

**KWAME NKRUMAH UNIVERSITY OF SCIENCE AND  
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PROCUREMENT AND SUPPLY CHAIN MANAGEMENT**



**EXAMINING THE EFFECT OF E-PROCUREMENT IN REDUCING  
PROCUREMENT FRAUD AND CORRUPTION: A CASE OF  
SELECTED MINING COMPANIES IN GHANA**

**A DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE  
REQUIREMENTS FOR THE AWARD OF MASTER OF SCIENCE  
(PROCUREMENT AND SUPPLY CHAIN MANAGEMENT)**

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# DECLARATION

## Candidate's Declaration

I hereby declare that this dissertation is the result of my own original work and that no part of it has been presented for another degree in this university or elsewhere.

Candidate's Name: Chelteau Barajei

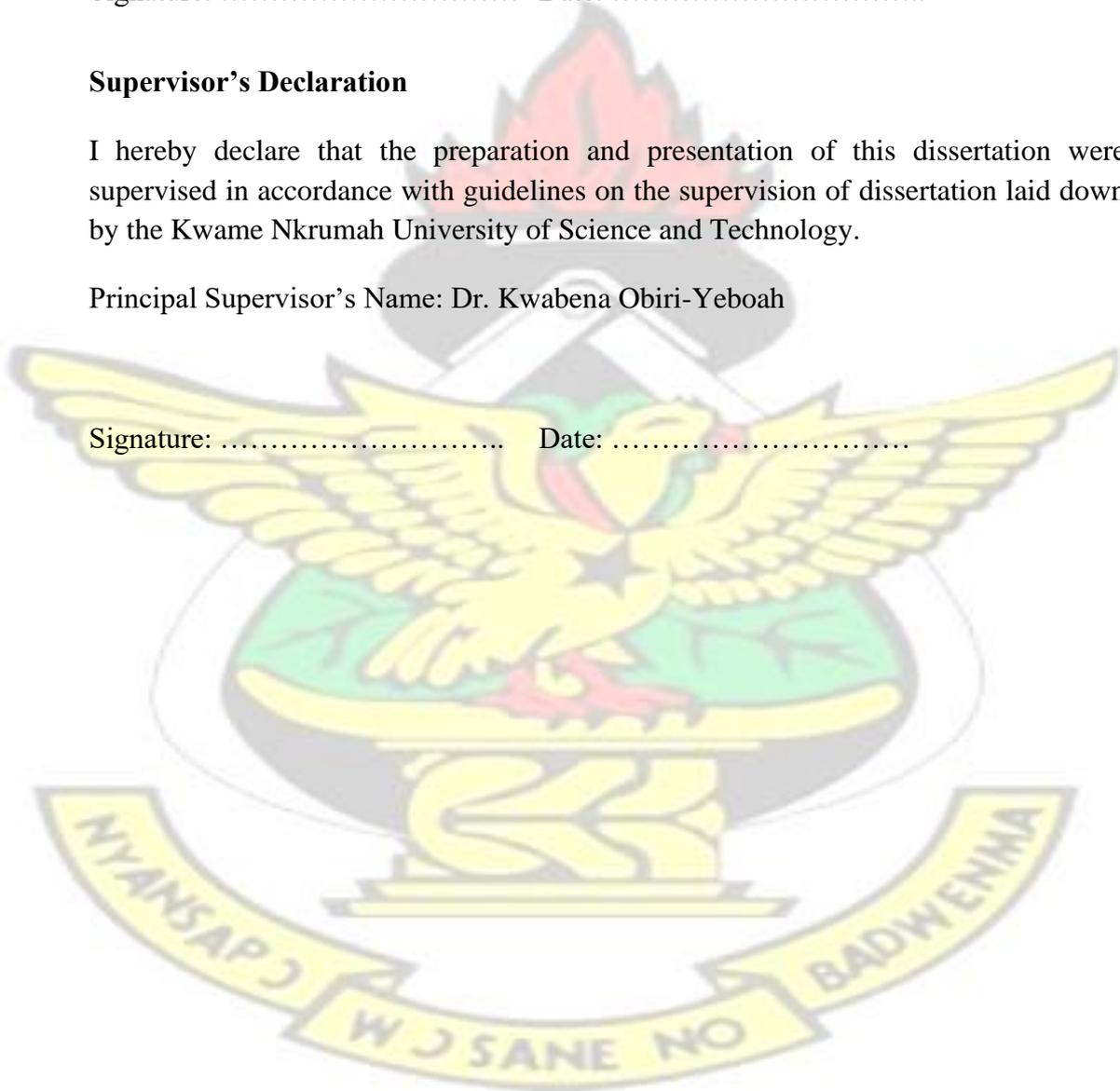
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## Supervisor's Declaration

I hereby declare that the preparation and presentation of this dissertation were supervised in accordance with guidelines on the supervision of dissertation laid down by the Kwame Nkrumah University of Science and Technology.

Principal Supervisor's Name: Dr. Kwabena Obiri-Yeboah

Signature: ..... Date: .....



## DEDICATION

To God, my parents, wife, children, siblings and friends.

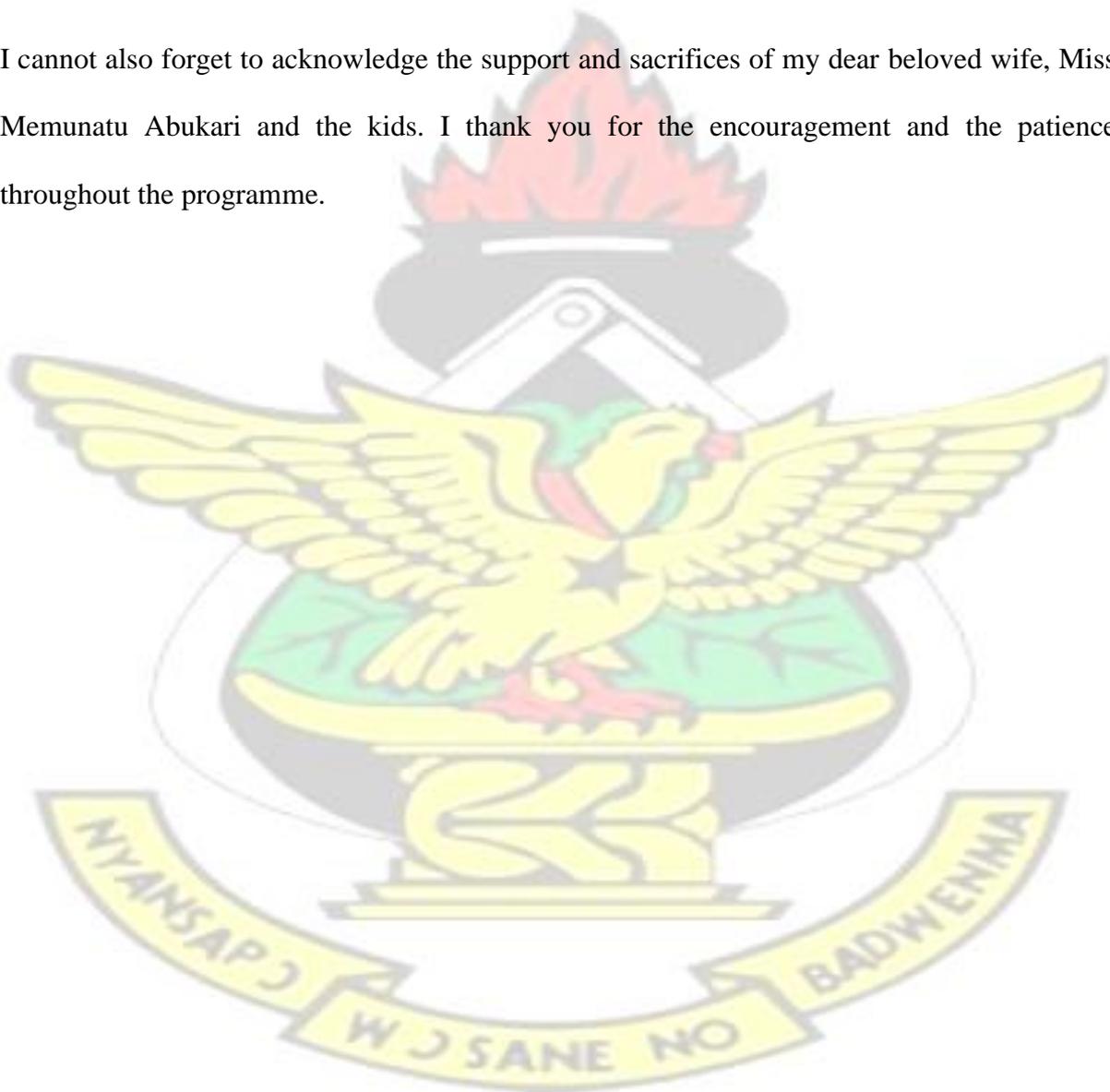
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## ABSTRACT

The study's main objective is to assess how e-procurement may reduce procurement fraud and corruption in four (4) Ghanaian mining enterprises. To achieve this objective, a research questionnaire was then designed, disseminated to study population, and responses from participants analyzed using factor analysis. The study revealed breaking of monopoly of power, transparency and accountability, and breaking of information asymmetry, as e-procurement anti-corruption variables that combat procurement fraud and corruption in the mining companies. The most effective e-procurement factor for preventing procurement fraud and corruption is breaking of monopoly of power, followed by transparency and accountability, and the least is breaking of information asymmetry. The results add to the body of knowledge on e-procurement in underdeveloped countries while also expanding it in Ghana. As a result, the study supports earlier research as well. Overall, the study's findings imply that e-procurement reduces corruption and fraud in the procurement processes of Ghanaian mining firms. A deeper comprehension of the potential of e-procurement to fight against corruption is a motivation for procurement professionals to advocate for its implementation as part of an anti-corruption agenda. The study is also restricted to the Ghanaian mining sector.

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## ABBREVIATIONS AND ACRONYMS

AfDB	African Development Bank
CSFs	Critical Success Factors
GDP	Gross Domestic Product
IMF	International Monetary Fund
MST	Media Synchronicity Theory
PAT	Principal Agent Theory
PEOU	Perceived Ease of Use
PU	Perceived Usefulness
TAM	Technology Acceptance Model
TTF	Task Technology Fit
UN	United Nations
WB	World Bank



# CHAPTER ONE

## INTRODUCTION

### 1.1 Background of the Study

Procurement is defined as the process through which organizations engage third parties to provide them with goods, services and works (Neupane et al., 2014). Governments and private sector organizations can only initiate significant proportion of their activities through procurement. Consequently, they use procurement as the medium for social, economic and technological improvement (Vaidya et al., 2017). This is corroborated by Burton (2005) who opined that procurement is a key role in public and private institutions in order to ensure efficient resource management. For instance, 10-15 % of Gross Domestic Product (GDP) in developed nations (Kashap, 2004) and 20 % to 70% of GDP in emerging economies (GTN as cited in Neupane et al., 2014) are spent on goods and services. In Ghana, 80 % of national tax revenue which is equivalent to 17% of the nation's GDP is expended through public procurement (Ameyaw et al., 2012). This figure does not take into account the borrowed funds from World Bank (WB), African Development Bank (AfDB), International Monetary Fund (IMF), United Nations (UN) among others. According to Ameyaw et al. (2012), the enactment of Public Procurement Act and Public Financial Management Act in Ghana undoubtedly has helped in addressing issues of procurement fraud and corruption. However, there still remain a lot to be done to ensure efficiency in institutions' expenditure as procurement fraud and corruption are prevalent (Essel, 2021).

