitigating corrupt practices in the delivery of construction projects and examine measures used in mitigating corrupt practices in construction project delivery. With respect of the geographical scope, the study shall be limited to the construction industries in Portharcourt metropolis. Major target respondents for this study will professionals in both public and private sectors which include the project managers, architects, builders, civil engineers, quantity surveyors and the clients.

CHAPTER TWO

LITERATURE REVIEW

2.1 Conceptual Review

2.1.1 E-Procurement

Bausal (2013), defined electronic Procurement as the use of electronic communications and transaction process when buying supplies and services or conducting tendering for works. Tatsis (2006) also defined electronic Procurement as the integration, management, automation, optimization and enablement of an organization's procurement process, using electronic tools and technologies and web-based applications to enhance transparency, probity and integrity in procurement processes. There are electronic Procurement technologies and applications that are mainly in form of web-enabled/ supported software packages which enhances performance of specific procurement tasks or functions, network technologies used mainly for exchange of data and information among project participants in the construction industry. Nevertheless, e-procurement when fully implemented in both public and private sector in Nigeria, it will assist in mitigating corrupt practices by with respect of reducing degree face to face interaction among various stakeholders whose aim for kickback, fronting, fraud emanate but will help to improve transparency and integrity of procurement processes and thereby ensuring value for money.

2.1.2 Corruption

Hawkins (2013) adopted the definition of corruption as defined by Transparency International as "The abuse of entrusted power for private gains". It is vital to know that corrupt practices in public and private sectors procurement processes results to

issues such as lack integrity of procurement processes, problem of accountability, problem of political interference and auditing and lack of transparency.

Inuwa, (2015) made an observation that in Nigerian construction industry, most projects fail as a result of corrupt activities on the part of the professionals whom the management and responsibility rests on. In this work it is essential to know that corruption or corrupt practices results to abandonment of building projects, loss of life and properties, delaying in payment of workers or contractors salary, incessant collapse of buildings, subjecting workers to job insecurity and also poor quality project delivery. Corruption can also lead to backward development of a nation as people having influential position make use of it for their own private gain.

2.1.3 Forms of Corruption in Construction

2.1.3.1 Bribery

Bribery as the name implies deals with the speed and grease of money (payments), gifts and gratuities, hospitality and the use of intermediaries (Gordon & Miyake, 2001; Amundsen, 2000). Bribery in terms of construction of project results to abandonment of project whereby so many contractors in the construction site try to cut corners especially when the contract is given to them by their close relation that is in political power.

2.1.3.2 Fraud

Fraud is seen as an acts such as swindle, trickery, misinformation or deceit (Tabish & Jha 2011; Vee & Skitmore 2003). It is also known as false misrepresentation or concealment of facts for commercial gain (United Nations, 2006). With respect to construction of project, it is as a result of greed, poverty, and incompetent in construction work in order to embezzle money meant for construction work which

can lead to the use of inferior material which can lead to the collapse of building on or after completion.

2.1.3.3 Kickbacks

Kickbacks is defined as illicit economic reward which is gotten for a favourable decision from a person in a position of power, for example, in contractor selection (Aluutu, 2007; Sohail & Cavil 2008; Osei-Tutu 2010). It is important to note that kickbacks inflate the cost of construction but rarely the quality (Aluutu, 2007). In terms of construction work, it brings about setbacks during construction of project because of the element of favoritism, tribalism, nepotism from top official in government thereby reducing the quality of the construction work by not following the clause in the contractual document.

2.1.3.4 Collusive Tendering and Bid-Rigging

This is defined as a “secret agreement between two or more parties for a fraudulent” reason (Le et al. 2014). Collusive tendering results to the compensation of unsuccessful bidders, cover pricing, hidden fees and bid cutting (Chotibhongs & Arditi 2012; Dorée, 2004; Bowen. 2007a; Zarkada & Skitmore 2000; Bajari 2001). During construction, the tenderer who have been chosen to do the work may cause a lot of errors during delivery of the contract because he/she is not qualified to handle the work and the major reason of taking the contract is to embezzle the funds for the project for his own selfish gain which also result in delay or none payment of wages to the laborers in the site.

2.1.3.5 Embezzlement

Embezzlement deals with when an official of government intentionally in its capacity misappropriate project fund for his own selfish gain or benefit (Hartley 2009). Embezzlement of project funds can lead to problem of non-payment of

workers or contractors salary, poor project quality delivery and abandonment of project. During construction, it can make the worker to work below standard and when there is irregularities in payment, it can also result in workers looting material on site causing delay in the delivery of the project on time.

2.1.3.6 Conflict of Interest

Conflict of interest is defined as a clash between the interest of the client organization and personal interest of the client organization's official (United Nations, 2006). Conflict of interest with respect to construction work, result in one individual having selfish interest which can result in long span of a construction work and can also cause abandonment of the project.

2.1.3.7 Fronting

Fronting happens when an official of government or client organization intentionally form a front company for himself in order to win or obtain a construction contracts. Fronting in terms of construction result to other contracting firm not following the due processes with respect to what is stipulated in the contract document thereby executing the project in what they have on ground in order to maximize profit for themselves and causing much delays in the execution of the contract.

2.1.4 E-Procurement and mitigation of Corruption in Public Sector

It is important to note that unethical practices in the public procurement processes have resulted to an issues which ranges from problem of transparency, problem of probity and integrity of procurement processes, problem of accountability, problem of political control or interference, problem of auditing, problem of personal greed and also the problem of weak professionalism in bureaucracy. Bertot, Jaeger and Grimes (2010) pointed out that information and communication technology (ICT)

which is one of e-procurement tools and techniques can play an important role mitigating corrupt practices which provides good governance. However, developed countries like Mexico and Korea is among those countries that have fully implemented e-procurement to bring about new innovation in order to enhance transparency during public procurement processes. E-procurement implementation will aid in eliminating kickbacks, fronting, conflict of interest, bribery, fraud, embezzlement, collusive tendering and bid rigging, favoritism in contract award, tribalism, an unethical behaviours by various professional, sole source contracting and many more.

2.1.5 Benefits Enjoyed by the Implementation of E-procurement

2.1.5.1 Cost Saving

Cost saving is one of the benefits enjoyed when e-procurement is implemented whereby helping various organizations to reduce cost like up to 75% with the use of electronic procurement such as costs of labour, purchasing of materials and good price from supplier (Davila, 2003).

2.1.5.2 Process Efficiency

E-procurement implementation will help various organization in terms of spend analysis, transaction analysis, market analysis, which provides smooth running of the organization and in terms of procurement processes and thereby adding value for money.

2.1.5.3 Better Information Flow Between a Firm and Suppliers

In respect of electronic procurement implementation, it have helped so many organizations and firms with the aid of the internet and computers of various size which permits firms and their supplier to distribute information in a very short time

bases and allows both the parties to respond to each other immediately without any interference from any body which enhances transparency(Quayle, 2005) .

2.1.5.4 Reduced Maverick Spending

This is another benefit enjoyed by e-procurement implementation which assist in removing the element of insecurity in terms of using the internet which brings about smooth process during purchasing of goods and services and restore the relationship between various organization without fear or favour and this will ensure equity and fairness in terms of e-procurement processes (Quayle, 2005).

2.1.5.5 Streamlined Process

E-Procurement implementation helps organizations to streamline the procurement process in which internet medium allows firms to make a direct contact with their various suppliers thereby eliminating the element of middlemen and better revenue is been generated for both the parties and this will help to eliminate the atom of conflict of interest (Ross, 2007).

2.1.5.6 Better Inventory Level

Implementation of electronic procurement will help various organization not to cut corners because there will be a system check of placed orders hence there will be less chances of duplication or orders, reducing corruption in procurement processes.

2.1.5.7 Better Services to Customers

E-procurement implementation provides good services to various customers and these customers can in one way or the other will be given the opportunity to be connected direct to the organization which bring about unity and better customer satisfaction.

2.1.5.8 Improved Speed of Services to Customers

Using the internet, provides greater speed of information exchange between different organization this will help to improve collaboration and managerial effectiveness.

2.1.6 Public Procurement

Public Procurement deals with process of efficiently, effectively, and economically purchasing goods, services, works by government officials to gain more value for money, thereby ensuring transparency, accountability, equality and integrity in all procurement processes. This process also deals with leasing, purchasing goods and services, hiring and other means of contract involving the supplier in providing public services (Ngatia & Kenyatta, 2016).

Basheka and Kabatereine, (2013) concludes that, a better procurement is one which is abstain from corrupt practices and which is based on well known procurement practices which enhances transparency, competency, value for money, and most importantly better delivery of service for effectiveness and efficiency. However, the major objectives of public procurement are: to promote transparency and openness in public procurement, to promote economic efficiency which promote efficiency in public procurement and to promote equity and fairness in public procurement processes.

2.1.7 Challenges with E-Procurement Implementation

Hawking (2004), outlined some of the challenges with respect to the implementation electronic procurement which are ; lack of supplier electronic procurement solutions challenges, high cost of technology challenges, lack of a legal framework challenges, lack of technical expertise challenges and lack of electronic procurement knowledge challenges. Ibem and Laryea (2015), in his own

point of view also pinpointed another challenges facing electronic procurement implementation with respect of construction electronic procurement processes which are: unreliable and unequal access to IT infrastructure challenges; cultural challenges and security issues challenges, and also limited understanding of how electronic procurement systems work amongst industry stakeholders. With respect of all these challenges of electronic procurement, if it can be conveniently taken proper care of, both public and private sector construction industries will definitely enjoy value of electronic procurement which will enhance probity and integrity of procurement processes.

2.1.8 Factors Precipitating Corrupt Practices in Construction Project Delivery

Table 2.1.9.1

| S/N | FACTORS | SOURCES |
|------------|---|--|
| 1 | Absence of efficient and responsible administrative systems | Hartley (2009); Shant et al (2016). |
| 2 | Absence of control mechanism | Browen et al (2012); Stansbury (2009). |
| 3 | Absence of project anti-corruption systems | Shan et al.(2016), Boyd and Padilla (2009). |
| 4 | Asymmetric information amongst project parties | Porter (1993), shant et al(2016) |
| 5 | Close relationships | Le etal.(2014); Boyd and Pidilla(2009);Krishman (2009);Shant et al.(2016). |
| 6 | Complex contractual structure | Shan et al.(2016); Porter (1993). |
| 7 | Complexities of institutional roles and | Porter(1993), Hartley (2009). |

| | | |
|----|---|---|
| | functions | |
| 8 | Complexity of the projects | Boyd and Padilla(2009). |
| 9 | Deficiencies in rules and laws | Hartley (2009); Sohail and Cavill (2008); Shan et al.(2016). |
| 10 | Delaying the payment of workers' salaries | Leetal.(2014);Stansbury(2009). |
| 11 | Deregulation in the public construction | Boyd and Padilla(2009). |
| 12 | Feeble semblance of public interest | Stansbury (2009),Porter (1993). |
| 13 | Fierce competition in tendering process | Porter (1993); King et al.(2008); Locatelli et al. (2016). |
| 14 | Flawed regulation system | Boyd and Padilla(2009); Moodley et al.(2008); King et al.(2008), King et al.(2008). |
| 15 | Inadequate sanctions | Boyd and Padilla(2009); Moodley, King et al.(2008) et al.(2008); P = King et al.(2008). |
| 16 | Inappropriate political interference | Hartley (2009); Porter (1993). |
| 17 | Insufficient legal punishments and penalties | Sohail and Cavill (2008). |
| 18 | Insufficient transparency in the selection criteria for tenderers | Porter (1993); King et al.(2008). |
| 19 | Lack of coordination among | Fan and Fox (2009). |

| | | |
|----|--|---|
| | Government departments | |
| 20 | Lack of legal awareness | Fan and Fox (2009); Bowen et al.(2012). |
| 21 | Lack of pro-active steps by financiers to limit corruption on projects | Tanzi (1998); Stansbury (2009). |
| 22 | Lack of rigorous supervision | Boyd and Padilla(2009); Gunduz and O'nder (2013); Shan et al.(2016). |
| 23 | Lack of standardized execution in construction projects | Bowen et al. (2012); Tabish (2011). |
| 24 | Low wage level | Boyd and Padilla(2009); Shan et al.(2016). |
| 25 | Misrepresentation of qualifications | Locatelli et al. (2016); Porter (1993). |
| 26 | Monopoly | Shan et al.(2015); Bowen et al (2012). |
| 27 | Nature of infrastructure projects | Shan et al.(2016), Porter (1993). |
| 28 | Negative industrial and working conditions | Boyd and Padilla(2009); Gunduz and O'nder (2013); Moodley et al.(2008). |
| 29 | Negative role models | Boyd and Padilla(2009); Gunduz and O'nder (2013); Shan et al.(2016). |
| 30 | Personal greed | Porter (1993); Moodley et |

| | | |
|----|---|---|
| | | al.(2008); King et al.(2008). |
| 31 | Poor documentation of records | Fan and Fox (2009). |
| 32 | Poor professional ethical standard | Zhang et al.(2017); Brown and Loosemore (2015); Le et al. (2014). |
| 33 | Privacy of corruption activity | King et al.(2008). |
| 34 | Subjecting workers to job insecurity | Shan et al.(2015); Moodley et al.(2008). |
| 35 | Transition of governments | Shan et al.(2015) ;Hartley (2009). |
| 36 | Weak procurement / contractual structures | Moodley et al.(2008); Zarkada-Fraser and Skitmore (2000). |

Source: (Authors Compilation, 2023).

2.1.9.1 Absence of Efficient and Responsible Administrative Systems

This is one of the factors precipitating corrupt practices in construction project delivery which affects the efficient of public procurement processes and administrative system as a result of bribe, negligence of duties by bureaucrats, lack of efficiency, unnecessary interventions, nepotism, hence instituting corrupt practices thereby hindering effective and efficient delivery of construction projects, (Hartley, (2009); Shant et al.2016).

2.1.9.2 Absence of Control Mechanism

The absence of control mechanism is another factors causing corruption in the delivery of construction projects as a result of the absence of control behavior within a process or system. As a result, inadequate control can cause owner higher risk or poor performance with respect of project delivery resulting to corrupt practice, (Browen et al (2012); Stansbury, 2009).

2.1.9.3 Absence of Project Anti-Corruption Systems

As a result of the absence of project anti-corruption system such as e-procurement tools like Information Communication Technology (ICT), Internet based tools etc, which is used to mitigate corrupt practices, it results to higher tendency of corruption during construction project delivery, (Shan et al, 2016), Boyd & Padilla, 2009).

2.1.9.4 Asymmetric Information Amongst Project Parties

Asymmetric information refers to a situation in which a contractual agreement or economic transaction where the two parties involved have disproportionate information. As one of the factors precipitating corruption, it involve when one party has greater information and material knowledge than the other party in a contract thereby cutting corner which can result in high rate of corruption in procurement process, (Porter, 1993), Shant et al 2016).

2.1.9.5 Close Relationships

This is major factor precipitating corrupt practices in construction project delivery in which a contract is been given to a family member who is not competent enough or qualified to handle a project which He or She may embezzle the money that is given for the contract and this result to construction project to suffer from poor performance in term of time delay, cost overrun and quality defects. (Le etal, 2014); Boyd & Pidilla,2009); Krishman ,2009); Shant et al, 2016).

2.1.9.6 Complex Contractual Structures

Complex contractual structure is another factor causing corruption. Complex contract are written agreement between two or more parties that are legally binding but with the added complexity of competing priorities such as financial target, support capabilities and delivery schedules. Complex contractual structures leads to

low labour and inefficient of equipment, issues arising from procurement, defective construction work etc and as a result , causing corruption in the delivery of construction projects, (Shan et al.,2016); Porter, 1993).

2.1.9.7 Complexities of Institutional Roles and Functions

This deals with the situation in which organizations confront incompatible prescriptions from multiple institutional logics that provide guideline or how to interpret and function in social situations. As a result of these complexities of institutional roles, it result to high tendency of corruption during construction project delivery, (Porter,1993), Hartley, 2009).

2.1.9.8 Complexity of the Projects

Complexity influence project planning and control increasing the rate of corrupt practices. It also hinder the clear identification of goals and objectives, it can affect the selection of an appropriate project organization form and can even affect project outcome, (Boyd & Padilla, 2009).

2.1.9.9 Deficiencies in Rules and Laws

Deficiencies of rules and laws is another factor precipitating corruption in construction project delivery which leads to improperly designed materials, poor workmanship and failure to follow construction code. (Hartley, 2009); Sohail & Cavill, 2008); Shan et al., 2016).

2.1.9.10 Delaying the Payment of Workers' Salaries

This is as a result of unrealistic cash flow, error in claims, poor financial problem and disagreement on valuation of work. It also affect the progress and schedule of work and lead to cost overrun and extension of time. Clients disagreeing on the valuation of work done. As a result of this, corruption occurs, (Leetal., 2014); Stansbury, 2009).

2.1.9.11 Deregulation in the Public Construction

Deregulation as one of factors precipitating corrupt practices in construction project delivery is the reduction or elimination of government power in a particular industry, which is established to create more competition among various professionals within the industry whereby some of the professional try to cut corners. This deregulation in the public construction causes corrupt practices, (Boyd & Padilla , 2009).

2.1.9.12 Feeble Semblance of Public Interest

This entail that when someone is weak or not strong enough to endure strain, pressure, or strenuous effort. When some one is not strong enough to manage or execute a contract it will result to corrupt practice which in turn hamper delivery of construction projects, (Stansbury ,2009), Porter, 1993).

2.1.9.13 Fierce Competition in Tendering Process

This is another factor precipitating corrupt practices in delivery of construction project which result to the issue of inability to provide a complete data base of contractors with their personnel, past works and experiences and performance evaluation. These result to the use of cheaper, poor quality materials and labour during construction project delivery, (Porter ,1993); King et al.,2008); Locatelli et al., 2016).

2.1.9.14 Flawed Regulation System

This is another factor causing corruption in the delivery of construction projects in which there is the tendency of errors in the management of complex systems according to a set of rules that exist in various fields, (Boyd & Padilla ,2009); Moodley et al.,2008); King et al.,2008), King et al.,2008).

2.1.9.15 Inadequate Sanctions

Inadequate sanction is also another factor causing corruption in construction project delivery as a result of tribalism, godfatherism, close relationship, collecting of bribe from top official resulting inadequate penalty which constitutes corruption with respect delivery of construction projects, (Boyd & Padilla, 2009); Moodley, King et al., 2008) et al.,2008); King et al., 2008).

2.1.9.16 Inappropriate Political Interference

This is another factors precipitating corrupt practices in construction project delivery in which one of the political leader or one occupying influential position in government intentionally interfere in terms of the planning, making of decision, organizing of works, budgeting and also in the allocation and use of public funds thereby precipitating corrupt practices during procurement processes. It also deals with the act of trying to change or have influence on things that are not your responsibility, especially by criticizing in a damaging way which will lead to maladministration , abuse of power, improper conduct, inexcusable delay, poor service delivery and lack of commitment among public staff, (Hartley, ,2009); Porter 1993).

2.1.9.17 Insufficient Legal Punishments and Penalties

This is another factors precipitating corrupt practices in the construction project delivery in which when an individual or a contractor is unable to execute a contract at the stipulated time in which by law he has violated the terms and conditions in the contract document and the punishment and penalty given was not sufficient enough and as result causing corrupt practices during construction project delivery, (Sohail & Cavill ,2008).

2.1.9.18 Insufficient Transparency in the Selection Criteria Tenderers

This is another factor causing corruption in construction project delivery in which the criteria and the process of selecting competent and qualified tenderers for the award contract in terms of decision making which is not sufficient enough as a result of corrupt practices whereby resulting favouritism, nepotism, tribalism etc, and the atom of transparency become insufficient, (Porter, 1993); King et al. 2008).

2.1.9.19 Lack of Coordination among Government Departments

This is another factor precipitating corrupt practices in the delivery of construction projects as a result of lack of information among various workers within the organization and other departments which can results also an organization spending unnecessary time and efforts in manufacturing the same kinds of products and this causes corruption in the delivery of construction projects. (Fan &Fox, 2009).

2.1.9.20 Lack of Legal Awareness

Lack of legal awareness constitute corrupt practices whereby without legal literacy people get intimidated and these gives the opportunity for corrupt practices and can also result to abandonment of project and embezzlement of project funds, Fan and Fox (2009); Bowen et al.(2012).

2.1.9.21 Lack of Pro-Active Steps by Financers to Limit Corruption Projects

This result to the inability of financiers to take all the necessary measure and steps in acting in anticipation of future problem, needs or changes during procurement processes of project thereby enhancing corruption on projects, (Stansbury, 2009).

2.1.9.22 Lack of Rigorous Supervision

This is also one of the factors precipitating corrupt practices with respect to delivery of construction projects as having either direct or indirect effect on the recorded occurrences which could be understood as contributing to an ineffective safety culture because a supervisor trying to cut corners during construction project delivery and when there is lack of supervision there is the tendency of potentially increase accident occurrence rate, (Boyd & Padilla, 2009); Gunduz & O'nder, 2013); Shan et al., 2016).

2.1.9.23 Lack of Standardized Execution in Construction Projects

Corruption occurs as a result of lack of extensive use of processes or procedures for a successful execution of project. For a project to called a project all the contractual terms and clauses must be put into consideration and the work done must be standard and because of poverty, greed, bribery, it brings about lack of standardized execution in construction of projects, Bowen et al., 2012); Tabish, 2011).

2.1.9.24 Low Wage Level

Low wage level is among the factors causing corrupt practices in the delivery of project whereby high levels of corruption leading to low wages in the public sector and increase in the wages of public servants can encourage corruption if public sector wages are highly unequal, (Boyd & Padilla(2009); Shan et al., 2016).

2.1.9.25 Misrepresentation of Qualifications

This involves falsifying or exaggerating details during the application process in order to get a contract at all means. For example, claiming to have degree that is required for the job role or offering the grade achieved in line with the

requirement which causes corrupt practices because when contract is given to contractor who is not competent enough to handle the project, there is every tendency of corruption in terms of construction project delivery, (Locatelli et al., 2016); Porter, 1993).

2.1.9.26 Monopoly

This is one of the structural causes of corruption, due to their size and inefficiency in market structure which exists when there is a single firm that controls the entire market it result to corruption, Shan et al.(2015); Bowen et al, 2012).

2.1.9.27 Nature of Infrastructure Projects

Nature of infrastructure is one of the factor precipitating corruption in construction project delivery. In the nature of infrastructure project, there are several factors that contributes to poor infrastructure and they include lack of or shortage of funds, lead to the tendency of corrupt practices emanating resulting to abandonment of project, (Shan et al.2016), Porter, 1993).

2.1.9.28 Negative Industrial and Working Conditions

This is another factor precipitating corrupt practices in construction project delivery whereby workers or employee are not provided good accommodation and these can expose them to danger and many risk that can result to loss of life etc. (Boyd , 2009); Gunduz & O'nder, 2013); Moodley et al., 2008).

2.1.9.29 Negative Role Models

This is one of the factors of corrupt practices whereby a contractors becomes unfriendly, uncooperative, and like to complain about anything and everything which could be a strategy to withheld workers salary and causing so much delay in the project which has a time frame, (Boyd & Padilla,2009); Gunduz &

O'nder, 2013); Shan et al., 2016).