Procurement corruption is not only prevalent but on the rise in emerging nations including Ghana. A lot of countries in Sub-Saharan African countries are having enormous challenges in curbing corruptions which is increasingly becoming a norm. The over concentration of power in the hands of dishonest politicians and technocrats continue to derail the effort in fighting corruption (Essel, 2021). Procurement breaches is very common to find in audits reports in

Ghana (Ofori-Mensah & Rutherford as cited in Dauda et al., 2020). For example, the former chairperson for Electoral Commission of Ghana was removed from office due to complete disregard of the procurement act such as; sole sourcing without authorization from Public Procurement Authority and abrogation of contract without due process among others (Essel, 2021).

Procurement fraud and corruption result in significant loss of nation's revenue with far-reaching consequences. This practice significantly accounts for the extreme economic difficulties and the associated adverse impact on social life in developing nations (Adjei-Bamfo, 2017). To this end, Hui et al (2011) argued that there is the need to identify ways to minimize corruption as it can endanger the stability of nations aside retarding national development. It is further emphasized by Essel (2021) that it is very urgent to put measures in place in order to curb procurement fraud and corruption given their negative impact on economies and the lives of citizenries.

## **1.2 Problem Statement**

Government institutions and international agencies such as UN, WB, AfDB, and IMF all recognize corruption as major issue affecting the economy of many nations including the livelihood of their citizenries (Neupane et al., 2014). As alluded to earlier, corruption in procurement is common on the African continent. Corrupt service providers and procurement officers will do anything to satisfy their greed. Suppliers would for instance bribe procurement officials to: seek unjust advantage or access privileged information; be part of pre-qualified list; fraudulently expunge a competitor from a pre-qualified list; way the bid evaluation process in their favour; or even out the competition in case other competitors are doing same (Osei-Tutu et al., 2010). Lio et al. (2011) and Raymond as cited in Neupane et al. (2014) professed that the negative impact of corruption on a nation's development include high cost of business transactions, lack of trust, fragile institutions and low confidence by external investors. The

grounds for corruption in developing nations include poor monitoring capacity, undue pressures on procurement officers, bureaucracy and weak professionalism (Kolstad & Wiig as cited in Arminen et al., 2021; Neupane et al. 2014; Ware et al. as cited in Odulana & Oyewobi, 2019).

Bid solicitation, bid evaluation and contract execution have been determined as the most vulnerable areas for procurement fraud and corruption in developing nations (Owusu et al., 2019; Adindu et al., 2020; Bukari, 2014; Mc Pheraon & Mac Searraigh as cited in Neupane et al., 2014). In Ghana, the manipulation of procurement process in order to serve the interest of procurement officers and politicians are common (Osei-Tutu et al., 2010; Ameyaw et al., 2017; Owusu et al., 2019). According to Osei-Tutu et al. (2010), examples of procurement fraud include: procurement entities manipulating procurement rules in favour of their preferred tenderer; earmarking of projects in the interest of procurement entities rather than the public or organization's interest; intentionally over designing to inflate the cost of project; changing content of documents to influence contract award; procurement officials undertaken subcontracting activities; procurement officials conniving and condoning with suppliers to accept inferior supplies; payment of fictitious claims and abuse of contracts contingencies. These practices are largely blamed on the paper-based procurement systems in developing nations (Bhattarai as cited in Neupane, 2014). Hence, researchers over the period have been examining ways to curb this unfortunate occurrence especially in developing nations.

For example, Odago & Mwajuma (2013) and Basheka et al. (2012) studied the critical success factors (CSFs) of e-procurement implementation in Kenya and Uganda respectively. The studies established various list of factors that promote the uptake of e-procurement. Thus, the ability of e-procurement to curb procurement fraud and corruption were not investigated in these studies. Also, other researchers (Neupane et al., 2014; Aboelazm, 2022; Kartika, 2022; Mutangili, 2019; Aduwo et al., 2020) interrogated the capability of e-procurement in reducing

procurement corruption in Africa. These studies established various list of e-procurement anti-corruption factors in those countries. However, in Ghana, researchers (Eric & Dadzie, 2019; Ofori & Fuseini; 2019; Azanlerigu & Akay, 2015; Ujakpa et al., 2016; Asare & Prempeh, 2017; Sarpong et al., 2018; Dza et al., 2018; Addo, 2019; Osei-Tutu et al., 2019) have largely studied CSFs that enhance the adoption of e-procurement. Studies on capability of e-procurement to curb procurement fraud and corruption are non-existent. Hence, it is paramount to identify e-procurement anti-corruption factors that are specific to Ghana.

### **1.3 Objective of Study**

The main objective of this study is to assess the effect of e-procurement in combating procurement fraud and corruption in selected Ghanaian mining companies. The specific objectives are as follows:

- i. To evaluate the impact of breaking of monopoly of power by e-procurement on reduction of procurement fraud and corruption in selected Ghanaian mining companies.
- ii. To assess the impact of breaking of information asymmetry by e-procurement on reduction of procurement fraud and corruption in selected Ghanaian mining companies.
- iii. To examine the impact of transparency and accountability by e-procurement on reduction of procurement fraud and corruption in selected Ghanaian mining companies.

### **1.4 Objective Questions**

By conducting the research, the researcher aims to answer the following research questions:

- i. Does breaking of monopoly of power by e-procurement fight against procurement fraud and corruption in the selected Ghanaian mining companies?
- ii. Does breaking of information asymmetry by e-procurement fight against procurement fraud and corruption in the selected Ghanaian mining companies?

- iii. Does transparency and accountability by e-procurement fight against procurement fraud and corruption in the selected Ghanaian mining companies?

### **1.5 Significance of the Study**

Many studies have established the benefit of e-procurement (Toktaş-Palut et al., 2014; Nawi et al., 2016; Sánchez-Rodríguez et al., 2019; Belisari et al., 2019; Ibem et al., 2021) in improving the efficiencies of public and private organizations alike. Anti-corruption studies such as: willingness to adopt e-procurement to reduce corruption (Neupane et al., 2014); e-procurement in the international experience: an approach to reduce corruption in administrative contracts in Egypt (Aboelazm, 2022); the impact of e-procurement implementation on public procurement's corruption cases: evidence from Indonesia and India (Kartika, 2022); role of e-procurement practices in fighting fraud and corruption in public procurement (Mutangili, 2019) and exploring anti-corruption capabilities of e-procurement in construction project delivery in Nigeria (Aduwo et al., 2020) have been conducted across the globe. It is evident from these studies that e-procurement is superior tool for combating procurement fraud and corruption compared to the traditional paper-based procurement systems prevalent in many developing nations. Examining the capability of e-procurement to curb procurement fraud and corruption in Ghana may help Ghana and countries with similar socio-economic conditions to that of Ghana to improve transparency, value for money and stakeholder satisfaction through procurement processes. It will further extend literature on fighting procurement fraud and corruption in Ghana. Also, government and the private sector could use the study outcome to minimize fraud and corruption in the procurement process. Thus, public and private institutions will be able to do more with the resources available to them.

### **1.6 Scope of the study**

This research covers topic of e-procurement and its effect in combating procurement fraud and corruption in Ghana using selected Ghanaian mining companies. The study will touch on the

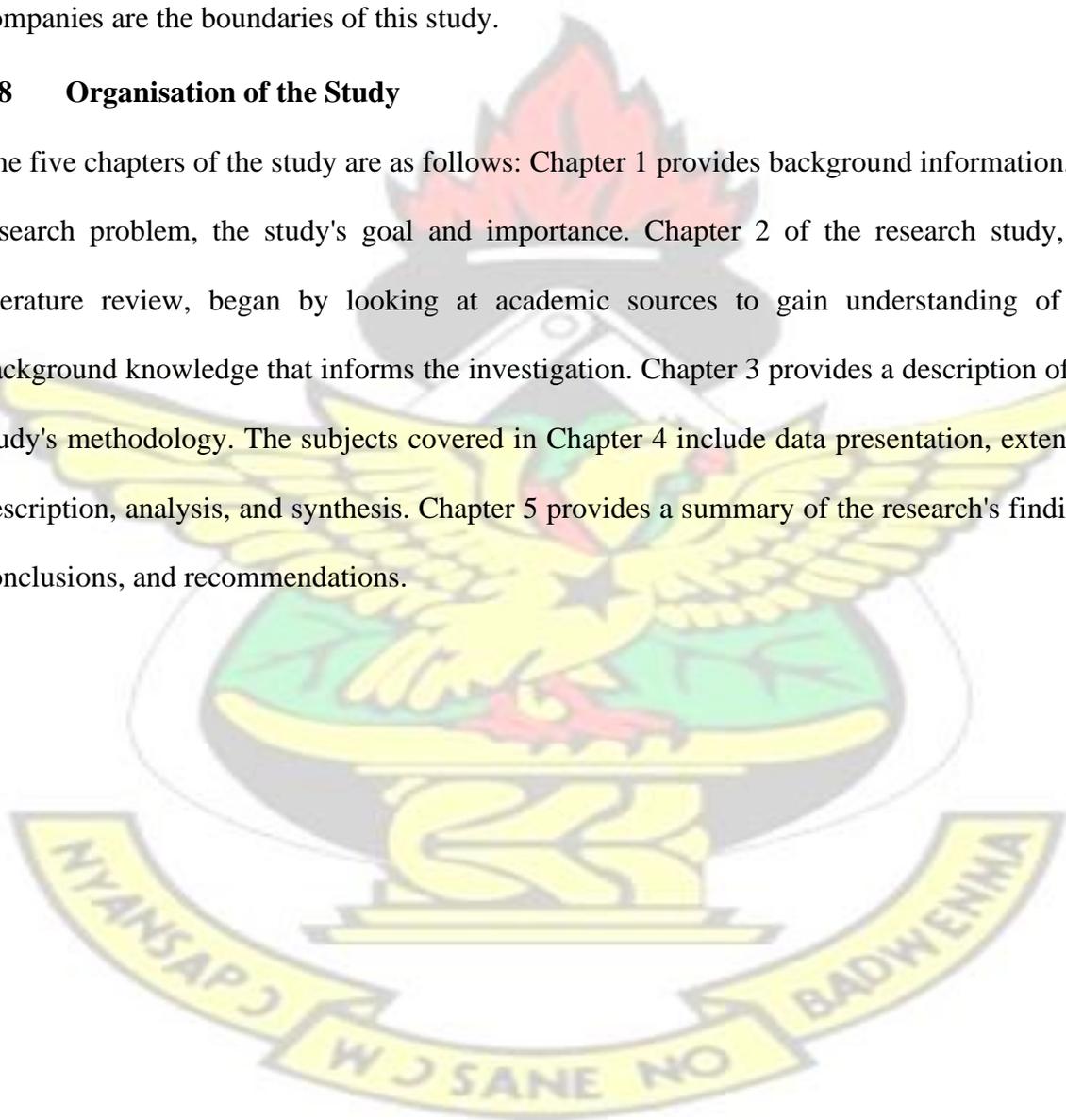
potential of e-procurement as a tool to help overcome corruption in procurement in selected Ghanaian mining firms.

### **1.7 Limitations of the Study**

The study must overcome difficulties caused by time and funding constraints. The second is about how challenging it is to get information from the responders. It's possible that some respondents will not be eager to divulge private information. The chosen Ghanaian mining companies are the boundaries of this study.

### **1.8 Organisation of the Study**

The five chapters of the study are as follows: Chapter 1 provides background information, the research problem, the study's goal and importance. Chapter 2 of the research study, the literature review, began by looking at academic sources to gain understanding of the background knowledge that informs the investigation. Chapter 3 provides a description of the study's methodology. The subjects covered in Chapter 4 include data presentation, extensive description, analysis, and synthesis. Chapter 5 provides a summary of the research's findings, conclusions, and recommendations.