2.1.9.30 Personal Greed

This is major contributing factors precipitating corrupt practices during delivery of construction projects. These deals with a selfish and excessive desire for more of something (such as money) and this could be as a result of poverty thereby using it as a means of embezzlement which could cause abandonment of construction work. Greed is mostly likely to cause a project to fail during the shaping and development phase of the projects as a result of cutting corners, (Porter, 1993); Moodley et al., 2008); King et al.,2008).

2.1.9.31 Poor Documentation of Records

Poor documentation of records result to construction process inefficiency, leading directly to delays, rework an variations and contributing to increases in project time and cost for both client and contractors alike, (Fan & Fox, 2009).

2.1.9.32 Poor Professional Ethical Standard

This is another factor causing corruption in construction project delivery in which regrettably, there are many contractors who are unethical but equally, there are many client who also engage in unethical practices and who do not pay contractors the monies they are due for and when there is poor professional ethical standard in trust and causing the construction project to suffer, (Zhang et al., 2017); Brown & Loosemore, 2015); Le et al., 2014).

2.1.9.33 Privacy of Corruption Activity

The privacy of corruption activity affects the entire supply chain , as it distorts markets, undermine competition and increases costs to firms, It prevent a fair and efficient of private sector, reduces the quality of products and services and also involve many activities which include bribery, influence peddling and

embezzlement, (King et al., 2008).

2.1.9.34 Subjecting Workers to Job Insecurity

This is another critical factor causing corruption in construction project delivery whereby job insecurity causes employees to lose their sense of belonging and loyalty to a firm, which results in emotional loss and it also results in poor performance, (Shan et al., 2015); Moodley et al., 2008).

2.1.9.35 Transition of Governments

This is another factor causing corruption for example when there is a transition of government most contractors see it as an opportunity to cut corners or to embezzle part of the funds given to them resulting in corrupt practices, (Shan et al., 2015); Hartley, 2009).

2.1.9.36 Weak Procurement/Contractual Structures

Procurement which is the acquisition or purchase of goods and services is a crucial institutional process and measure for the functioning of government, regarding service delivery. If there are weak procurement or contractual structures it will in turn cause corrupt practices and there will be no proper supervision by various professionals with respect to procurement processes, (Moodley et al., 2008); Zarkada-Fraser & Skitmore, 2000).

2.1.10 E-Procurement Tools and Techniques Used in Mitigation of Corrupt Practices in Construction Projects Delivery.

There are several tools and techniques which fall under e-procurement some of them according to (Buyse, 2015) are as follows:

2.1.10.1 Electronic Data Interchange System (EDI)

Procurement messages are exchanged between computers of two separate organizations especially for only procurement functions. Messages are usually

exchange batch by batch and can be easily transmitted and stored in the computer permanently. (Buyse, 2015). Furthermore, electronic data interchange system (EDI) as one of the e-procurement tools helps with respect of mitigating corrupt practices in construction project delivery in which during procurement processes, electronic data interchange system (EDI) helps to eliminate the element of face to face procurement message exchange between individual who tends to manipulate procurement processes in their favour which results to corruption. Conversely, EDI as an e-procurement tools will immensely aid both the public and private sectors if implemented whereby enhancing the dissemination of information electronically between two or more organization in terms of procurement processes and also ensure that messages are stored for future use or reference thereby curbing corrupt practices.

2.1.10.2 Web-Based Enterprise Resource Planning

It has separate modules to handle the procurement function. Enterprise resource planning system includes core software components such as customer relationship management, finance, supply chain management, finance and accounting, human resources and more. (Mahdillou & Akbary 2014). Web-based enterprise resource planning is another e-procurement tools used in mitigating corrupt practices in construction project delivery in which with the use of ERP it helps in facilitating procurement process in terms of purchasing of products and ensure that the receipt are received electronically without wasting transportation to purchase the product and making physical payment. Prior to this time most transaction and procurement process are done on traditional paper-based procurement processes which makes it possible for most contractors or client to cut corner by changing the values of product and changing their receipt resulting to corruption. Enterprise resource

planning have contributed immensely in mitigating corrupt practices in the delivery of construction projects whereby every financial transaction, accounting processes and supply chain management are done online which help to eradicate corruption ensuring transparency and accountability with respect to procurement activities, (Koorn et al., 2001).

2.1.10.3 Internet Based Tools

Internet based tools is another e-procurement tool used in mitigating corrupt practices in the delivery of construction projects in which internet based tools have eliminated the means of tendering by various companies whereby the submission of hard copies of tender document which could result to favouritism in terms of award of contracts to any tenderer as result of tribalism, nepotism and god-fatherism causing corruption but when internet based tools is implemented in all various construction industry in the country it will assist in e-procurement processes and also help for competitive tendering enhancing transparency and selecting the best tenderer for the contract award when done electronically thereby fighting against corruption in delivery of construction processes,(Buyse, 2015).

2.1.10.4 E-Sourcing Tools

It is a means of obtaining bids from different suppliers via a single online portal.(Buyse, 2015). Conversely, E-sourcing tools helps in the mitigating corrupt practices in the delivery of construction projects by creating a request for information electronically, creating a request for quotation, evaluating the quotations, setting up an e-auction and awarding the contract accurately without any error thereby eliminating human interference in terms of changing the quotation manually which aids in mitigating corrupt practices during construction project delivery, (Chikwe & Obi, 2016).

2.1.10.5 E-Ordering Tools/E-Maintenance Repair Operate (MRO)

E-ordering tool is used in the procurement of office supplies and services; it is accessible by all employees within the organization and is mainly used for ad-hoc purchases. (Koorn et al., 2001). E-ordering tool as one of the e-procurement tool which is used in mitigating corrupt practices in construction project delivery in that it assist electronically and makes ad-hoc purchase within an organization very easy, fast, reliable and simple for procurement of office supply and service thereby curbing corrupt practices which helps in terms of competitive advantage in any organizations.

2.1.10.6 E-Tendering Tools

E-tendering tools is as one of the e-procurement tools used in mitigating corrupt practices in the delivery of construction projects is used to send out tenders with procurement requirements, supply schedule, contracting terms, etc. It includes two sub-phases: e-Access and e-Submission. Nevertheless, e-tendering is one of the most essential e-procurement tools which aid in the mitigating corrupt practices during construction project delivery because it enables organization to choose qualified contractors and it is a paperless transaction with well-organized steps to complete and includes online centralized document repository for procurement and takes a break from traditional paperwork, free from tendering process that requires publishing tender notice in the newspaper in which organizations can have higher cost savings, offers a quick and transparent collaboration with suppliers resulting in visibility of every activity in the procurement process and helps increase efficiency, (Calipinar & Soysal, 2012).

2.1.10.7 E-Auctioning Tools

E-auctioning tool is another e-procurement tools used in mitigating corrupt practices in construction project delivery in that as an online tool, it assist to facilitate and speed up the negotiation process, and award contract to the best lowest bidder (within a set time) wins and thereby eradicating corruption, and thereby ensuring equity and equality in procurement processes (Nawi et al, 2017).

2.1.10.8 E-Submission Tools

Electronic submission tool are standard tool used in mitigating corrupt practices in construction project delivery which is used for submitting transnational proposals to joint calls, (Buyse, 2015). This is another e-procurement tools used in mitigating corrupt practices in construction project delivery in which it helps in the monitoring of project construction work, evaluating the progress of work done periodically and upload proposal for contract work electronically eliminating any political interference in the process.

2.1.10.9 E-Noticing Tools

E-noticing tool is another-procurement tools used in mitigating corruption in the delivery of project which aids in the electronic notification call for tender in the relevant official journal and notifying tenderers in terms of the contract award eliminating favoritism, tribalism and nepotism with respect to contract award.

2.1.10.10 E-Awarding Tools

E-awarding tools as one of the e-procurement tools used in mitigating corruption in the delivery of construction project is used in awarding contract to the best bidder and they can be evaluated in terms of the lowest price or economic advantages, (Buyse , 2015). In order to mitigate corrupt practices in the delivery of construction projects e-awarding tool is implemented which facilitates a fair and transparent

awarding of contract work to the right tenderer which is done electronically to avoid any form of manipulation in terms of selecting the best competent company for the award of contract.

2.1.10.11 The Procurement Workflow and Request Wizard Tools

The procurement workflow commences with requests, and leading e-procurement software provide a diverse array of request options. (Hartly, 2009). The procurement workflow and request wizard tools is another e-procurement tools used in the mitigating corrupt practices in the delivery of construction projects which helps to enhance checks and balances in the areas of requesting for bid process thereby promoting free and fair procurement processes and hindering bribery and corruption in the process.

2.1.10.12 ICT-Enabled Anti-Corruption Tools

The ICT-enabled anti-corruption tools is one vital e-procurement tools used in mitigating corrupt practices in construction project delivery in which it can reduce corrupt practices by promoting good governance, ensuring monitoring of project from inception of the project to the final completion of the project and thereby reducing potential for corrupt practices and unethical behaviours by various professionals in the construction industry, (Shim & Eom, 2008).

2.1.10.13 Intelligent Request Generation and Online Bid Advertisement Tools

This another electronic procurement tools and techniques used in mitigating corruption in delivery of construction projects. After a request proposal document has been formalized, bid are ready to be announced. They can be advertised publicly or by invite only – straight from the organization’s procurement and contract management software platform. (Buyse, 2015). When implemented, it assist in mitigating corrupt practices by helping organization to request accurate

document for bid for proper publication without any rigorous process thereby saving time and cost of manual preparation or waiting for public announcement.

2.1.10.14 Easy Vendor Awards Tools

This is another electronic procurement tools and techniques tools which is quite useful for bid management processes that permits organization to award several vendors for different aspect of a given bid, (Buyse, 2015). It is another e-procurement tools used in mitigating corrupt practices in the delivery of construction project by assisting an organization electronically to award different bid for vendors which makes it easy to select the best competent vendor for the award of contract without any interference thereby mitigating corrupt practices with respect construction project delivery.

2.1.10.15 Quick Contract Creation Tools

Once the award phase detailed above is finished, organization can begin the contract lifecycle process seamlessly, (Buyse, 2015). It helps in mitigating corrupt practices in construction project delivery by creating a new procurement record for already awarded contract for proper documentation in the case of accountability of the contract for future use.

2.1.11 Measures used in mitigating corrupt practices in construction project delivery.

2.1.11.1 Government commitment to open contracting

The government/agency should make a policy which will help to commit to transparency and accountability throughout the whole construction work and establishes a team and structure to action this. Furthermore, many government are moving to implement open government standards in respect of public procurement process, and particularly with respect to construction. With respect to government

commitment to open contracting is that government commits to much greater transparency in respect of all aspects of public infrastructure contracting and this will in turn mitigate corruption in construction project delivery, Pyman (2021).

2.1.11.2 Creating clarity in ministry organization structure and process

Creating clarity in the ministry organizational structures and process and in relevant agencies is another measures used in mitigating corrupt practices in construction project delivery. In most countries, a significant part of the construction and public works corrupt practices lie with ministry officials, both low level ones and at the most senior levels especially in public sector. Government officials can easily become corrupted in whole or in part, or at the least, tolerant of dubious behavior, Pyman and Kaakar (2018).

2.1.11.3 Requiring transparency of decision-making at senior levels.

This is another measures used in mitigating corrupt practices in construction project delivery in which confidence is built from knowing that it is possible for the senior decision-making process and result be scrutinized by others and the relevant ministers, plus the outside stakeholders all participate in real time decision-making on each of the large procurement processes and also they have opportunity to ask questions, Pyman (2021).

2.1.11.4 Establishing a formal integrity framework

Integrity approaches is seen as another measures used in mitigating corrupt practices-by improving the behaviours their staff instead of by compliance. Furthermore, the integrity framework is aimed at developing code of conduct which include: clear mission of the organization, its values and principles, clear definition of what constitutes a corruption risk, sanctions for integrity breaches and providing standards of conduct of elected and non-elected public officials, Pyman (2021).

2.1.11.5 Requiring clarity of project delivery structure modality

This is another measures used in mitigating corruption in construction project delivery. OECD (2016) gave a guidance in their integrity framework on the benefits of different sorts of project delivery structures for major government infrastructure delivery. ‘infrastructure projects constitutes for major mandate of governments in delivery of key public services and have high and direct implications on the country’s economic capacity, human development, social inclusion and environmental sustainability. Once a project is planned and financing schemes have been defined, it is critical that government deliver infrastructure projects in a cost-effective way that is trusted by users and citizens to fulfill their mandate, Pyman (2021).

2.1.11.6 Carrying out analysis of regular impact

Carrying out analysis for regular impact aid as a measure used in mitigating corrupt practices with respect of delivery of construction projects. The world economic forum has many good observations about how nations can strengthen themselves by way of policy measures in infrastructure sector in order to mitigate corruption by offering a centralized helpline for process information and frequently asked questions section online, setting-up a complete single portal for project clearance for all aspects of permits and licenses, centralize inspections, one single team visit for inspection, online submission of project proposals, online submission and automated clearance with review done by software, and online payment and receipt, Pyman (2021).

2.1.11.7 Active engagement with construction industry and with related professional bodies

There are much to be learnt from talking to the executives of large construction and infrastructure companies. The price waterhouse coopers 2014 report finds that 70% of all corruption related to their projects is caused by insiders within their companies; most of them senior management. In cases where companies have been exposed in large corruption scandals, one of the industry responses in mitigation, is established an advisory council of worthy people to advice the company on how to behave in the future and to enhance transparency, accountability, integrity in procurement processes, good standard and ethical behaviour.

2.1.11.8 Instituting construction works and processes supervision throughout the lifecycle of a project

This is a preventive and reactive measures commonly referred to as anti-corruption measure used in mitigating corrupt practices in delivery of construction project. According to Zou (2006), there is the urgent need to engage trained professional to be involve in the initiation, planning, implementation, performance and monitoring to monitor the project from the inception of the project work down to the completion of the project to ensure transparency and accountability in order to avoid abandonment of the project thereby mitigating corruption and although according to Zou (2006), it is a short term measure in mitigating corruption.

2.1.11.9 Involving civil society in project oversight

The immense complexity of major construction projects prompted many authorities to look at additional oversight of the specific project by civil society bodies as an additional check on corruption risk. Example include the new Berlin airport in 2005, (Olaya, 2010) and hydroelectric power plants in Mexico, Olaya (2010).

2.1.11.10 Developing of an ethical and honest construction culture

An ethical and honest construction culture is one of the measure used in mitigating corrupt practices in construction project delivery. In order to build an ethical culture, leaders must model the desired behavior and reward when employees display it. This can be accomplished through policies and procedure that reinforce what is expected, but also through why ethics are important at a (and beyond) work, and according to Zou (2006). It is a long-term measure used in mitigating corruption to ensure successful delivery of construction projects..

2.2 Theoretical Review

2.2.1 Institutional theory

Scott (2004) advances that institutes are consists of regulative elements and cultural cognitive comprised of regulative elements with associated activities and resources that give human significance. Institutional theory is relevant as it asserts that if organizations complied with the public procurement regulations then they would be assured of competition in bids, transparent processes, and professional approach in procurement process. In the implementation of e-procurement in mitigating corrupt practices in construction project delivery, this institutional theory will help with respect of transparency of procurement processes ,competitive advantage in terms of bids when e-procurement is implemented in order to reduce corrupt practices in delivery of construction projects.

2.2.2 Transaction cost theory

Transaction cost theory could serve as a good starting point for the analysis, which explains why certain tasks are performed by firms and others by markets (Holland, 2008). Transaction costs can be divided into coordination costs and transaction risk (Harrington, 201). Coordination costs are the direct costs of integrating decisions

between economic activities (such as search and bargaining costs). The use of information technology has facilitated the reduction of coordination costs, which has been extensively documented in the literature (Handfield, 2013). For example, electronic market places, facilitated through IT, reduce the cost of searching for obtaining information about product offerings and prices (Handfield, 2013). Also, collaboration facilitated by information sharing can lower transaction costs (in particular coordination costs) as companies can thereby reduce supply chain uncertainty and thus the cost of contracting). The transaction cost theory will help this current study on implementation of e-procurement in terms of reducing the cost of searching for obtaining information about product offerings and prices and therefore adding value for money in any transaction been done by any firm thereby mitigating corruption.

2.2.3 E -Technology perspective theory

E-procurement lacks an overarching definition and encompasses a wide range of business activities. For example, (Choi & Rungtusanatham, 2001), state that e-procurement remains a first generation concept aimed at buyers, which should progress into e-sourcing and ultimately into e-collaboration. E-collaboration allows customers and suppliers to increase coordination through the internet in terms of inventory management, demand management and production planning (Lee, 2003). Despite the fact that business-to-business (B2B) trade has enjoyed a quieter existence online than business-to-consumer (B2C) (Barratt & Rosdahl, 2002) the benefits of e-procurement in a B2B setting are significant (Min & Galle, 2001). Indeed it has been claimed that e- procurement has become the catalyst that allows companies to finally integrate their supply chains from end-to-end, from supplier to the end user, with shared pricing, availability and performance data that allows

buyers and suppliers to work to optimum and mutually beneficial prices and schedules (Morris, 2003). With respect of e-technology perspective theory, it will aid this study by enabling professionals in construction industry both public and private sector to see the need while e-procurement implementation is necessary in that it provide for easy accountability, transparency, auditing and enabling supply chain from end-to end, from supplier to the end user.

2.2.4 Disruptive innovation theory

Barahona and Elizondo (2012) discussed the theory of disruptive innovation. This theory points out that e-procurement is an innovation. As such it requires continual improvement. Because of such improvements, it disrupts the normal procurement operations and processes. The theory of disruptive innovation is characterized by: small and costly client base and non-attractiveness at the initial stages of implementation, some level of acceptance as the system is implemented, new competition as innovation continues and continuous quality improvement to improve adaptability to user and stakeholders needs. The theory of disruptive innovation recognizes the fact that public organizations and systems are less flexible. Therefore, the implementation of e-procurement strategies requires a strategic and proactive approach so as to build the system within the existing structures rather than implementation of completely new systems. Adequate preparation in terms of the right technology, leadership to foster change process, training of the employees and awareness campaign among users is critical. It is important to note that sometimes disruptive innovations may only work in the short run. In implementation of e-procurement in mitigating corrupt practices in construction project delivery, this disruptive innovation theory point out that if e-procurement is fully implemented by both private and public organizations it will

bring about good innovations which will foster great change and thereby reducing corruption during procurement processes.

2.2.5 Innovation diffusion theory

According to innovation diffusion theory, innovation is defined as an idea perceived as new by individuals. OECD (1997) cited by Andreeanne and Swaminathan (2007) defined innovation as all the scientific, technological, organizational, financial, and commercial activities necessary to create, implement, and market new or improved products or processes. According to innovation theory, rate of adoption of innovative strategies can be looked at in terms of; relative advantage given to the organization, compatibility, complexity, trial-ability of the new strategies and observability to the stakeholders within the social system. The second factor is communication that lays information and creating and sharing information relating to innovative initiatives in the organization. The third element is time that considers the duration involved in the innovation-decision process. The last element is the social context of the new systems (Rogers, 1997). They help build on the study and enable the researcher understand the expected relationship between the variables. While innovation diffusion theory brings understanding of the innovation process, it has a number of limitations. The theory does not foster a participatory approach. It is therefore only able to work best with adoption of behaviors. Lastly, the theory does not take into account an organization's resources and social support in adoption of new methods. In innovation diffusion theory in terms implementation of e-procurement in mitigating corrupt practice in construction project delivery will help the public sector and private sector in making good decision that will enhance the growth of the organization thereby eliminating corrupt practices in which each individuals working in the organization will abide to the rules guiding the

organization which results to transparency in order for the organization to achieve its objectives.

2.3 Empirical Review

The empirical review of this study will refer to various studies conducted by other scholars and researchers related to the project topic. This empirical review compares and aligns their assertion and findings with this research situation and topic. Adding to the structure and synthesizing the existing relevant and related research, this thesis identified as implementation of e-procurement in mitigating corrupt practices in construction project delivery. Vaidya, Sajeev and Callender (2006) conducted a study on Critical Factors that Influence e-procurement Implementation Success in the Public Sector. They found out that despite the efforts put by the governments through reforms towards adoption of e-procurement, adoption of e-procurement still remains a major challenge for many procurement functions. Factor analysis was used as analytical tools. The findings further revealed that successful implementation of e-procurement established systems and feedback mechanism. They associated e-procurement with improved procurement performance. Tsuma and Kanda (2017) studied the factors affecting the adoption of e-procurement systems among international NGOs in Kenya. The study adopted factor analysis to analyze factors affecting the adoption of e-procurement systems among international NGOs in Kenya. This research based its objectives on four procurement related factors on e-procurement; organization factors, innovation related factors, supply factors and strategic factors. The organizational factors influence e-procurement up to 82% of e-procurement, 93.5% the results indicated that innovation related factors influence the adoption of technology on procurement operations, 94% NGO managers find strategic factors to influence adoption of e-

procurement among international NGOs and over 72% found the influence to be at great extent and even beyond. Muchelule and Shalle (2017) conducted a research on the determinants of E-Procurement Adoption in the Kenyan Public Sector at Kakamega County. Both primary and secondary data was used for the study. The research study used a questionnaire as a key instrument for primary data collection. Qualitative data was analyzed through content analysis. Some of the determinants arising while responding to these technological changes include lack of employee competence and the legal framework. From the study, it was revealed that employee competency and the legal framework was a challenge to e-procurement adoption in the organizations under review. The study recommended that among others, due to continuous turnover of the employees', continuous training for the incoming staff was required on e-procurement.

2.3.1 Research Gaps

Vaidya, Sajeev and Callender (2006) conducted a study on Critical Factors that Influence e- procurement implementation Success in the Public Sector. The findings revealed that successful implementation of e-procurement established systems and feedback mechanism.

Tsuma and Kanda (2017) conducted a research on the factors affecting the adoption of E-Procurement systems among international NGOs in Kenya. In this study, E-Procurement implementation and mitigation of the corrupt practices are expected to provide a smooth process and ideas using the e-procurement tools for efficient and effective management of procurement processes and project team members to meet up with the best practices on how to evaluate the impact of E-Procurement implementation in mitigating corrupt practices in the delivery of

construction projects by public and private sector for the challenges faced in today's project as a result of corruption.

Implementation of e-procurement will help in identifying, analyzing the corrupt practices using e-procurement tools and techniques and to provide a preventive measure in mitigating the corrupt practices for efficient and effective delivery of construction projects in order to enhance performance which in turn hamper corruption. It may not be easy to implement e-procurement especially in public sectors considering differing culture traits, social interest and cognitive reasoning, self-esteemed ego, and background to enhance probity, transparency, accountability and integrity in procurement processes and in the delivery of construction projects.

CHAPTER THREE

METHODOLOGY

Methodology is the systematic collection and analysis of data in a research study. It also has to do with the research design, population of the study, source of data, sampling procedure and sample size, method of data collection and as well as method of data analysis. Below are the components of the methodology of this study.