## CHAPTER TWO

### LITERATURE REVIEW

#### 2.1 Introduction

The theoretical setting for the study is provided in this chapter. This is accomplished by first reviewing the history of electronic procurement. The chapter also includes a study of the literature on e-procurement's advantages and CSFs, as well as a review of empirical investigations to determine the research gap that the researcher hopes to fill. Subsequently, the chapter presents the study theoretical framework which highlights the variables that the researcher will be interrogating.

#### 2.2 Definition of E-procurement

The role of procurement is to ensure that works, goods and services are delivered at the right place and at the right time (Neupane al., 2014). Also, Weele (2010) view procurement as “the process of managing external resources in order to make sure that the supply of all goods, services, capabilities and knowledge which are necessary for running and maintaining the company’s primary and support activities are safeguarded in all possible regards”. The procurement function deals with “the business management function that ensures the identification, sourcing, access and management of the external resources that an organization needs or may need to fulfil its strategic objectives” (Kidd as cite in Osei-Tutu et al., 2019). The required standards in procurement include professionalism, value for money, accountability, efficiency, integrity and fairness. These principles must be adhered to across the procurement cycle to increase competition and to ensure efficiency and effectiveness of the procurement process. According to Ofori and Fuseini (2020) the benefits of procurement are: sustainable supply, value addition, high quality, reduced cost, minimized risk, high efficiency and innovation. The most widely practiced procurement process begins with the advertisement in newspapers or online and in some instance sending request for quotation directly to known service providers to shorten the process. Vendors then return completed tenders on the closing

date and time stated in the tender document. Subsequently, tenders are opened in the presence of tenderers and submission prices and other key documentations declared publicly. Evaluation is then carried out and tender awarded in line with the tender evaluation criteria to the most responsive bidder. This approach is termed as ‘traditional procurement’ as it has been a long-standing practice in many countries across the world (Mathonsi & Thwala, 2012). However, e-procurement could be used to combat this method's encouragement of corruption and fraud in the procurement process. "Any forms of use of electronic infrastructure that connects two organizations in the purchase process" is how Min and Galle (2003) defined e-procurement. Subsequently, Baily et al. (2008) defined e-procurement as "the use of electronic techniques in every stage of the buying process from identification of requirement through to contract administration and potentially to payment". Moreover, Peris et al. (2013) defined e-procurement as the practice of public and commercial entities using information and communication technology (ICT) as a means of conducting business. E-procurement was lastly defined by Rotich and Okello (2015) as the use of electronic means over the internet to conduct transactions between clients and service providers. Furthermore, Neupane et al. (2012) by these definitions have categorized e-procurement systems as indicated in Table 2.1.

**Table 2.1: Classification of E-procurement Systems**

<b>E-procurement Systems</b>	<b>Description</b>	<b>Author(S) &amp; Year</b>
e-information	Using internal technology, collecting and disseminating purchase data from and to internal and external partners.	Essig & Arnold, 2001; De Boer et al., 2002; Boer et al., 2001
e-Sourcing	leveraging internet technologies to find new suppliers for particular types of purchasing requirements	Fuks et al., 2009; De Boer et al., 2002; Knudsen, 2003
E-Tendering	The method of contacting suppliers via the internet to request information and prices and then receiving a response	De Boer et al., 2002; Betts et al., 2010
E-Reverse auctioning	Reverse auction technology based on the internet that emphasizes the selling price of the items and services up for auction	Teich et al., 2009; Carter et al., 2004
E-MRO and web-based ERP	A software program based on internet technology is used to create and approve purchase orders, place them, and then receive	Fink, 2006; Gunasekaran et al., 2009; Bruno et al., 2005; De Boer et al., 2002

<b>E-procurement Systems</b>	<b>Description</b>	<b>Author(S) &amp; Year</b>
	the products or services ordered. E-MRO deals with indirect items (MRO), whereas web-based ERP deals with product-related items.	
E-Ordering	Operationalizing the purchasing procedures, including ordering (requisitioning), approving orders, receiving orders, and processing payments, through the use of the internet	Reunis et al., 2006; Harink, 2003
E-Markets	E-Markets are gathering places for suppliers and buyers of components who use electronic exchange mechanisms to support the procurement process	Fuks et al., 2009; Block & Nwumann, 2008
E-Intelligence	A management information system that includes capabilities for expenditure analysis	Harink, 2003; Eakin, 2003
E-Contract Management	the application of information technology to boost the efficacy and efficiency of businesses' contracting procedures	Yang & Zhang, 2009; Angelov & Grefen, 2008

Source: Neupane et al. (2012)

### 2.3 History of E-procurement

The unveiling of electronic data interchange (EDI) in the 80's came along with the introduction of e-procurement (Asare & Prempeh, 2017). Clients and service providers in consumer-packaged goods were able to transact business through safe and secure store and call forward networks. Hence, companies were able to share and harmonize information on products, prices, specifications and business' locations and trading practices (Ofori & Fuseini, 2020). Asare and Prempeh (2017) further stated that, software firms later in the 1990's started developing buyer managed electronic catalogues for use by companies when internet software was out-dooed. However, communication challenges between companies and customers led to software developers becoming middlemen between companies and customers by customizing, maintaining and hosting catalogues. Software companies later started selling same catalogues to different companies as a result of catalogue outsourcing (Asare & Prempeh, 2017). The emergence of internet has rapidly changed the way businesses operate and has resulted in global sales channels and enhanced sharing of information among supply chain members (Asare & Prempeh, 2017). This has made it possible to create global businesses with dispersed network

of suppliers, manufacturers and distributors (Kraemer & Dedrick, 1994). By putting knowledge management at the forefront, it can be claimed that e-procurement has altered the landscape of purchasing and supply chain management. E-procurement has so altered the ethos of supply chain management and purchasing in businesses, resulting in affordable rates and quick services (Asare & Prempeh, 2017).

#### **2.4 E-procurement in Ghana**

E-procurement in Ghana is at infant stage especially with public institutions. Comparatively, the mining and oil and gas sectors have had higher adoption of e-procurement compared to the rest of the sectors. The public sector is in the process of setting up mechanisms to enhance the adoption of e-procurement through the e-Ghana initiative (PPA, 2020). According to Osei-Tutu et al. (2019), the adoption of e-procurement in Ghana will enhance transparency, minimize discrimination, deepened competition and accountability, and ensure the integrity of tender process. They further argued that the amendment of the current procurement to include e-procurement transactions will be key in driving the adoption e-procurement. Bondzi (2010) further opined that such effort will deepen the use of e-procurement as clients and service providers will have no choice than to use e-procurement to transact their businesses. Even though some effort is being made by government to roll out e-procurement through the e-Ghana project, the pace is still very slow. Only few public organizations have been included in the pilot that was only started about two (2) years ago. For instance, the big spending ministries such as Ministry of Food and Agriculture, Ministry of Roads and Highways, Ministry of Energy and Ministry of Education are yet to be enrolled on the e-Ghana project. Thus, government needs to do more to fast-track the e-Ghana project in view of the benefit the country stands to gain.

## **2.5 E-procurement Implementation Success Factors**

Government leadership, policy and legal framework, organizational change management systems, training and infrastructure are key factors to ensure the success and uptake of e-procurement implementation (Asian Development Bank, 2006). Osei-Tutu et al. (2019) argued that even though there are many lists of critical success factors of e-procurement by different authors, however, some of the factors are common to many of the lists. Many of the studies identified political and legal framework as very key to ensure smooth implementation and adoption of e-procurement (Panda & Sahu, 2012). This is rightly the case as political and legal framework addresses country specific political and administrative context. However, government will have to demonstrate leadership and must be committed to the course (Kierkegaard, 2006 and Panda & Sahu, 2012). Also, success factors including willingness of suppliers, ICT infrastructure, business case, process re-engineering, safety and authentication, leadership support and change management are crucial for the success and subsequent uptake of e-procurement.

### **2.5 Benefits of E-procurement**

Below are the major benefits of e-procurement as compiled from literature. Hence, it is envisaged that countries and organizations implementing e-procurement would enjoy these benefits.

#### **2.5.1 Reduced Transaction Cost**

According to Ofori and Fuseini (2020) the traditional paper-based procurement system is expensive to run as a result of the huge expenses undertaken by procurement units. For example, printing of bid documents, cost of publication, cost of transportation and other indirect cost contribute to the high cost of the paper-based procurement system (Obat, 2016). Thus, adoption of e-procurement would reduce procurement transaction cost since the entire process will be carried out online (Ofori & Fuseini, 2020).

### ***2.5.2 Information Sharing***

Implementation of e-procurement requires a single interface for transaction by clients and service providers to enable sharing of information among the parties (Frimpong, 2014). As a result, visibility of the procurement process is much enhanced and provides opportunities for negotiation (Ibem, 2021). Additionally, e-procurement enables parties in the procurement process to have a real time assessment of the entire process and are able to timely address issues that may arise (Hosseini, 2012).

### ***2.5.3 Increased Supplier Base***

E-procurement provides a unique opportunity for organizations to widen their supply base, thereby enhancing competition (Hosseini, 2012). It takes away biases associated with paper-based procurement and provides suppliers equal opportunities to tender (Ofori & Fuseini, 2020). Increasingly, suppliers associate the paper-based procurement systems with “whom you know” and usually refuse to participate in such tenders as they perceived them to be discriminatory (Aduwo et al., 2020). Hence, implementation of e-procurement will boost confidence of suppliers to participate in tenders due to the greater transparency and accountability it brings to bear (Al-Moalla & Li, 2010).

### ***2.5.4 Reduced Procurement Cycle Time***

E-procurement significantly reduces procurement lead time and resource requirement compared to the traditional procurement system (Ofori & Fuseini, 2020). This benefit results in enhanced relationship between vendors and suppliers as the tender process is shortened and payment for work done also executed without delays (Mohd et al., 2013). Another consequence of the reduced transaction time is reduced inventory (Patel, 2016). Thus, the organizations are able to save on inventory carrying cost and improving their cash flows.

### ***2.5.5 Improved Efficiency and Transparency***

Implementation of e-procurement ensures that procurement processes are efficient and effective by reducing overhead cost associated the traditional procurement system (Bondzi, 2010). There is high participation of suppliers in e-procurement due to its flexibility and transparency (Kaliannan et al., 2009). The high participation ensures competition and value for money. E-procurement grants easy access to tender information and deepens stakeholder confidence in the procurement process (Frimpong, 2014). This is corroborated by Korir et al. (2015) who opined that fairness and transparency in procurement processes enhances competition thereby improving procurement transaction efficiencies.

## **2.6 Overview of Anti-corruption Theories**

Theories explain a phenomena, action, or event that is natural or social (Bhattacharjee, 2012). Bacharach (1989) described scientific theory as a "system of constructs and propositions that collectively gives a logical, systematic, and coherent explanation of a phenomenon of interest within specified assumptions and boundary conditions". Likewise, Leedy & Ormrod (2005) described theory as an "organized corpus of concepts and principles meant to explain a particular event".