3.1 Research Design

The research design constitutes the blueprint for collecting, measuring, and analyzing data. It is the plan and structure of investigation so conceived as to obtain answers to research questions (Creswell, 2012; Armstrong, 2018). The data was collected from the stakeholders, staff and management of construction projects and contracting firms executing various construction projects. The target respondents helped to capture the data needed to examine the factors precipitating corrupt practices in construction project delivery, identify e-procurement tools and techniques used in mitigating corrupt practices, and the measures used in mitigating corrupt practices in construction project delivery.

The research design method adopted for the study is the survey study/technique (Krueger, 1994; Kothari, 2004). The respondents include project managers, quantity surveyors, architects, civil engineers, and clients. They are found to possess technical skills, academic qualifications, and experience in managing construction projects.

3.2 Source of Data

The researcher conspicuously has minimal control over the element as it is survey research and, in a bid, gathering useful and reliable information, primary and

secondary sources of data collection were conceived and utilized. Journals, conferences/seminar papers and internet sources formed the major secondary sources of data. These were utilized in the review of existing literatures on e-procurement implementation in mitigating corrupt practices in construction project delivery.

3.3 Population of the Study

The target population of the study were professionals in public and private sector construction companies in PortHarcourt, Rivers State, Nigeria which include project managers, builders, architects, civil engineers, quantity surveyors, and clients/employers which formed the target population of this study .

The information from project managers, builders, architects, civil engineers, quantity surveyors, and clients/employers provide a total population of one hundred and fifty six (156) respondents.

3.4 Sample Size and Sampling Techniques

There is always a conspicuous between what is desirable and what is feasible; and this is called the sample size. Taro Yamane (1976) formula, at 0.05 finds an application in this study as was adopted in getting a sample size of one hundred and twelve (112). A judgmental and area sampling technique was adopted, which involves identifying population within a geographical area, conforming to criteria of high population density with a high concentration of construction projects and teams. This approach provides an unbiased estimate of population parameters. It is economical. More efficient with the lowest cost per sample and easy to carry out a population list.

Therefore, this study employed Taro Yamana formula in the selection of the sample size.

Taro Yamana Formula =

$$n = \frac{N}{1 + N(e)^2}$$

where ;

n = the sample size

N = the population size

e = the acceptable sampling error at 5% or 0.05

1 = 1 is a constant

$$n = \frac{156}{1 + 156(0.05)^2}$$

$$n = \frac{156}{1 + 156(0.0025)}$$

$$n = \frac{156}{1.39}$$

$$n = 112$$

Therefore, sample sizes $n_1, n_2, n_3, n_4, n_5,$ and n_6 of project managers, builders, architects, civil engineers, quantity surveyors, and clients/employers were 15, 10, 17, 25, 35, and 10 respectively. $n_1 + n_2 + n_3 + n_4 + n_5 + n_6 = 112$

3.5 Method of Data Collection

Oral interview and distribution of questionnaires constituted a benchmark for data gathering for the study. Preliminary studies unearthed the fact that matters relating to e-procurement implementation in mitigating corrupt practices in construction project delivery in Rivers State which are of more concerned to the construction project stakeholders who include inter alia: Project managers, architects, builders, civil engineers, quantity surveyors, and clients.

3.6 Procedures for the Administration of Research Instrument

The questionnaire which was designed into sections formed the research instrument used for the study. Section A establishes the demographic data of the respondents, section B, C, D and E of course were constructed to elicit response and generate data on the factors precipitating corrupt practices in construction project delivery, e-procurement tools and techniques used in mitigating corrupt practices. The structured questionnaire allows for easy interpretation of data and designed in five points Likert scale format in the order of (Strongly agree=5; Agree=4; Neutral=3; Disagree=2; and Strongly disagree=1) and also (Very satisfied=5; Somewhat satisfied=4; Neither Satisfied=3; Somewhat dissatisfied=2; and Very dissatisfied=1) and for measures used in mitigating corrupt practices in construction project delivery.

3.7 Data Analysis Methods and Procedures

The analytical frameworks employed is a descriptive analysis. First, the study used factor analysis tools to analyze each of the thirty six (36) factors precipitating corrupt practices in construction project delivery. The choice of using this tools is owing to the following reasons; to enable the reduction of the large identified variables and summarize it to represent them in different factors or components and

to investigate whether the variables are related to a number of unobservable factors; as this will be done by grouping variables based on inter-correlations among set of variables. A pilot study was done using the initial 36 factors, but after the pilot study, comments from professionals suggested that it should be pruned down to 23 factors precipitating corrupt practices in construction project delivery. Secondly, the study used mean item score (MIS) to examine e-procurement tools and Techniques used in mitigation of corrupt Practices in construction projects delivery. Lastly, the study made use of relative importance index to examine measures used in mitigating corrupt practices in construction projects. To this end, it made use of computer facilities for the analysis. A computer software called Statistical Package for Social Sciences (SPSS) version 25.0 was used to analyze the data.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Preview

In this chapter, the study firstly presents the results of the survey in the form descriptive statistics using tables, figures and charts as well as other statistic tools to arrive at the findings in the first instance. Secondly, the responses from the focused and targeted respondents on the subject matter are based on implementation of e-procurement in mitigating corrupt practices in construction project delivery. Out of 168 questionnaires allocated to focused and target respondents, 112 were returned as follows:

Table 4.1: 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 2023.

From table 1 above, a total of one hundred and fifty six (156) questionnaires were sent out to respondents, however a total of one hundred and twelve (112) were returned. This represents the targeted sample for this research.

Table 4.2 KMO and Bartlett’s Tests

| KMO and Bartlett's Test | | |
|--|--------------------|----------|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. | | .657 |
| Bartlett's Test of Sphericity | Approx. Chi-Square | 1643.020 |
| | Df | 253 |
| | Sig. | .000 |

Twenty-three (23) items of factors precipitating corrupt practices in construction project delivery were subjected to principal component analysis using IBM SPSS Statistics version 25.0. Before this, the suitability of data for analysis was assessed. Inspection of the correlation matrix showed many of the coefficients had values of 0.5 and above. The Kaiser-Meyer- Olkin (KMO) measure of sampling adequacy of 0.657 was obtained. This value is within the desirable value of 0.6. From the table above, Bartlett’s test of sphericity was 1643.020 with an associated significance of 0.000. Also, a Cronbach’s alpha of 0.844 was realized, suggesting an acceptable level of internal consistency and reliability in the measures and the scale.

Table 4.3 Factors Precipitating Corrupt Practices in Construction Project Delivery.

| 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 financiers 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 | 1.000 | .814 |

| | | |
|---|-------|------|
| functions | | |
| Lack of standardized execution in construction | 1.000 | .813 |
| Poor professional ethical standard | 1.000 | .870 |
| Extraction Method: Principal Component Analysis. | | |

From the table above, the average communality of these variables after extraction was 0.778. Therefore, the communalities extracted really support the use of factor analysis on the variables. It is also observed that no item had extracted eigenvalues less than the 0.50 cut-off point, therefore all the variables are qualified for further analysis.

Table 4.4 Extraction Method: Principal Component Analysis.

| 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 | 72.43 | 1.307 | 5.684 | 72.43 | 1.411 | 6.134 | 71.84 |

| | | | | | | | | | |
|----|-------|-------|-------------|-------|-------|------------|-------|-------|------------|
| | | | 5 | | | 5 | | | 3 |
| 8 | 1.133 | 4.927 | 77.36 3 | 1.133 | 4.927 | 77.36 3 | 1.269 | 5.519 | 77.36 3 |
| 9 | .907 | 3.944 | 81.30 6 | | | | | | |
| 10 | .832 | 3.618 | 84.92 5 | | | | | | |
| 11 | .657 | 2.857 | 87.78 2 | | | | | | |
| 12 | .472 | 2.054 | 89.83 6 | | | | | | |
| 13 | .433 | 1.884 | 91.71 9 | | | | | | |
| 14 | .402 | 1.746 | 93.46 5 | | | | | | |
| 15 | .336 | 1.459 | 94.92 4 | | | | | | |
| 16 | .321 | 1.394 | 96.31 9 | | | | | | |
| 17 | .258 | 1.120 | 97.43 8 | | | | | | |
| 18 | .184 | .798 | 98.23 7 | | | | | | |
| 19 | .143 | .623 | 98.85 9 | | | | | | |
| 20 | .085 | .371 | 99.23 0 | | | | | | |
| 21 | .081 | .352 | 99.58 2 | | | | | | |
| 22 | .064 | .277 | 99.86 0 | | | | | | |
| 23 | .032 | .140 | 100.0 00 | | | | | | |

Extraction Method: Principal Component Analysis.

From the result presented in the table above, an eight-factor component solution which explained a total of 77.363% of the variance was obtained. The first component explained 19.689% of the variance; the second component explained 13.199%; while the third component 11.898%; while the eight and last component was 4.927%. The total variance explained is above the recommended minimum of 50%. The eight components were named according to the factor with the highest loading in the cluster. These are explained in greater details in the discussion section. Also, the screen plot for the factor analysis is shown in table 4.4.

Component matrix^a

| | Component | | | | | | | |
|--|-----------|------|------|---|---|---|---|---|
| | 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 financiers 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 | | | .631 | | | | | |

| | | | | | | | | |
|---|--|--|--|------|------|---|------|------|
| projects | | | | | | | | |
| Personal greed | | | | .587 | | | | |
| Poor professional ethical standard | | | | | .745 | | | |
| Absence of efficient and responsible administrative systems | | | | | .702 | | | |
| Insufficient transparency in the selection criteria for tenderers | | | | | | 8 | .57 | |
| Lack of standardized execution in construction projects | | | | | | 7 | .50 | |
| 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. | | | | | | | | |

The findings from the results shown above indicate that 23-factors can be grouped into eight decision matrix (components) for factors precipitating corrupt practices in construction project delivery. However, 8-principal components were later extracted for effectiveness. In the first component, 9 factors in that order loads positively maximally, 2 factors, loads positively maximally in the second component, while 2 factors load positively maximally in the third component. In the fourth component, 1 factor loads positively maximally. While in the fifth, sixth, seventh and eight components, 2, 2, 3, 2 factors respectively load positively maximally. From this result, the components that emerged could be the dominant

underlining factors determining factors precipitating corrupt practices in construction project delivery.



It is important to also look at the scree plot provided by the report. What we need to look for is a change (or elbow) in the shape of the plot. Only components above this point are retained. In our case, there is quite a clear break between the first, second, third, fourth components. Component 1 explains or captured much more of the variance than the remaining components. Hence, the point where the slope of the curve is leveling off indicates the number of factors that should be generated by the analysis. From this plot, we would recommend retaining (extracting) only eight components.

Table 4.5 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 findings from the results shown above indicates the 15 E-procurement tools and techniques used in mitigating corrupt practices in the delivery of construction projects in Rivers State. After applying the mean item score (MIS), the table indicates that Using Internet-based Tools had the highest MIS value of 4.64. This was followed by Easy Vendor Awards with an MIS value of 4.63., E-Noticing Tools =4.63, E-Auctioning tools=4.60, E-Ordering Tools =4.55, E-Submission Tools=3.93 and the last amongst the tools is E-Awarding Tools =2.02.

Table 4.10 Showing Relative Importance Index scoring for Measures used in mitigating corrupt practices in construction project delivery.

| S/N | MEASURES | Respondent's Scorings | | | | | | |
|-----|--|-----------------------|----|----|----|----|-------|------------------|
| | | 1 | 2 | 3 | 4 | 5 | RII | RANK |
| 1 | To ensure government commitment to open contracting | 20 | 20 | 20 | 20 | 32 | 0.643 | 8 th |
| 2 | Creating clarity in the ministry organizational structure and process | 20 | 30 | 20 | 20 | 22 | 0.589 | 9 th |
| 3 | Requiring transparency of decision-making at senior levels | 10 | 10 | 20 | 30 | 42 | 0.75 | 3 rd |
| 4 | Establishing a formal integrity framework | 20 | 20 | 10 | 30 | 32 | 0.661 | 5 th |
| 5 | Requiring clarity of delivery structure modality | 10 | 25 | 25 | 30 | 22 | 0.652 | 6 th |
| 6 | Carrying out analysis of regulatory impact | 30 | 30 | 20 | 20 | 12 | 0.518 | 10 th |
| 7 | Active engagement with the construction industry | 10 | 25 | 30 | 20 | 27 | 0.652 | 6 th |
| 8 | Instituting construction works and processes supervision throughout the lifecycle of a project | 5 | 13 | 14 | 40 | 40 | 0.773 | 1 st |
| 9 | Involving civil society in project oversight | 10 | 20 | 20 | 30 | 32 | 0.696 | 4 th |
| 10 | Developing of an ethical and honest construction culture | 0 | 15 | 25 | 40 | 32 | 0.759 | 2 nd |

From the table above, the findings show that instituting construction works and processes supervision throughout the lifecycle of a project is the most important measures in mitigating corrupt practices in construction project delivery with RII (0.773) and ranked first. Another leading as discovered from the research measure used in mitigating corrupt practices in construction project delivery that was ranked second with RII (0.759) and this measure led to developing of an ethical and honest construction culture. Similarly, Establishing a formal integrity framework is ranked 3rd with RII (0.75), involving civil society in project oversight is ranked 4th with RII (0.696) as one of the measures used in mitigating corrupt practices in construction project delivery while establishing a formal integrity framework came 5th with RII (0.661), active engagement with the construction industry and requiring clarity with of delivery structure modality with the RII (0.652), government commitment to open contracting with the RII (0.643) and finally Carrying out analysis of regulatory impact having the RII (0.518) with respect to the measures used in mitigating corrupt practices in construction project delivery.

4.2 Discussion of Findings

4.2.1 Factors precipitating corrupt practices in construction project delivery in Rivers State

With respect to this study on implementation of e-procurement in mitigating corrupt practices in construction project delivery, from the finding, apart from other forms of corruption in construction project delivery like embezzlement, kickbacks, fraud, bribery, conflict of interest, fronting, collusive tendering and bid rigging etc, there are other twenty three (23) factors precipitating corrupt practices in construction project delivery which include weak procurement/contractual structures, nature of

infrastructure projects, insufficient legal punishment and penalties, lack of coordination among government departments, poor documentation of records, lack of pro-active steps by financiers to limit corruption on project, low wage level, absence of project anti-corruption systems, complexities of institutional roles and functions, flawed regulation system, absence of control mechanism, inappropriate political interference, complexity of the projects, personal greed, poor professional ethical standard, absence of efficient and responsible administrative systems, insufficient transparency in the selection criteria for tenderers, lack of standardized execution in construction projects, lack of rigorous supervision, transition of governments, delaying the payment of workers' salaries, deficiencies in rules and laws, and negative industrial and working conditions are the major causes of corruption in both public and private sector procurement processes. Furthermore, from the findings also, it show that there are eight major factors causing corrupt practices in the delivery of construction projects which are: complexity of project, weak procurement/contractual structures, flawed regulation system, lack of rigorous supervision, absence of project anti-corruption system, personal greed, deficiencies in rules and laws, insufficient legal punishments and penalty.

4.2.2 E-procurement tools and techniques used in mitigating corrupt practice in the delivery of construction project.

From the finding with respect of e-procurement tools and techniques used in mitigating corrupt practices in construction project delivery, 15 e-procurement tools and techniques used in mitigating corrupt practices in the delivery of construction projects in Rivers State. From the respondents, show that the Internet-based Tools is the most powerful e-procurement tools. The internet based tools as one of e-procurement tools helps in the process of procurement. Some of the

common applications are the email, internet based EDI, via the internet etc. internet provides tools for e-sourcing, e-tendering, e-auctioning, e-catalogue, Nevertheless, internet based tools have eliminated the means of tendering by various companies whereby the submission of hard copies of tender document which could result to favouritism in terms of award of contracts to any tenderer as result of tribalism, nepotism and god-fatherism causing corruption but when internet based tools is implemented in all various construction industry in the country it will assist in e-procurement processes and also help for competitive tendering enhancing transparency and selecting the best tenderer for the contract award when done electronically thereby fighting against corruption in delivery of construction processes. Other e-procurement tools are easy vendor award tools, e-noticing tools, e-auctioning tools, e-ordering tools, e-submission tools, e-awarding tools etc are the e-procurement tools that will in turn hamper corrupt practices during procurement processes.

4.2.4 Measures used in mitigating corrupt practices in construction project delivery.

With respect to implementation of e-procurement in mitigating corrupt practices in the delivery of construction projects, from the findings, the study have provided some preventive measures that is used in mitigating corruption with respect to construction project delivery. From the findings, respondents have it that instituting construction works and processes supervision throughout the lifecycle of a project is the most important measures in mitigating corrupt practices in construction project delivery, from the respondents, another leading as discovered from the research measure used in mitigating corrupt practices in construction project delivery is developing of an ethical and honest construction culture and followed by establishing a formal

integrity framework, involving civil society in project oversight, active engagement with the construction industry, requiring clarity with of delivery structure modality, government commitment to open contracting and finally Carrying out analysis of regulatory impact which respect to the measures used in mitigating corrupt practices in construction project delivery in Rivers State. If all these measures is been implemented by various public and private firms in Nigeria it will in turn hamper corruption thereby enhancing efficient and effective construction project delivery, transparency, accountability and integrity of procurement processes.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

This research presents evidence of widespread corrupt practices within the Nigerian public and private sector construction industry; this is despite the Public Procurement Act and ancillary codes of conduct for industry professional bodies. Because corrupt officials within government represent the industry's biggest and most prominent client, contractors are more concerned about placating these officials to secure business survival than observe procurement rules/ laws. These inextricably linked political-industry connections and the operating environment of construction projects restrict competitive pressure in the construction industry to yield poor performance. Based upon a survey of construction industry practitioners, the most endemic corrupt practices were revealed to be: kickbacks, bribery, tender rigging and collusion, and conflict of interest which predominantly occur at bid evaluation and tendering phases of project development. This situation is facilitated by high-level political connections in awarding contracts, the excessive and reckless sole sourcing for public contracts and contractor's lack of commitment in tackling corruption. Addressing these challenges requires improvement in the transparency and accountability environment in public procurements throughout the project development phases, including a strict enforcement of the Public Procurement Act (Act 663). This will help to create an environment for fair competition, enabling contracts to be won and awarded on merit. Another critical issue to tackling corruption is to give priority to certain aspects of the Nigerian culture/traditions that influence corruption in public procurements; these include gift-giving and gift-

taking and strong familial ties. The theoretical framework of this study was hinged on institutional theory, transaction cost theory etc. The study used a survey design and the target population of the were professionals in both public and private construction companies operating in Rivers State. The study used taro yamen to establish a sample size of 112. The analytical framework deployed by the study was a descriptive analysis and factor analysis, mean item score and relative important index was used to analyze the data and using statistical package for social sciences (SPSS) version 25.0

The study examines factors precipitating corrupt practices in construction project delivery such as close relationship, complexity of 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 in such as ensuring government commitment to open contracting, establishing a formal integrity framework, Requiring clarity of delivery structure modality, active engagement with the construction industry, instituting construction works and processes supervision throughout the lifecycle of a project etc.

5.2 Recommendations

The recommendation of this study emanate as a result of the empirical findings and conclusion drawn. Therefore, the following recommendation are hereby made:

1. The government as a matter of policy, should be organizing periodic awareness and reorientation workshops and seminars via professional associations platforms through a web based portals, for both public and private sectors and

enlightened them of the danger of factors precipitating corrupt practices in construction project delivery.

2. There is the need to implement all the e-procurement tools and techniques in both public and private companies to ensure transparency, accountability and competitive tendering process electronically during procurement processes which in turn hamper corruption.
3. Government as a matter of urgency should provide anti-corruption measures at all stages of public procurement and contracting.

5.3 Contribution to Knowledge

This research work contributes to the body of knowledge both in methodology, theory and practice. The research examine implementation of e-procurement in mitigating corrupt practices in construction project delivery in Rivers State. this paper reviewed various factors precipitating corrupt practices in construction project delivery such as absence of control mechanism, absence of efficient and responsible administrative system, close relationship, personal greed, transition of government, poor documentation of record etc. furthermore this study has outlined e-procurement tools and techniques used in mitigating corrupt practices in delivery of construction project such as internet based tools, enterprise resource planning tools, e-sourcing tools, e-tendering tools, e-awarding tools etc which when implemented will eradicate corrupt practices and enhance good governance. The study also have provided anti-corruption measures used in mitigating corrupt practices such as government commitment to open contracting, establishing formal integrity framework, analysis of regular impact etc which ensure transparency, accountability in all procurement processes and contracting.

Therefore , the findings emanating from this study can be used as a support tools.

REFERENCES

- Adewole, K.K., Oladejo, J.O. & Ajagbe, W. (2014). Incessant collapse of building in Nigeria: The possible role of the use of inappropriate cement grade/strength class. *World Academy of Science, Engineering and Technology, International Journal of Civil, Structural, Construction and Architectural Engineering*, 8(7), 818-820.
- Adeyemo, A.A. (2015). Corruptible tendencies in the Nigerian construction industry. Graduate Thesis of the Federal University of Technology, Owerri, Nigeria.
- Aduwo, E.B., Ibem, E.O., Tunji-Olayeni, P., Uwakonye; O.U. & Ayo-Vaughan, E.K. (2016). Barriers to the Uptake of e-Procurement in the Nigerian Building Industry. *International Journal of Applied Theoretical and Applied Information Technology (IJATAIT)* 89(1), 133-147.
- Ajibike, K.O. (2019). Report on E- procurement in the Federal Capital Territory. file FCTA/TB. <http://www.uwc.ac.za/Students/Postgraduate/Documents/Research and Design.1.pdf> Aliyu, M.M. (2015).
- Akinsola, O.E. & Omolayo, O.H. (2013). Corruption and fraud in the Nigerian construction sector. The transformation of the building industry- Possibilities and realities. 43rd Annual General Meeting and Conference of Nigeria Institute of Building Held at Conference Centre on 26th-30th.
- Al-Qirim, N. (2007). The adoption of ecommerce communications and applications technologies in small businesses in New Zealand. *Electronic Commerce Research and Applications*, 6(4), 462-473.

- Aman, A., & Kasimin, H. (2011). E-procurement implementation: a case of Malaysia government. *Transforming Government: People, Process and Policy*, 5(4), 330-344.
- Ameh, O.J. & Ogundare, O. (2013). Impact of due process policy on construction projects delivery in Nigeria. *Journal of Building Performance*, 4(1), 13-23.
- Amemba, C.S. Ojha, A. & Mark, C. V. (2013). Challenges affecting Public Procurement Performance Process in Kenya. *International Journal of Research in Management*, 3(1), 1- 12.
- Anigbogu, N.A. & Shwarka, M.S. (2011). Evaluation of the impact of public procurement reform program in combating corrupt practices in public building project delivery in Nigeria. *Environtech Journal*, 1 (2) 43-51.
- Awino Z. B. (2011), An empirical investigation of selected strategy variables on firm's performance: A study of supply chain management in large private manufacturing firms in Kenya, *Journal of Public Administration and Policy Research* Vol. 3(8), 228-236.
- Ayangade, J. A., Wahab, A.B. & Alake, O. (2009). An investigation of the performance of due process mechanism in the execution of construction projects in Nigeria. *Civil Engineering Dimension*, 11 (1), 1-7.
- Azadegun, A. & Reich, J. (2010). Effective Benchmarking of Innovation Adoptions-A Theoretical Framework for e-Procurement Technologies. *Benchmarking: An International Journal*, 17(4), 472-490.
- Basheka, B.C. & Kabatereine, D., (2013). Public Procurement Reforms in Uganda. A Historical Trajectory. *Journal of Public Procurement and Contract Management*, 2 (1), 27-41.