### ***2.6.1 Principal-Agent Theory***

According to Miller (2005), principal-agent theory (PAT) became popular among economist in the 1970s before its adoption by political scientists and sociologists. The theory is premised around two key actors (Walton & Jones, 2017). These are principal (voters) and the agent (politicians, groups or individuals) monitored by the principal. Walton and Jones (2017) contend that researchers examining corruption issues adopt this theory as they perceive information and preference variability between principals and agents provides fertile ground for agents to become corrupt. It can then be said that, the principals' inability to adequately supervise agents promotes corruption especially when the two do not share common goals. For

instance, citizens' inability to adequately monitor politicians has resulted in the rise of corruption in developing countries. Conversely, agents exhibiting high accountability and transparency by putting systems in place to enable effective monitoring by principals allows principals to effectively punish the agent for lapses leading to alignment of goals for both parties (Ugur & Dasgupta, 2011). Anti-corruption actors are alarmed that principal-agent response to corruption are worsening by the day especially in emergent economies where systems are weak (Zaum et al., 2012 and Persson et al., 2013). Evidence of this occurrence being the new norm abound in many literatures (Persson et al., 2013 and Walton & Jones, 2017). Walton and Jones (2017) argue that this new norm is as a result of particularistic forms of governance in developing nations through practices that disrupt the principal-agent relationship. For example, the appointment of dishonest and corrupt agents by principals has weakened the principals' ability to demand transparency and accountability from agents (You, 2015 & Aspinall, 2016).

### ***2.6.2 Transaction Cost Theory***

Transaction cost theory advocates for the modification of governance structure in order to reduce total cost associated with external conditions of a given transaction (Schmidt & Wagner, 2019). This theory is well grounded within supply chain management (Ketchen & Hult, 2007) and purchasing and supply management (Ellram et al., 2008). A plethora of studies within purchasing and supply chain management have been underpinned by transaction cost theory (Bals & Turkulainen, 2017; Ruth et al., 2015; Wynstra et al., 2018). For instance, Wynstra et al. (2018), employed transaction cost theory to assess the dissimilarity between purely goods and goods with services transaction. They concluded that services cause greater uncertainty and as a result attract additional costs to address induced uncertainty across the procurement cycle. Transaction which is the unit of analysis for this theory is defined as an exchange of information, services or goods between successive phases of a production process (Williamson,

1998). For example, there is always the need to collate information, negotiate and manage contracts and maintain closer relationships with suppliers which generate transaction costs (Dyer, 1997). Hobbs (1996) defines search and information cost as cost associated with seeking information (price, quality, availability etc) about goods and services. Likewise, bargaining cost arise after vendor has settled on a supplier and have to engage with the supplier to finalize price, terms and conditions of contract. This is followed by monitoring of contract execution to ensure that suppliers meet the quality standards and timelines as enshrined in the contract. The transaction theory is underpinned by two major suppositions about human behavior. These are bounded rationality and opportunism (Williamson, 1998). Under bounded rationality, as introduced by Simon (1972), consideration is given to cognitive restrictions when dealing with human behavior. Even though people might want to be rational with their actions, however, their difficulties to process and comprehend information at their disposal sets boundary on their rational decision making (Grover & Malhotra, 2003). Opportunism has to do with the risk that individuals would always wish to seek their self-interest. These behaviours include holding back information, collusion and other forms of contract violation (Gulbrandsen et al., 2009).

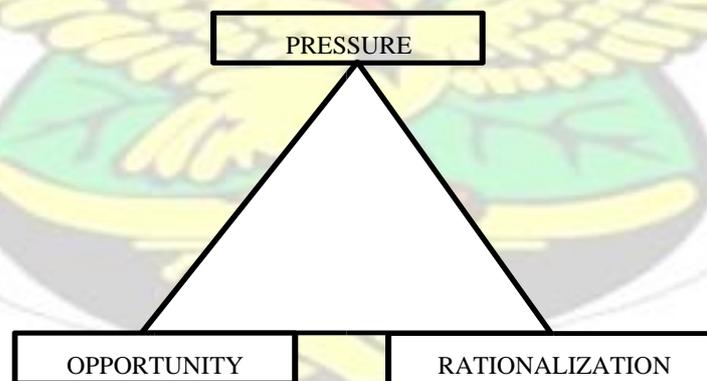
### ***2.6.3 Technology Acceptance Model***

According to Lee et al. (2011), the technology acceptance model (TAM) is the most popular theory that researchers use to account for how people and organizations receive information technology. TAM is useful in explaining attitude of users (Davis, 1989) as well as the effect of perceived ease of use (PEOU) and perceived usefulness (PU) towards adopting an information system (Venkatesh & Davis, 2000). However, TAM has been castigated for not entirely demonstrating the nature of consumer adoption. This shortfall in TAM have been addressed by other studies (i.e., Kim, 2016; Lee et al., 2011; Morosan & DeFranco, 2014) through the extension of the TAM model by the addition of more antecedents (Min et al., 2019). For instance, Kim (2016) introduced subjective norm and perceived credibility antecedents into the

framework and investigated their influence on behavioral intention of customers toward the uptake of hotel tablet apps. Also, according to Morosan and DeFranco (2014), subjective norm, PU, and PEOU are important factors that influence club members' inclination to use mobile devices in clubs. PEOU is defined as "the degree to which a person feels that utilizing a specific system would be free of effort," whereas PU is defined as "the degree to which a person believes that adopting a particular system would increase his or her job performance" (Van van Heijden, 2003). The positive or bad feelings of users toward the use of a particular technology also known as Attitude (Kim, 2016) determines the intention of users to adopt that technology (Wang et al., 2012).

#### **2.6.4 Fraud Triangle Theory**

Cressey (1950) by examining 250 convicts within a duration of 5 months put together the fraud triangle theory. However, it was in 1953 that the theory was published. The theory states that three conditions must prevail for a fraudster to undermine trust. These conditions are opportunity, pressure/incentive and rationalization as shown in Figure 2.1.



**Figure 2.1: Fraud Triangle (Cressy, 1953)**

Albrecht et al. (2006) opined that when defining pressure or opportunity to perpetrate fraud it is important to associate the word perceived with them as pressure or opportunity to perpetrate fraud might be imaginary and is only contingent on the fraudster's perceptions. The major factor in perpetrating fraud is pressure or incentive (Lister, 2007). He further identified personal, employment and external stress as kinds of pressure. Vona (2008) suggested that

some individual and corporate stress are notable motivational agents for fraud commitment. According to Abdullahi and Mansor (2018), greed, extravagance, debt, family financial challenges and drug abuse are all examples of stress. A besotted fortitude towards attaining organizational goals despite the consequences also leads to fraud (Hooper & Pornelli, 2010). Opportunity is the flaws in a system that provides chance, power and enables staff of organizations to take undue advantage or perpetrate fraud (Rasha & Andrew, 2012). The more fragile the internal control system of firms, the more likely that fraud can be concealed (Abdullahi & Mansor, 2018). This assertion is further attested to by Hooper and Pornelli (2010) who contend that, no matter the pressure on an employee, financial fraud can only occur as a result of existing opportunity within a firm. Hence, weakness in internal control, weak auditing system, poor accounting documentation and poor segregation of duty promote fertile grounds for fraud (Abdullahi & Mansor, 2018).

According to Abdullahi and Mansor (2018), rationalization is when the perpetrator believes that fraudulent and unethical behaviour is not criminal but another thing. By this definition, the perpetrator exhibits various kinds of morally acceptable behaviours to justify his or her fraudulent actions. Thus, perpetrators can only commit fraud when they are able to justify unethical behavior. Fraudsters will use moral behavior like "I was only borrowing the money," "I was entitled to the money," "I had to steal to provide for my family," and "I was underpaid/my employer had defrauded me" as justifications (Cressey 1953). One must note that identifying fraud rationalization is extremely difficult as it impossible to read the mind of fraudsters (Cressey, 1953). Even though Cressey (1953) postulates that pressure, opportunity and rationalization are inter-related and all three must be present before fraud can occur. However, Howe and Malgwi (2006) argue the rationalization of fraud is the link between pressure and opportunity.

### ***2.6.5 Diffusion of Innovation Theory***

A plethora of studies adopted TAM to describe technology acceptance by users. However, the use of TAM alone to explain technology acceptance is inadequate (Abdullahi & Mansor, 2018). To address this, numerous studies suggested combining TAM with other theories such as diffusion of innovation theory (DIT) in order to better understand and explain user acceptance of technology (Lee et al., 2011). DIT is an expanded social and psychological theory that explains user acceptance of technology by their adoption motif and comprehension structures to prognosticate users' decision making in relation to the adoption of new technology (Rogers, 1995). According to Rogers (1995), the five innovation traits that are precursors to technology uptake are: i. competitive advantage compared to existing technology or way of doing things (cost saving or perceived convenience); ii. simplicity (ease of use); iii. consistency (compatibility with existing technology, beliefs, needs, and past experiences of potential users); iv. noticeability (observable implication); and v. reliability (dependability). DIT focuses more on innovation characteristics that describe why users adopt a new technology or how users decide to adopt a particular technology as compared to TAM (Rogers, 1995 and Wang et al., 2012). Furthermore, diffusion is defined as the dissemination of technology or innovation as a result of people talking to others about the uptake of such innovation (Rogers, 2002). Sarker & Wells (2003) adds that social factors are key in describing one's uptake of mobile technology. Thus, the explanation of technology uptake cannot be comprehensive without the consideration of social systems (Abdullahi & Mansor, 2018). They further argued that there is the need to add social factors to the five technology traits of DIT.

### ***2.6.6 Task-Technology Fit Theory***

Task-technology fit (TTF) theory construct was introduced by Goodhue and Thompson (1995) and they defined it as “the degree to which a technology assists an individual in performing his or her portfolio of tasks”. Other researchers built on this construct to create TTF theory

(Furneaux, 2012). They contend that when technologies are compatible with task, they positively impact work outcomes. In order to provide good understanding of this theory, five key elements of the theory will be discussed.

To begin with, the theory contends that the right integration of tasks and technologies can produce outcomes considerably higher than the sum of their parts (Howard & Rose, 2019). Theories such as media synchronicity theory (MST) and TAM have pointed out properties of technologies that have direct impact on performance - processing capabilities, transmission capabilities, and media capabilities (Dennis et al., 2008 and Lin, 2012). However, TTF theory highlights the overall reliance of technologies for the purposes they were developed and does not indicate technology pairings in order to achieve a strong mutual effect (Howard & Rose, 2019). Secondly, TTF theory suggest that interaction of task and technology characteristics through TTF influence performance outcomes (Howard & Rose, 2019). Thirdly, researchers believe that TTF not only influence performance outcomes but it also has direct influence on user reactions (Lee & Lehto, 2013 and Lin, 2012). For example, if there is a fit between a technology and task, users are expected to recognize it. Also, users are expected to recognize and appreciate the value addition. In this regard, TTF can be said to influence user reactions such as perceived usefulness and pleasure. Fourthly, TTF theory propose that utilization moderates the association of TTF with outcome and user reactions (Pelzer et al., 2015). This point to the fact that TTF cannot impact performance if people do not use technology. Finally, researchers propose that TTF directly influence utilization (Zigurs & Khazanchi, 2008). It may seem surprising that a predictor has influence on a moderator, however, there is no theoretical or statistical basis to doubt this occurrence (Hayes, 2017).

## **2.7 Empirical Review**

In 2013, Odago and Mwajuma conducted research on the elements that contribute to Kenya's successful adoption of e-procurement. The study used a descriptive research methodology to

collect data from the Kajiado County tender committee members. It was established that factors such as top management support, financial allocation, employee competency, and information technology base affected how well e-procurement was implemented. Similar to this, Basheka et al. (2012) evaluated key success factors (CSFs) that affect the adoption of e-procurement technology in Uganda's public sector using factor analysis. The study came to the conclusion that cautious supplier involvement, systematic risk management techniques, systematic organizational process redesign, employment of knowledgeable consultants, and careful selection of software providers affect the uptake of e-procurement. Afolabi et al. (2020) investigated the ambiguities in the Nigerian public procurement system to identify the best e-procurement solutions for them. Frequencies, percentages, bar charts, and categorical regression were the statistical methods used to examine the data that was gathered for the study. The study identified key grey areas or areas thought to have a high frequency of procurement fraud, including bidding competition, interpersonal interactions, and paperwork in the procurement process. Web portals, e-tendering tools and e-award tools were identified as technologies that will help minimize corruption at these grey areas. These studies did not consider the anti-corruption capabilities of e-procurement.