- Basheka, B.C., (2008). Procurement Planning and Accountability in Local Government Procurement Systems in Developing Countries: Evidence from Uganda. *Journal of Public Procurement*, 8 (3), 379-406
- Bertot, J. C., Jaeger, P. T., & Grimes, J. M. (2010). Using ICTs to create a culture of transparency E-government and social media as openness and anti-corruption tools for societies. *Government information quarterly*, 27(3), 264-271.
- Beth, S., Burt, D.N., Copacino, W., Gopal, Ch., Lee, H.L., Lynch, R.P., Morris S., 2003, Supply Chain Determinants: Building Relationships, *The Harvard Business Review*, July.
- Burt, D.N., & Dobbler, D. W., (1996). *World Class Supply Management: The Key to Supply Chain Management*. Singapore: McGraw Hill. Cogburn, J.D., (2003). Exploring Differences in American States Procurement Practices. *Journal of Procurement Management*, (3) (1) 3-28.
- Carter, J. R., Maltz, A., Yan, T., & Maltz, E. (2008). How procurement managers view low cost countries and geographies: a perceptual mapping approach. *International Journal of Physical Distribution & Logistics Management*, 38(3), 224-243.
- Caulfield, T. O. M. (2014). The anatomy of procurement fraud. *Contract Management*, 54(4), 52- 55.
- Croom, S., & Johnston, R. (2003). "E-Service: Enhancing internal customer service through e- procurement." *International Journal of Service Industries Management*, 14 (5), 539-555.

- Da Vila, A., & Gupta, M. (2003) "Moving Procurement Systems to the Internet: The Adoption and Use of E-Procurement Technology Models," *European Management Journal* 21(1), 11- 23.
- Davila A., Gupta, M.& Palmer, R. (2003). Moving Procurement Systems to Internet: Adoption and use of e-Procurement Technology Models. *European Management Journal*, 21(1), 11-23.
- Desmond, Addison, Ernest Osei Tutu, Ernest Kissi, Safowaa Osei Tutu, Ernest Kissi, Ernest Osei-Tutu, and Addison Desmond. 2019. "Evaluating Critical Factors for the Implementation of E-Procurement in Ghana." Article in *International Journal of Procurement Management* 12(1),1–14.
- Eadie, R., Perera, S.&Carlisle. E. (2007). Drivers and Barriers to Public Sector e-Procurement within Northern Ireland's Construction Industry. *Journal of Information Technology in Construction*, 12, 103-120.
- Edmiston, K. (2003). "State and local e-government: prospects and challenges," *The American Review of Public Administration*, vol. 33,no. 1, 20-45.
- Egidario, B, A., Ibem, E, O., Uwakonye, O., Olayeni, P. T. and Ayo-Vuaghan, E, K. (2016) Barriers to the uptake of e-Procurement in the Nigerian Building Industry. *Journal of Theoretical and Applied Information Technology*. E-ISSN:1817-3195
- Gastor J.O. (2019). Factors Affecting Strategic Procurement Practices in Public Procuring Entities in Moshi- Tanzania. *International Journal of Research in Management, Economics and Commerce*, 9(3), 1-9.
- Greunen, D. V. (2010). Adoption of Regulation-based E-procurement in the Eastern Cape provincial Administration. *African Journal of Business Management*, 4(17), 3655- 3665.

- Harrigan, P. O., Boyd, M. M., Ramsey, E., Ibbotson, P., and Bright, M. (2008). The Development of e-Procurement within the ICT Manufacturing Industry in Ireland, *Management Decision*, 46(3), 481–500.
- Hashim, N. H., Ilias, S. and Nur, H. I. (2014). E-Procurement Implementation in the Malaysian Construction Industry. *Australian Journal of Basic and Applied Sciences*, 8(6), 231-238.
- Hashim, N., Said, I., and Idris, N. H. (2013). Exploring e-Procurement Value for Construction Companies in Malaysia. *Procedia Technology*, 9, 836-845.
- Hawking, P., Stein, A., Wyld, D. and Foster, S. (2004). E-Procurement in the ugly duckling actually swan down? *Asian Pacific Journal of Marketing and Logistics*, 16(1), 1-24.
- Ibem, E. and Laryea, S. (2015). E-Procurement use in the South African Construction Industry. *Journal of Information Technology in Construction (ITcon)*, 20, 364-384.
- Iyanda, D.O. (2012). Corruption: Definitions, theories and concepts. *Journal of Business and Management Review*, 2(4), 37-43.
- J. Brown & M. Loosemore, “Behavioural factors influencing corrupt action in the Australian Construction Industry”. *Engineering, Construction and Architectural Management*, 22(4), 372–389. 2015.
- J. C. Porter. “Ethics in practice”. *Journal of Professional Issues in Engineering Education and Practice*, 19(1), 44–50. 1993.
- Jain, Mukul, Naseem Abidi, & Asit Bandyopadhyay. 2018. “E-Procurement Espousal and Assessment Framework: A Case-Based Study of Indian Automobile Companies.” *International Journal of Technology Management and Sustainable Development* 17(1):87–109.

- Jayraj et al. (2006). Adoption of information systems innovations by individuals: A study of processes involving contextual, adopter, and influencer actions. *Information and Organization*. 18(3), 205-234
- Johnson, Michael. 2011. "Public Sector E-Procurement: A Study of Benefits from e-Markets in the Local Government Sector." *International Journal of Services, Technology and Management* 16(1), 1–27.
- K. Moodley, N. Smith, & C.N. Preece. "Stakeholder matrix for ethical relationships in the Construction Industry". *Construction Management and Economics*, 26(6), 625–632. 2008.
- Knudsen, D. (2003). Aligning corporate strategy, procurement strategy and e-procurement tools, *International Journal of Physical Distribution and Logistics Management* , 33(8), 720-734.
- M. Sohail & S. Cavill. Accountability to prevent Corruption in Construction Projects. *Journal of Construction Engineering and Management*, 13(4). 729-738. 2008.
- Muchelule, S. C., & Shalle, N. I. (2017). Determinants of E-Procurement Adoption in the Kenyan Public Sector: A Case of Kakamega County. *The Strategic Journal of Business Management and Change*, 1-18. Nolan, A. (2009), "Purchasing's new power", *Director*, Vol. 52 No.7, pp.46-9 .
- Nawaz, T. & Ikram, A.A. (2013). Unethical practices in Pakistan construction industry. *European Journal of Business and Management*, 5(4), 188-202.
- Neupane, A., Soar, J. & Vaidya, K. (-corruption capabilities of public e- The *Electronic Journal on Information System in Developing Countries*, 55 (2), 1-17.

- Ogunsanmi, O. E., Salako, O. A. & Ajayi, O. M. (2011). Risks Classification Model for Design and Build Projects, *Journal of Engineering Project, and Production Management*,1(1), 46-60.
- Oslomobekov, T., Bello, D.C. & Gilliland, D.I., (2002). Adoption of electronic commerce tools in business procurement: Enhanced buying center structure and processes. *The Journal of Business & Industrial Marketing* , 17(2/3), 151- 166..
- P. A. Bowen, P. J. Edwards, & K. Cattell, “Corruption in the South African Construction Industry: A thematic analysis of verbatim comments from survey participants”. *Construction Management and Economics*, 30(10), 885-901. 2012.
- Phillips, P. & Piotrowicz, W. (2006). E-Procurement: How does it enhance Strategic Performance? Retrieved on 13th November, 2017 from <http://www.kent.ac.uk/KBS/>
- Presutti, W. (2003), “Supply management and e-procurement: creating value added in the supply chain”, *Industrial Marketing Management*, Vol. 32 No. 3, pp. 219-27.
- Puschmann, T., Alt, R. (2005), "Successful use of e-procurement in supply chains", *Supply Chain Management: an International Journal*, 10(2), 22-33.
- Pyman, Mark and Kaakar S (2018) Afghanistan’s Radical–and So-Far-Surprisingly Successful– Public Procurement Reforms. *Global Anti-Corruption blog* March 8, 2018. Accessed 23 Sept 2019 at <https://globalanticorruptionblog.com/2018/03/08/guest-post-afghanistans-radical-and-so-far-surprisingly-successful-public-procurement-reforms>.

- Rajkumar, T.M. (2001), "E-procurement business and technical issues", *Information Systems Management*, Vol. 18No. 4, pp. 52-61.
- Roman, A. V. (2013). Public policy and financial management through eProcurement: A practice oriented normative model for maximizing transformative impacts. *Journal of public procurement*, 13(03), 337-363.
- Roman, A. V. (2013). Public policy and financial management through eProcurement: A practice oriented normative model for maximizing transformative impacts. *Journal of public procurement*, 13(03), 337-363.
- Shahkooh, K., Shahkooh, S., Saghafi, F., & Abdollahi, A. (2018). A proposal for corruption reduction in developing countries based on E-government. *World Applied Sciences Journal*, 4(2), 1-7.
- Sohail, M., & Cavill, S. (2018). Accountability to prevent corruption in construction projects. *Journal of Construction Engineering and management*, 134(9), 729-738.
- Subramaniam, C. and Shaw, M.J. (2002) "A Study of the Value and Impact of B2B ECommerce:The Case of Web-Based Procurement", *International Journal of Electronic Commerce* 6(4):19-40.
- Sun, S. X., Zhao, J., & Wang, H. (2012). An agent based approach for exception handling in e-procurement management. *Expert Systems with Applications*, 39(1), 1174-1182.
- Tsuma, V. I., & Kanda, M. (2017). Factors Affecting the Adoption of e-Procurement Systems among International Non-Governmental Organisations in Kenya. *International Journal of Academic Research in Accounting, Finance and Management Sciences*, 7(2), 164-176.

- Vaidya, K., Sajeev, A. S. M., & Callender, G. (2016). Critical factors that influence e-procurement implementation success in the public sector. *Journal of public procurement*, 6(1/2), 70-99.
- Vaidya, K., Sajeev, A. S. M., & Callender, G. (2016). Critical factors that influence e-procurement implementation success in the public sector. *Journal of public procurement*, 6(1/2), 70-99.
- Vaidya, K., Sajeev, A. S. M., & Callender, G. (2016). Critical factors that influence e-procurement implementation success in the public sector. *Journal of public procurement*, 6(1/2), 70-99.

APPENDIX 1

Department of Project Management Technology,
Federal University of Technology

P.M.B. 1526

Owerri, Nigeria.

4th January 2023.

To Whom It May Concern

Dear Sir/Madam,

COLLECTION OF DATA FOR MSC RESEARCH

I am Godson Kelechi, an MSC student of the Department of Project Management Technology, School of Management Technology of the above School. This questionnaire is meant to collect data for a research titled “implementation of E-Procurement in Mitigating Corrupt practices in Construction Project Delivery in Rivers State”. The questions are therefore intended to solicit information from you/your organization so that the objectives of the research work can be achieved.

The result of this thesis work will eventually be of immense benefit to both the public and private construction industry in particular and the Country at large. You are further assured that all the information that will be treated in strict confidence. It would therefore be appreciated if you could provide the needed information with utmost clarity and sincerity.

Thank you for your anticipated co-operation.