The perceived readiness of potential tenderers to use e-procurement for the supply of goods and services in Nepal was examined by Neupane et al. (2014). The inferential approach used to analyze the information obtained from respondents was structural equation modeling (SEM). The study found that the factors of information asymmetry, trust, transparency, and accountability had a substantial impact on tenderers' intentions to adopt electronic procurement. Similar study was conducted by Siti and Habiburrochman (2020) in Venezuela to examine the impact of monopoly power, transparency and accountability and asymmetric information on adoption of e-procurement to curb procurement fraud. Their findings concurred with those of Neupane et al. (2014). Also, Mutangili (2019) assessed the contribution of e-

procurement techniques to Kenya's battle against fraud and corruption in public procurement. The study came to the conclusion that e-procurement is effective at preventing procurement fraud and corruption because it is transparent. The degree to which e-procurement implementation decreased procurement corruption instances in Indonesia and India was examined by Kartika (2020) using a mixed technique. The results show that major capital projects were more likely to engage in corrupt procurement practices, while the adoption of e-procurement considerably decreased procurement fraud. However, in India e-procurement was not effective in reducing procurement fraud due to staff's low competency and professionalization as well as excessive political interference in public institutions. In Nigeria, Aduwo et al. (2020) evaluated the anti-corruption capacities of e-procurement in the delivery of building projects using a relative relevance index and categorical principal component analysis. The ability of e-procurement to enable good inventory management and record keeping, accountability by offering audit services trails, and minimizing direct human connections during bidding were the top-ranked anti-corruption elements from the study. In terms of the factor analysis, the advantages of e-Procurement over the conventional paper-based method, the transparent nature of the bidding process, the rise in bidder competition and the decline in the number of needless projects, the disclosure of procurement information, and the reduction in the number of actual human interactions during the bidding process all directly impacted the reduction of procurement fraud. Wicaksono et al. (2017) examine the relationship between e-procurement, internal controls and internal auditing and procurement fraud prevention employing SEM in Indonesia. The study revealed a significant positive relation between e-procurement and internal auditing and procurement fraud reduction. The effectiveness of Malaysia's e-procurement system in lowering lobbyist engagement in public procurement was researched by Said et al. in 2017. The interview method was employed to get the responses' opinions. According to the interview findings, the automated and open aspect of

electronic procurement helps to lessen the role of lobbyists in the procurement procedures. Also, e-procurement was perceived to fend off direct communication between vendors and suppliers, thus, reducing the risk of lobbying.

Numerous studies have been conducted in Ghana in relation to e-procurement. In 2015, Aazanlerigu and Akay looked into the potential and difficulties of e-procurement in a few particular public entities. The study's inferential tool was the one-way analysis of variance (ANOVA). According to the report, the main obstacles to e-procurement adoption in public institutions are staff competency, an inadequate regulatory framework, a lack of technology infrastructure, and security of procurement transaction data. Similar to this, Asare and Prempeh (2017) used factor analysis to examine the variables that affect the adoption of e-procurement at Technical Universities. It was shown that significant factors influencing the adoption of e-procurement include information technology base, public procurement legislation, management commitment, and employee competency. The findings of Asare and Prempeh (2017) and Aazanlerigu and Akay (2015) were supported by subsequent research on e-procurement in public institutions (Ofori and Fuseini, 2020; Addo, 2019; Osei-Tutu, 2019). Moreover, Boakye et al. (2019) evaluated how e-procurement improved the responsiveness of procurement management in a subset of mining enterprises. The analysis of the information received from respondents using the linear regression technique. The study came to the conclusion that e-procurement increases the effectiveness and efficiency of procurement processes. Similarly, Ujakpa et al. (2016) investigated the difficulties in getting multinational corporations in the oil and gas industry to adopt and use e-procurement.

The barriers to e-procurement adoption and acceptance by multinational companies were identified as end-user resistance, difficulty in changing purchasing-related employee behavior, risks associated with the e-procurement process, lack of system integration and standardization, external business risk, technology risk, immaturity of e-procurement-based market services,

and risks. Furthermore, Sarpong et al. (2018) assessed how the e-procurement system affected public hospital performance and procurement methods. The results of the study demonstrated that e-procurement significantly improves hospitals' procurement practices and performance. The anti-corruption capabilities of e-procurement were not taken into account in these researches carried out in Ghana. Thus, empirical research is required to pinpoint Ghana-specific e-procurement anti-corruption elements.

## 2.8 Theoretical Framework

Lidow (1999) suggested that a process can only improve or change by creating the enabling environment for the change to occur. He went further to identify different variables (ducks) that must be properly implemented and monitored to achieve the desired changes. The list of anti-corruption capabilities of e-procurement compiled from literature is indicated in Table 2.3 below.

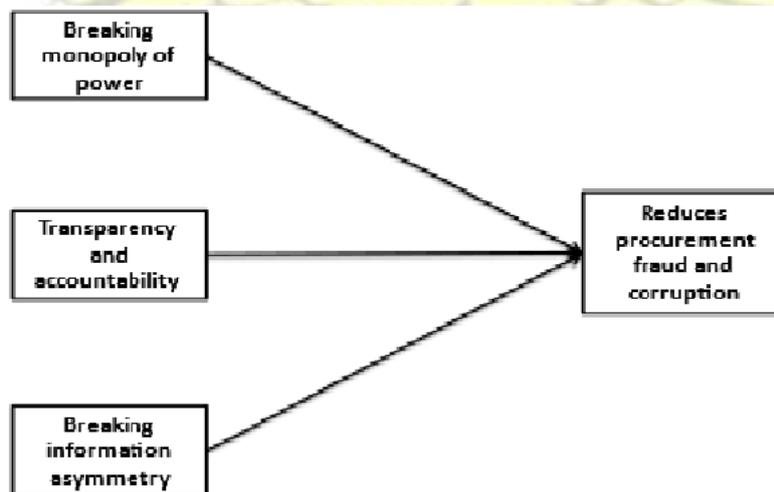
**Table 3.2 Study E-procurement Anti-corruption Factors**

S/N	E-procurement Anti-corruption Factors	Sources
1	Access to procurement information on real time basis or real time bidding	Adebiyi et al., 2010; Neupane et al., 2012; Ibem & Laryea, 2015
2	Automation of procurement process	Sohail & Cavill, 2008; OECD, 2016; Neupane et al., 2012
3	Increase competition among the bidders/suppliers /vendors	Hanna, 2010 ; OECD, 2016
4	Reduction in the levels of human interactions in the bidding process	Sohail & Cavill, 2008; OECD, 2016; World Economic Forum , 2016
5	Standardization of procurement information	Neupane et al., 2012
6	Monitoring and tracking audit trail	Vaidya, 2007; Aman & Kasimin, 2011; World Economic Forum , 2016;

S/N	E-procurement Anti-corruption Factors	Sources
7	Efficient and secured online exchange of procurement information	Hanna, 2010; Adebisi et al., 2010; Neupane et al., 2012
8	Disclosure of procurement information	Sohail & Cavill, 2008; Pathak et al., 2009; Neupane et al., 2012
9	Easier and faster procurement process	Hanna, 2010; Ibem & Laryea, 2015
10	Obtain the best quality services/product at competitive price	World Economic Forum, 2016
11	Reduction of cartel formation, collusion and bid riggings	Pathak et al., 2009
12	Improvement in audit analysis	Neupane et al., 2012; World Economic Forum, 2016

Source: Aduwo et al. (2020)

Thus, e-procurement anti-procurement factors are the ducks that must be properly prepared, executed and monitored in order to reduce or combat procurement fraud and corruption. The theoretical framework for the study is shown in Figure 2.2 below.



*Figure 2.2: Theoretical Framework for the Study (Neupane et al., 2012)*

### **2.8.1 Breaking of Monopoly of Power**

An important part of procurement process is the provision of goods and services, and stakeholders are best served when these goods and services are provided in a transparent

manner. When it comes to the provision of products and services, officials of organizations may "have monopoly of power that is crucial in understanding the incidence of corruption without stealing" (Neupane et al., 2012). Furthermore, Klitgaard (1988) noted that corruption frequently occurs when a business or an official has exclusive control over the acquisition of an item or service. When it comes to the granting of contracts, this is particularly frequent in poor nations where many tenders are given to preferred firms or bidders due to corruption (Neupane et al., 2014). E-procurement can automate the procurement process, reduce the amount of human involvement during the bidding process, and control cartel formation, collusion, and bid rigging (Neupane et al., 2014 and Aduwo et al., 2020). Hence, reducing the likelihood of corruption.

### ***2.8.2 Breaking of Information Asymmetry***

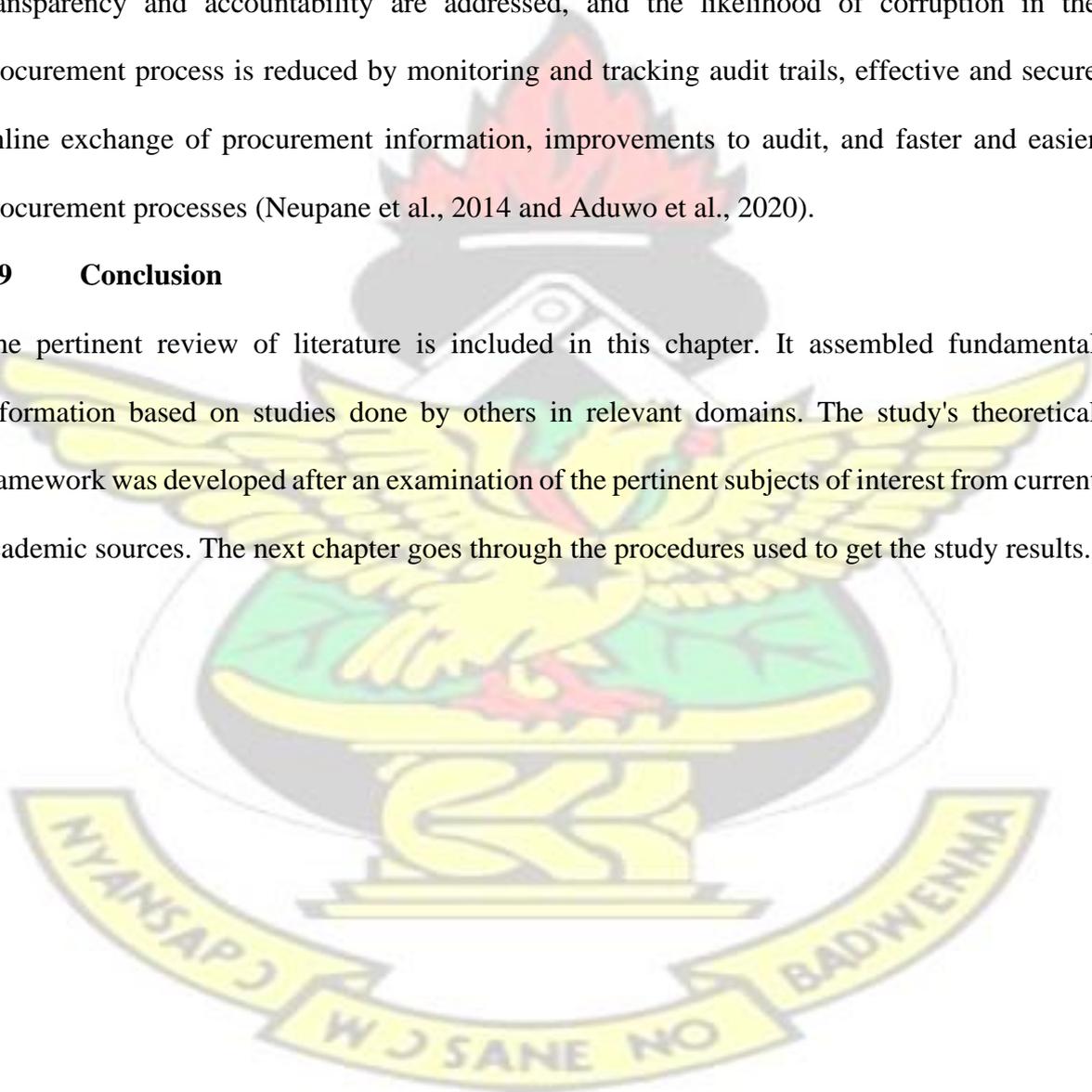
A crucial element of the principal-agent theory is information asymmetry (Amagoh, 2009). There is a principal-agent relationship between bidders and clients' tender administrators during the procurement process (Finkle, 2005; Larbi, 2006). Information asymmetry develops in a contract between clients and bids when the agent or principal has more information than the other (Amagoh, 2009). Missing data, a contract that isn't complete, problems with monitoring procedures, and how the projects are set up during the contracting process are all causes of these kinds of information gaps (Finkle, 2005; Gauld, 2007; Taylor, 2005). Standardization of procurement data, acquiring the highest-quality services or goods at a reasonable cost Information asymmetry issues and the risk of corruption in procurement are reduced through increased competition among bidders, suppliers, and vendors, access to real-time procurement information or real-time bidding, and disclosure of procurement information (Neupane et al., 2014 and Aduwo et al., 2020).

### ***2.8.3 Transparency and Accountability***

Procurement is guided by the values of transparency and openness. Transparency is widely acknowledged as the cornerstone of effective governance (Parigi & Kailasam, 2004). Lack of transparency and accountability increases the likelihood that agents may abuse their positions for corrupt motives (Neupane et al., 2014). In some instances, the representatives of bids and clients bargain with one another to generate a dishonest outcome. The perceived benefits of transparency and accountability are addressed, and the likelihood of corruption in the procurement process is reduced by monitoring and tracking audit trails, effective and secure online exchange of procurement information, improvements to audit, and faster and easier procurement processes (Neupane et al., 2014 and Aduwo et al., 2020).

### **2.9 Conclusion**

The pertinent review of literature is included in this chapter. It assembled fundamental information based on studies done by others in relevant domains. The study's theoretical framework was developed after an examination of the pertinent subjects of interest from current academic sources. The next chapter goes through the procedures used to get the study results.



## CHAPTER THREE

### METHODOLOGY

#### 3.1 Introduction

The study's methodology as well as the research design are presented in this chapter. Also, it aims to characterize and clarify the intended audience, sample techniques, data gathering tools, and analytic processes.

#### 3.2 Research Philosophy

There is never a single, conventional, or accurate way to do a piece of research, according to Simon (1978). This is so that a problem can be approached in a variety of ways—some excellent, some poor, but most likely multiple good methods. There isn't one ideal design. The answer to an algebraic problem is not the same as a study methodology for a specific issue. It's more akin to a beef stroganoff recipe: there is no one approach to solving problems (Simon, 1978). While agreeing that there is no one right approach to conduct scientific research, Feyereisl et al. (1994) hastily added that scientific techniques should make mention of "empirical testability". Empirical research is that which is based on experience, experimentation, or observation. This suggests that choosing the right methodology is essential to reaching the goal of every research project.

To explain why a certain research approach was chosen, it is important to list the numerous research possibilities. While choosing a research option, it should be advised to use a "research onion" (Collis et al., 2003). This is made up of the research philosophy, then an approach, a time frame, and a plan for conducting the research. According to Collis et al. (2003), the most common paradigms (philosophies) are positivism, interpretivism, and realism. Each philosophy is established, observed and measured by different perspectives of our understanding of the world (Neuman & Kreuger, 2003). Researchers are guided by research philosophies in selecting suitable methods of inquiry in order to better and successfully carry out the research and to also acquire knowledge at the end.

### **3.2.1 Positivism**

Natural sciences typically adopt positivism. The goal of positivist science is to socially design society by developing societal laws. This dealt with a departure from religious dogma and a return to empirical evidence (Amponsah, 2010).

Under this philosophy, the researcher is an objective analyst who does an impartial interpretation of collected data using defined methodology to enable replication and on quantifiable observations to allow for statistical analysis (Nagpal *et al.*, 1997). It is assumed that the researcher is neutral (Remenyi & Sherwood-Smith, 1998). According to Collis *et al.* (2003), qualitative data could be used in positivist research.

### **3.2.2 Interpretivism**

With this concept, the researcher aims to understand the participants' subjective reality and interpretation. According to Cavana (2001), this philosophy is applied when a researcher wants to comprehend socially produced meaning from the perspective of a person or group of individuals. Usually, constructionism or social constructionism serves as the foundation for this ideology.

### **3.2.3 Realism**

According to Riege (2003), the basis of realism philosophy is the conviction that reality exists apart from human perceptions and assumptions. It is believed by realists that people's social interpretations and behaviours are impacted by external and objective reality which may not be noticeable to them. This paradigm also acknowledges that people cannot be studied like the natural scientist studies objects. It rather recognizes the importance of comprehending how people interpret and understand socially produced meanings. The paradigm offers the researcher a comprehensive view of the study situation in this regard. Yet, it is vital that the researcher keep in mind that the real world could differ from their unique description of it (Amponsah, 2010).

### **3.3 Research Strategy**

Three research strategies have been identified by researchers, namely, quantitative, qualitative and mixed researches (Creswell & Creswell, 2017; Collis & Hussey, 2013; Saunders et al., 2009).

#### **3.3.1 Quantitative Research**

Quantitative research uses statistical investigation techniques to arrive at numerical results upon which conclusions are drawn. Inferences on parameters are made after undertaking statistical analysis (Creswell & Creswell, 2017). A given set of statistical techniques are employed to transform numerical data into information that is easy to understand and interpret through this method. According to Bello (2016) studies such as experimental studies, surveys, cohort studies and case control studies can be examined by employing quantitative research approach. Knight & Ruddock (2008) further posit that surveys can employ both numerical and non-numerical data depending on the statistical technique employed. Partiality or subjectivity is eliminated in quantitative method as the researcher detaches himself/herself from the study participants. Creswell and Creswell (2017) profess that when it comes to evaluating hypotheses and illustrating relationship between dependent and independent variables, quantitative method is the best approach to use.

#### **3.3.2 Qualitative Research**

According to Collis and Hussey (2013), qualitative method evaluates distribution free information such as belief, judgement and extent of satisfactions. Thus, qualitative research enables the researcher to make inferences on a particular phenomenon or event. Researchers make sense out of the quality of data collected. There is a strong attachment by the researcher to the study giving rise to predilection or bias (Creswell & Creswell, 2017). However, it is possible to employ Likert scale in qualitative research and use statistical tools to analyze such data (Woods, 2006).

### **3.3.3 Mixed Research**

Mixed research strategy uses both qualitative and quantitative approaches in solving a research problem by employing either sequential, concurrent or transformative research design (Collis & Hussey, 2013).

#### **3.3.3.1 Sequential**

With sequential, the researcher expands the findings of one method with the other. Thus, researcher uses his/her discretion in deciding which of the two methods to start with (Collis & Hussey, 2013).

#### **3.3.3.2 Concurrent**

Under concurrent approach, the researcher uses both quantitative and qualitative data so as to considerably interrogate the research problem (Collis & Hussey, 2013). Hence, the researcher embeds one form of data within the other so that both data are gathered together.

#### **3.3.3.3 Transformative**

Transformative approach employs both sequential and concurrent approaches in a specific study (Collis & Hussey, 2013). Also, the researcher is at liberty to commence with any of the two approaches and end with the other.

### **3.3.4 Adopted Research Strategy**

This study intends to examine the anti-corruption capability of e-procurement in selected companies within the Ghanaian mining sector without determining the causal factors. The adoption of quantitative method would permit the researcher to establish the relationship between e-procurement anti-corruption factors and reduction in procurement fraud and corruption within the mining sector through the use a statistical technique.

### 3.4 Survey Population

Ninety (90) study participants (i.e., clients' representatives and vendors of the clients) were selected across four (4) companies within the mining sector. The companies and participants selected have not less than five (5) years of experience in e-procurement.

Out of the 90 questionnaires that were distributed, 68 (75.6%) were collected. Three (3) responses (3.3%) were removed during the data cleaning procedure, leaving 65 (72.2%) valid responses for data analysis. The number of valid responses is significant and sufficient for factor analysis because the minimal sample size criterion is a ratio of at least 5 observations per variable (O'Rourke, Hatcher, & Stepanski, 2005). The high response rate was a result of the researcher's vast network in the mining sector, constant email reminders, phone contacts, and in-person visits to respondents. The high response rate could also be attributed to the questionnaire's clarity. The breakdown of responses for the questionnaires issued is shown in Table 3.1.

**Table 3.1: Questionnaires Return Rate**

Description	Vendors		Clients		Total	
	Number	%	Number	%	Number	%
Valid Response	37	67.3	28	80.0	65	72.2
Discarded	2	3.6	1	2.9	3	3.3
No Response	16	29.1	6	17.1	22	24.5
Total	55	100	35	100	90	100%

Source (Field Data, 2022)

### 3.5 Sampling Technique

The sample size of a study is contingent on factors such as time, budget and study uncertainties (Rea & Parker, 1997). Purposive sampling technique was employed for this study given the nature of the study, time and budget challenges. The method is a type of non-probability sampling which permits the researcher to particularly earmark certain people within the study population based on a well-defined criterion or criteria (Tongco, 2007). He further stated that

purposive sampling technique if rightly used is more effective and efficient juxtaposed to random sampling technique.

### 3.6 Study Outline

The study commenced with the establishment of research gap and developing the study's theoretical framework by conducting a thorough literature review. The study questionnaire was subsequently developed and a pilot study carried out. The study questionnaire was subsequently finalized with input from the pilot study. Full survey was subsequently conducted to gather data for analysis. Table 3.2 and 3.3 show the stages of the entire research.

**Table 3.2: Phase 1- Pilot Study with 15 Participants from the Mining Sectors**

Stage	Item	Timeline
1	Literature Review leading to problem clarification	5 <sup>th</sup> August 2022
2	Definition of research concepts and theoretical framework	10 <sup>th</sup> August 2022
3	Development of e-procurement anti-corruption factors list and initial study questionnaire.	10 <sup>th</sup> August 2022
4	Collection of data from 15 respondents within the mining sector	15 <sup>th</sup> – 30 <sup>th</sup> August 2022
5	Development of Final questionnaire.	15 <sup>th</sup> September 2022

**Table 3.3: Phase II – Main Study (Survey Conducted for 90 study population)**

Stage	Item	Timeline
6	Data collection activities	18 <sup>th</sup> September 2022 - 18 <sup>th</sup> November 2022
7	Data inputting and analysis	30 <sup>th</sup> November 2022
8	Discussions, conclusions and recommendations	15 <sup>th</sup> December 2022
9	Submission of research	15 <sup>th</sup> January 2023

### 3.7 Survey Instrument Design

List of e-procurement anti-corruption factors was initially gathered from literature. The list was then studied by a panel of five (5) e-procurement experts from academia, clients and their vendors in the Ghanaian mining sector. The panel of experts comprised of two (2) experts each from clients and their vendors and one (1) expert from academia. The minimum years of experience in e-procurement in the mining sector for the experts was five years. The panel was permitted to also add any other factor they deemed relevant but missing in the list and to also

remove from the list factors they deemed unimportant to the Ghanaian context. At the end of this exercise, the panel adopted 12 out of the 18 list of e-procurement anti-corruption factors compiled by Aduwo et al. (2020).