Yours Faithfully

Godson, Kelechi M.Sc (Project Management Technology) Candidate

08160131243 or 07010485280

IMPLEMENTATION OF E-PROCUREMENT IN MITIGATING CORRUPT PRACTICES IN CONSTRUCTION PROJECT DELIVERY IN RIVERS STATE.

SECTION A

Demographic information of respondents

1. Name of Company/Industry if (applicable) -----
2. Location of Company/Establishment-----
3. Academic Qualification:[] B.Sc [] M.Sc []MBA [] Ph.D [] Others
4. Years of Experience (a) 1-5 years [] (b) 6-10 years [](c) 11-15 years []
(d) 16-20 years [] (e) 21 and above [].
5. Which group of professional/ participants do you belong?
(a)Architects [] (b) Civil Engineers [] (c) Quantity Surveyors []
(d)Client/Employer [] (e) Builder [] (f) Project Manager []
6. Which group of regulatory bodies in the construction industry in Nigeria do you belong? (a) The Nigerian Institute of Building(NIOB) [] (b)The Nigeria Institute of Architects (NIA) [] (c)The Nigeria Society of Engineers(NSE) [] (d)The Nigerian Institute of Quantity Surveyor (NIQS) [](e) Association for Project Management (APM) [] (f) Professional Employer organization(PEO) [] (g) Others [].
7. Have you been involved in e-procurement related activities? (a) Yes [] (b) No []

APPENDIX 2
QUESTIONNAIRE
SECTION B

SPECIFICATION OBJECTIVES

1.0 In each of the following factors precipitating corrupt practices in construction project delivery, kindly rate using the Likert Five Point scales provided:[5] strongly agree [4] agree [3] neutral [2] disagree [1] strongly disagree.

| S/N | FACTORS | 5 | 4 | 3 | 2 | 1 |
|-----|---|---|---|---|---|---|
| 1 | Absence of efficient and responsible administrative systems | | | | | |
| 2 | Absence of control mechanism | | | | | |
| 3 | Absence of project anti-corruption systems | | | | | |
| 4 | Asymmetric information amongst project parties | | | | | |
| 5 | Close relationships | | | | | |
| 6 | Complex contractual structure | | | | | |
| 7 | Complexities of institutional roles and functions | | | | | |
| 8 | Complexity of the projects | | | | | |
| 9 | Deficiencies in rules and laws | | | | | |
| 10 | Delaying the payment of workers' salaries | | | | | |
| 11 | Deregulation in the public construction | | | | | |
| 12 | Feeble semblance of public interest | | | | | |
| 13 | Fierce competition in tendering process | | | | | |
| 14 | Flawed regulation system | | | | | |
| 15 | Inadequate sanctions | | | | | |
| 16 | Inappropriate political interference | | | | | |
| 17 | Insufficient legal punishments and penalties | | | | | |
| 18 | Insufficient transparency in the selection criteria for tenderers | | | | | |
| 19 | Lack of coordination among Government departments | | | | | |
| 20 | Lack of legal awareness | | | | | |
| 21 | Lack of pro-active steps by financiers to limit | | | | | |

| | | | | | | |
|----|---|--|--|--|--|--|
| | corruption on projects | | | | | |
| 22 | Lack of rigorous supervision | | | | | |
| 23 | Lack of standardized execution in construction projects | | | | | |
| 24 | Low wage level | | | | | |
| 25 | Misrepresentation of qualifications | | | | | |
| 26 | Monopoly | | | | | |
| 27 | Nature of infrastructure projects | | | | | |
| 28 | Negative industrial and working conditions | | | | | |
| 29 | Negative role models | | | | | |
| 30 | Personal greed | | | | | |
| 31 | Poor documentation of records | | | | | |
| 32 | Poor professional ethical standard | | | | | |
| 33 | Privacy of corruption activity | | | | | |
| 34 | Subjecting workers to job insecurity | | | | | |
| 35 | Transition of governments | | | | | |
| 36 | Weak procurement / contractual structures | | | | | |

Please state any other factors precipitating corrupt practices in construction project delivery that have not been mentioned above

APPENDIX 3

SECTION C

2.0 In each of the following e-procurement tools and techniques used in mitigating corrupt practices in the delivery of construction projects, kindly rate using the Likert Five Point scales provided:[5] strongly agree [4] agree [3] neutral [2] disagree [1] strongly disagree

| S/N | E-PROCUREMENT TOOLS AND TECHNIQUES | 5 | 4 | 3 | 2 | 1 |
|-----|---|---|---|---|---|---|
| 1 | The implementation of electronic data interchange system (EDI) is the mostly used for order transmission, order confirmation, logistics information | | | | | |

| | | | | | | |
|----|---|--|--|--|--|--|
| | and order invoicing. | | | | | |
| 2 | The use of Enterprise Resource Planning tools System in E-Procurement has enabled a considerable improvement in payment process. | | | | | |
| 3 | Using internet based tools has help in the process of procurement in terms of using e-mail, internet based EDI etc. | | | | | |
| 4 | E- Sourcing tools usage has greatly help to identify potential suppliers during the selection phase. | | | | | |
| 5 | E-Auctioning tools brings about upward price mechanism for selling organization and downward price mechanism for the buying organization | | | | | |
| 6 | E-Ordering tools Is used for procurement of office supplies and services and accessible by all employees within the organization and is mainly used for ad-hoc purchases. | | | | | |
| 7 | E-Tendering tools is used to send out tenders with procurement requirements, supply schedule, contracting terms etc. | | | | | |
| 8 | E-Submission tools enabled the submission of offers in electronic format to the contracting authority or entity. | | | | | |
| 9 | E-Noticing tools helps to Calls for tenders which are published in electronic format in the relevant Official Journal. | | | | | |
| 10 | E-Awarding tools helps in contract award to the best bid and can be evaluated in terms of the lowest price or economic advantages | | | | | |
| 11 | ICT-Enabled Anti-Corruption Tools helps in reducing corrupt practices and enhancing better governance. | | | | | |
| 12 | The procurement workflow and request wizard aids in review process that determines if the request should involve a bid process. | | | | | |
| 13 | Intelligent Request Generation And Online Bid Advertisement assist organizations in generating timely, formally, comprehensive and accurate request document. | | | | | |

| | | | | | | |
|----|--|--|--|--|--|--|
| 14 | Easy Vendor Awards helps organizations with the enlisting of specific bids for individual items and useful for bid management processes | | | | | |
| 15 | Quick Contract Creation helps organization to begin the contract lifecycle process seamlessly when the award of contract phase detailed is finished. | | | | | |

Please state any other e-procurement tools and techniques used in mitigating corrupt practices in delivery of construction projects that have not been mentioned above

Appendix 4

SECTION D

In each of the following measures used in mitigation of corrupt practice in construction project delivery, kindly rate using the satisfaction Likert scale Five Point scales provided:[5] very satisfied[4]somewhat satisfied[3] neither satisfied [2] somewhat dissatisfied [1] very dissatisfied.

| S/N | MEASURES | 1 | 2 | 3 | 4 | 5 |
|-----|---|---|---|---|---|---|
| 1 | To ensure government commitment to open contracting | | | | | |
| 2 | Creating clarity in the ministry organizational structure and process | | | | | |
| 3 | Requiring transparency of decision-making at senior levels | | | | | |

| | | | | | | |
|----|--|--|--|--|--|--|
| 4 | Establishing a formal integrity framework | | | | | |
| 5 | Requiring clarity of delivery structure modality | | | | | |
| 6 | Carrying out analysis of regulatory impact | | | | | |
| 7 | Active engagement with the construction industry | | | | | |
| 8 | Instituting construction works and processes supervision throughout the lifecycle of a project | | | | | |
| 9 | Involving civil society in project oversight | | | | | |
| 10 | Developing of an ethical and honest construction culture | | | | | |

Please mention other measures used in mitigating corrupt practices in construction project delivery that have not been mentioned above.

FACTOR ANALYSIS FOR THE FACTORS PRECIPITATING CORRUPT PRACTICES IN CONSTRUCTION PROJECT DELIVERY

KMO and Bartlett's Tests

| KMO and Bartlett's Test | | |
|--|--------------------|----------|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. | | .657 |
| Bartlett's Test of Sphericity | Approx. Chi-Square | 1643.020 |
| | Df | 253 |
| | Sig. | .000 |

| 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 financiers 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. | | |

Principal Component Analysis.

| 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. | | | | | | | | | |

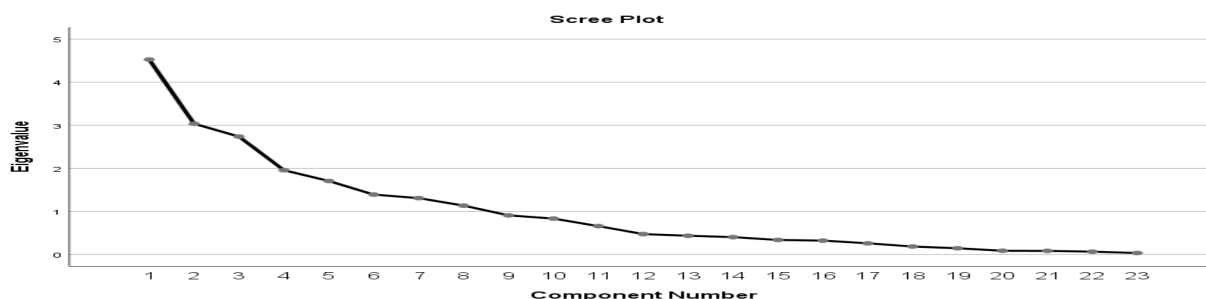
Component matrix^a

| | Component | | | | | | | |
|---|-----------|---|---|---|---|---|---|---|
| | 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 proactive steps by financiers 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 | | | .719 | | | | | |

| | | | | | | | | |
|---|--|--|------|------|------|------|------|------|
| interference | | | | | | | | |
| 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 | | | | | | | | .652 |

| | | | | | | | | |
|---|--|--|--|--|--|--|--|--|
| working conditions | | | | | | | | |
| Extraction Method: Principal Component Analysis. | | | | | | | | |
| a. 8 components extracted. | | | | | | | | |



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 | | | | | | |

MEASURES FOR MITIGATING CORRUPT PRACTICES IN CONSTRUCTION PROJECT DELIVERY.

Respondent's Scorings

| S/N | MEASURES | 1 | 2 | 3 | 4 | 5 | RII | RANK |
|-----|--|----|----|----|----|----|-------|------------------|
| 1 | To ensure government commitment to open contracting | 20 | 20 | 20 | 20 | 32 | 0.643 | 8 th |
| 2 | Creating clarity in the ministry organizational structure and process | 20 | 30 | 20 | 20 | 22 | 0.589 | 9 th |
| 3 | Requiring transparency of decision-making at senior levels | 10 | 10 | 20 | 30 | 42 | 0.75 | 3 rd |
| 4 | Establishing a formal integrity framework | 20 | 20 | 10 | 30 | 32 | 0.661 | 5 th |
| 5 | Requiring clarity of delivery structure modality | 10 | 25 | 25 | 30 | 22 | 0.652 | 6 th |
| 6 | Carrying out analysis of regulatory impact | 30 | 30 | 20 | 20 | 12 | 0.518 | 10 th |
| 7 | Active engagement with the construction industry | 10 | 25 | 30 | 20 | 27 | 0.652 | 6 th |
| 8 | Instituting construction works and processes supervision throughout the lifecycle of a project | 5 | 13 | 14 | 40 | 40 | 0.773 | 1 st |
| 9 | Involving civil society in project oversight | 10 | 20 | 20 | 30 | 32 | 0.696 | 4 th |
| 10 | Developing of an ethical and honest construction culture | 0 | 15 | 25 | 40 | 32 | 0.759 | 2 nd |