A single-staged and cross-sectional survey design was used for this study. The questionnaire comprised of two (2) sections as indicated in Appendix 1. Section one (1) allowed the researcher to gather information regarding participants profile. These included information on participants' gender, level of education, number of years of experience in e-procurement, etc. This information will enable the researcher understand the value he/she has to place on the responses gathered from participants. Under section two (2), research participants were requested to indicate the extent to which e-procurement anti-corruption factors reduce procurement fraud and corruption in the mining the sector. The five-point Likert scale (Jamieson, 2004; Allen & Seaman, 2007; Carifio & Perla, 2008) on which the variables in the questionnaire were evaluated are: 1 – not significant; 2 – slightly significant; 3 – moderately significant; 4 – very significant and 5 - extremely significant. The questionnaire was subsequently finalized by incorporating comments gathered from the pilot study and the finalized questionnaire distributed to the study participants.

### **3.8 Validity and Reliability**

The experience of the researcher and team of advisors was used to ensure that the survey instrument was of high quality and robustness. The researcher was very careful in the design of the research questions for the variables bearing in mind the possible introduction of errors should questions be misrepresented to participants (Huck & Cormier, 1996). According to Kouzes and Posner (1995) validity explains whether an instrument adequately measures what is to be measured by the participants. The accuracy of the survey instrument with regards to topics to be measured is referred to as content validity. A research tool's validity is determined by how well it captures the variables that it is intended to capture (Leedy & Omrod, 2001). In

this instance, the issues regarding the content validity of the survey instrument are taken care of by using e-procurement anti-corruption factors identified in literature and shaping them up through focus group discussions with experts from the Ghanaian mining sector. A measurement tool's level of reliability is determined by how consistently it generates data while the characteristic being measured has not changed. One can evaluate reliability using the test-retest strategy, the split-half method, and the usage of recognized metrics (Babbie, 2007). In addition to Cronbach's alpha ( $\alpha$ ), the test-retest method may be used to assess reliability (Hair et al., 2006). Bassioni et al. (2008) employ Cronbach's alpha as a metric for internal consistency and reliability. Cronbach's alpha, which can be carried out with the aid of SPSS, was the method employed in this study to evaluate the reliability of the measurement device. In exploratory research, Cronbach's alpha may drop as low as 0.60, which is the generally acknowledged lower bound (Hair et al., 2006). According to Cooper and Schindler (2001), the ultimate test of a sample design is how effectively it represents the features of the population it wants to represent. The sample must also be valid in terms of measurement. The accuracy and precision of a sample are two factors that affect its validity. "Accuracy is the extent to which sampling bias is absent" (Cooper & Schindler, 2001). The standard error of estimate, a sort of deviation measurement, is used to assess precision; the lower the standard error of estimate, the higher the level of precision of the sample (Cooper & Schindler, 2001). To determine the perceived relevance of e-procurement anti-corruption components of procurement activities carried out in particular Ghanaian mining businesses, the survey instrument was created with validity and reliability in mind.

### **3.8.1 Content Validity**

Content validity examines how emblematic a study construct is in terms of the constructs capability to give valid results (Ives et al., 1983). Therefore, the validity of the study is dependent on the representativeness of the content of the survey questionnaire with regards to

the particular subject being examined. It is however important to note that there is no statistical instrument to sufficiently measure content validity (Cooper & Schindler, 2006). Hence, content validity of studies is attained through the use of experts' panel (Cooper & Schindler, 2006).

### **3.8.2 Face Validity**

Face validity simply evaluates whether the survey instrument appears (at face value) to measure what it intends to (Bhattacharjee, 2012). The main objective is to measure the ease of use of questionnaires, their clarity and decipherability (Burton & Mazerolle, 2011b). The process of pre-testing the questionnaire was supported by the face validity. Researchers conducting pilot studies helps in the achievement of face validity. The pilot study enables researchers to determine if questions asked are relevant and appropriate for the study. Thus, researchers are able to make appropriate changes to the study questionnaire before launching the main study survey.

### **3.9 Data Analysis**

Using SPSS 23, the demographic data was analyzed to identify the characteristics of respondents, including their training, age, years of experience in e-procurement, etc. The results were reported using frequency, percentages, means, and standard deviations (Trochim & Donnelly 2008). The inferential statistical technique employed in this study to examine the relationship between the variables that were measured was factor analysis.

Factor analysis is a statistical approach for describing how variables in a research study are primarily structured (Bandalos & Finney, 2018). The method condenses data from a large number of variables into more manageable groupings of relevant clusters (Hair et al., 2014; Pallant, 2020).

Factor analysis has long been used in many studies. Factor analysis was used in studies like Cheung and Yeung (1998) and Pongpeng and Liston (2003). The appropriateness of the data is the most crucial factor to be taken into account. According to Fidell et al. (1996), the two

most important elements to look at are sample size and the degree of connection between variables. Factor analysis was utilized as an inferential approach for this investigation due to the vast number of study-related components and the requirement to group the factors for meaningful interpretation. Hence, Kaizer- Meyer- Olkin (KMO) and Barlett test of sphericity was used to evaluate the adequacy of the data for this study (Hair et al., 2014). The method use Varimax rotation to extract factors with eigenvalues greater than unity using principal components analysis (Lin et al., 2011). The optimal number of research factor components based on eigenvalues is further supported by the use of scree plot. Plotting the latent roots versus the number of components in their extraction sequence yields the Scree plot and the resulting curve is used to establish the cut-off point (Hair et al., 2014). Factors having eigenvalue values greater than one are kept for further investigation, according to Fellows and Liu (2008).

### **3.10 Protection of Human Subjects**

The researcher ensured highest ethical considerations in line with the policies of Kwame Nkrumah University of Science and Technology at all times during his engagement with the respondents who volunteered to participate in the study. The main ethical considerations were to ensure that participants do not suffer intentional physical harm, discomfort, mental anguish, embarrassment, or loss of privacy (Cooper & Schindler, 2001).

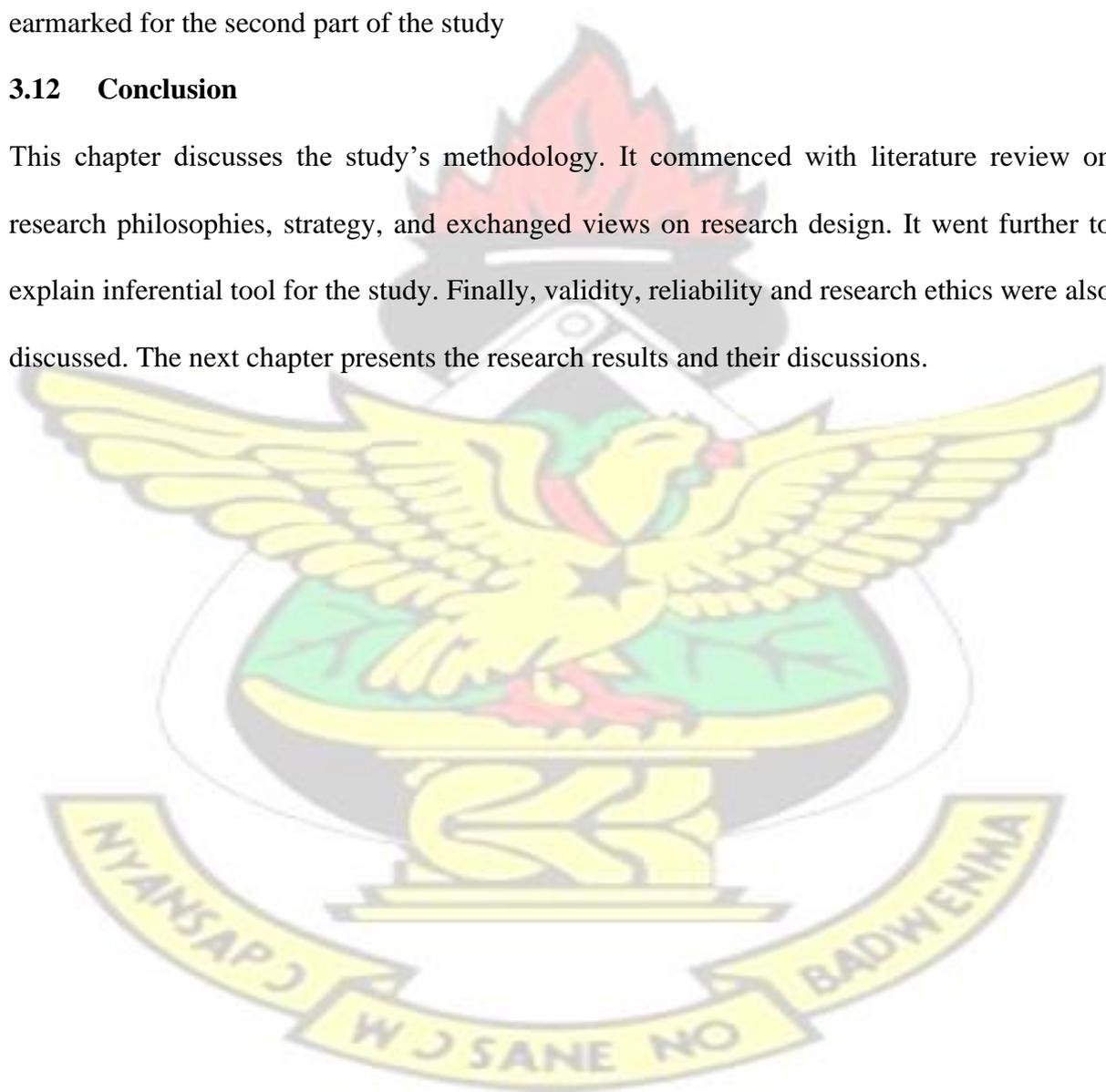
### **3.11 Pilot Study**

Polit & Beck (2014) and Van Teijlingen & Hundley (2001) postulate that a pilot study is a small-scale of a full-size study intended to pre-test research instruments or questionnaire. Thus, the preliminary version of research instrument developed through experts' panel and literature review are pre-tested through a mini survey. The phase I of the study was a pilot study of the quantitative approach where views of 15 respondents on extent to which e-procurement anti-corruption factors reduce procurement fraud and corruption in the mining sector were analyzed.

The importance of this approach was to adapt the already established e-procurement anti-corruption factors to those of the Ghanaian mining sector. The content of the questionnaire was modified in terms of wording to provide the Ghanaian context to the earlier draft wherever necessary following the feedback from the survey. In research, validity can be established using a panel of experts or a field test. Thus, the pilot study was a tool to attain face and content validity for the study (Burton & Mazerolle, 2011a). In the end, a list of 12 factors was earmarked for the second part of the study

### **3.12 Conclusion**

This chapter discusses the study's methodology. It commenced with literature review on research philosophies, strategy, and exchanged views on research design. It went further to explain inferential tool for the study. Finally, validity, reliability and research ethics were also discussed. The next chapter presents the research results and their discussions.



## CHAPTER FOUR

### RESULTS AND DISCUSSION

#### 4.1 Introduction

This chapter presents the data on perspectives of internal and external respondents associated with the four (4) mining companies selected for the study. The statistical analysis of the data as well as the discussion of the results are also presented in this chapter.

#### 4.2 Results

This section presents the study's descriptive and inferential results.

##### 4.2.1 Profile of Respondents

The assessment of respondents' backgrounds in surveys, according to Creswell and Creswell (2017), ensures the validity and trustworthiness of study results. The background of respondents has an impact on the credibility and integrity of the data collected (Dainty, 2008). The descriptive statistical approach used to analyze the collected demographic data in order to provide clarity and a complete understanding is percentages. According to Hallowell and Gambatese (2009), education and years of experience of respondents are excellent predictors of professional expertise.

**Table 4.1 displays the characteristics of the respondents that participated in the study.**

Variable	Frequency	Percent	Mean (SD)
Gender of respondent			
Male	59	90.8	NA
Female	6	9.2	
Total	65	100	
Highest level of academic achievement			
Diploma	15	23.1	NA
Bachelors	39	60	
Masters	11	16.9	
Total	65	100	
Training in e-procurement?			
Yes	51	78.5	NA
No	14	21.5	
Total	449	100	
Role in project delivery			
Client	28	43.1	NA

Variable	Frequency	Percent	Mean (SD)
Vendor	37	56.9	
Total	65	100	
Years of e-procurement experience in the mining sector			
5 - 10 years	41	63.1	11.85 (5.117)
Above 10 years	24	36.9	
Total	65	100	

Source: Field Data (2022)

#### ***4.2.1.1 Gender of respondents***

Table 4.1 shows that there were 6 female responses out of the total 65 respondents, or 9.2% of the sample. This is a clear example of the domination of men in the mining industry.

#### ***4.2.2.2 Highest level of academic achievement of respondents***

Table 4.1 illustrates this: A diploma is held by 15 respondents (23.1%), a bachelor's degree by 39 respondents (60.0%), and a master's degree by 11 respondents (16.9%). It also suggests that those surveyed were aware of how to complete the forms.

#### ***4.2.2.3 Respondents trained in e-procurement***

Only 14 (21.5%) of the 65 valid responses lacked e-procurement training, as shown in Table 4.1. Therefore, it can be claimed that the respondents have formal training in e-procurement in addition to their academic credentials and professional experience. This also supports the claim that respondents understood and appreciated the anti-corruption features of e-procurement.

#### ***4.2.2.4 Role in project delivery***

Table 4.1 reveals that 37 responses (56.9%) were provided by vendors, while 28 responses (43.1%) came from clients' representatives. In light of this, it may be said that respondents' assessments of the study's variables fall into a variety of relatively balanced groups.

#### ***4.2.2.5 Years of e-procurement experience of respondents***

According to Table 4.1, of the 65 valid responses, 41 people (63.1%) had between 5-10 years of experience with e-procurement in the mining industry, while the remaining 24 people

(36.9%) had more than 10 years of experience. This demonstrates the depth of the respondents' experience in the study's subject matter.

#### 4.2.2 Mean Scores for Scales

For a particular set of statistical data, the standard deviation measures how consistently and changeably respondents comprehend certain factors (Motulsky, 2003). As a result, it is seen as significant when it comes to the trustworthiness and validity of research results (Motulsky, 2003). A standard deviation of less than 1.00 denotes strong consistency and little changeability. Low variability and high consistency in the respondents' perception of the variable are suggested by a modest standard deviation (less than 1.00) linked with the mean scores of the variables or qualities being measured (Field, 2005). Because the standard deviations were less than 1.00 for all the variables examined, it can be concluded that the study participants' replies had low variability and good consistency. The details are shown in Table 4.2 below.

**Table 4.2: Mean Score for Scales**

Notation	Scale Item	Minimum	Maximum	Mean	Std. Deviation
SF1	Reduction in the levels of human interactions in the bidding process	3.00	5.00	4.358	0.706
SF2	Automation of procurement process	3.00	5.00	4.302	0.745
SF3	Reduction of cartel formation, collusion and bid riggings	3.00	5.00	4.179	0.837
SF4	Increase competition among the bidders/suppliers /vendors	2.00	5.00	3.783	0.926
SF5	Access to procurement information on real time basis or real time bidding	2.00	5.00	3.726	0.911
SF6	Easier and faster procurement process	2.00	5.00	3.962	0.850
SF7	Monitoring and tracking audit trail	2.00	5.00	3.849	0.903
SF8	Efficient and secured online exchange of procurement information	3.00	5.00	4.302	0.719
SF9	Improvement of audit and analysis	3.00	5.00	4.443	0.677
SF10	Standardization of procurement information	3.00	5.00	4.434	0.648
SF11	Obtain the best quality services/product at competitive price	3.00	5.00	4.236	0.711
SF12	Disclosure of procurement information	3.00	5.00	4.302	0.706

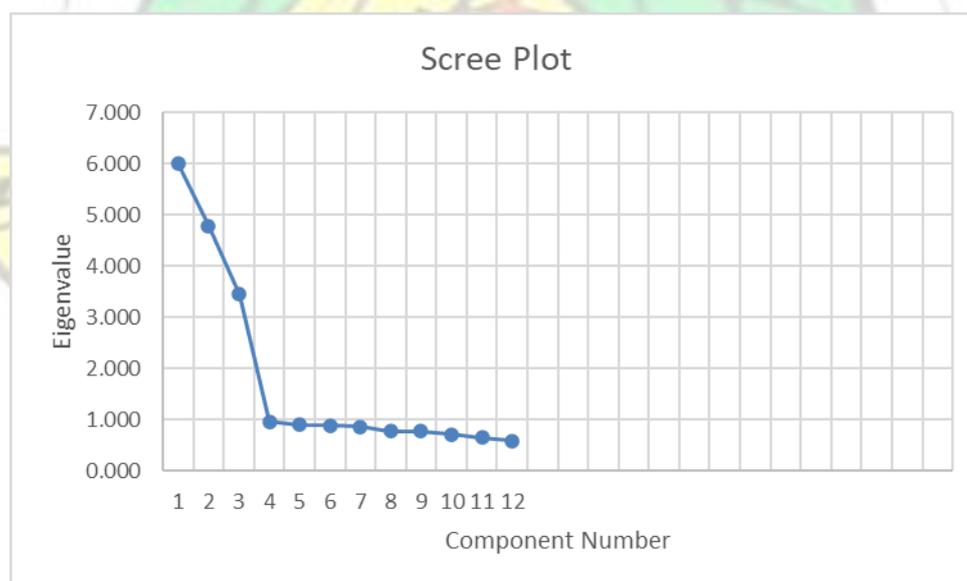
### 4.2.3 Inferential Analysis

For a set of data to be considered for factor analysis, the KMO measure of sampling adequacy must have a value of 0.600 (Hair et al., 2014). As a result, the KMO value of 0.632 for this study, as shown in Table 4.3, is thought to be more than sufficient to deserve factor analysis. Additionally, the approximate Chi-Square result for the Bartlett test of sphericity was 412.828, with a significance level of 0.000. This is unmistakable proof that the variables are likely to be related. Additionally, it is a sign that there may be possible groupings and that the population matrix is not an identity matrix (Hair et al., 2014).

**Table 4.3: KMO and Bartlett's Test**

Test	Value
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.632
Bartlett's Test of Sphericity	Approx. Chi-Square
	412.828
	Df
	120
	Sig.
	0.000

The study's variables were then separated into their component parts using exploratory factor analysis (EFA). It is clear from the Scree plot in Figure 4.1 that three (3) factor components were anticipated from the EFA. The elements with eigenvalues above one are those.



**Figure 4.1: Scree Plot for the Study's E-procurement Anti-corruption Variables**

Table 4.4 displays the three (3) elements with eigenvalues greater than one (6.010, 4.792, and 3.448), and it also illustrates that these three (3) elements reduce 67.7% of procurement fraud and corruption in the mining sector.

**Table 4.4: Total Variance Explained for E-procurement Anti-corruption Factors**

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	6.010	38.234	38.234	6.010	38.234	38.234	3.964	36.357	36.357
2	4.792	22.101	60.335	4.792	22.101	60.335	2.919	20.567	56.923
3	3.448	7.363	67.698	3.448	7.363	67.698	2.787	10.774	67.698
4	.963	6.999	74.697						
5	.901	6.509	81.206						
6	.891	5.203	86.409						
7	.862	4.719	91.128						
8	.782	3.668	94.796						
9	.776	1.778	96.574						
10	.710	1.399	97.973						
11	.654	1.089	99.062						
12	.588	0.938	100.000						

Note:

- Component 1: Breaking Monopoly of Power
- Component 2: Transparency and Accountability
- Component 3: Breaking Information Asymmetry

The elements with eigenvalues greater than one were monopoly of power, information asymmetry, and transparency and accountability. To verify the reliability and validity of the components found through the EFA, a confirmatory factor analysis (CFA) was carried out. Cronbach's alpha ( $\alpha$ ) acceptable threshold is 0.7 (Hair et al. 2014), composite reliability (CR) values should be higher than 0.7, and average variance extracted (AVE) values should be greater than 0.4 (Peterson, 2000), both of which are required for model confirmation based on CFA (Nunally & Bernstein, 1978). Values over the cutoff of 0.7 for each construct  $\alpha$  indicate that the elements extrapolated from the analysis are regarded sufficient in fighting procurement fraud and corruption. Table 4.5 displays the findings of the reliability and the factor analyses.

**Table 4.5: Factor Loadings of Variables, Construct Cronbach's Alpha Values, Composite Reliability values and Average Variance Extracted**

<b>Notation</b>	<b>Construct</b>	<b>Variables</b>	<b>Factor Loading</b>	<b>A</b>	<b>CR</b>	<b>AVE</b>
SF1	Breaking the Monopoly of Power	Reduction in the levels of human interactions in the bidding process	0.896	0.803	0.862	0.678
SF11		Access to procurement information on real time basis or real time bidding	0.859			
SF3		Reduction of cartel formation, collusion and bid riggings	0.703			
SF7	Transparency and Accountability	Monitoring and tracking audit trail	0.834	0.781	0.861	0.676
SF8		Efficient and secured online exchange of procurement information	0.724			
SF9		Improvement of audit and analysis	0.899			
SF6		<i>Easier and faster procurement process</i>	0.124			
SF10	Breaking Information Asymmetry	Standardization of procurement information	0.682	0.773	0.789	0.557
SF2		Automation of procurement process	0.748			
SF12		Disclosure of procurement information	0.803			
SF5		<i>Obtain the best quality services/product at competitive price</i>	0.376			
SF4		<i>Increase competition among the bidders/suppliers /vendors</i>	0.209			

### 4.3 Discussions of Results

This section discusses the e-procurement anti-corruption factors identified by this study.

#### 4.3.1 *Breaking of Monopoly of Power*

Breaking of monopoly of power is the most significant factor that fight against procurement fraud and corruption in the selected Ghanaian mining companies. It accounts for 38.3% of the reduction in procurement fraud and corruption in those companies. It comprises the reduction in the levels of human interactions in the bidding process; access to real-time procurement information; and reduction of cartel formation, collusion, and bid riggings based on the rotated factor pattern. This result confirms the findings of Neupane et al. (2014) and Aduwo (2020). One of the key elements influencing the likelihood of corruption is the monopoly of official power (Klitgaard, 1988). This study underlines that the monopoly of power held by clients' executives (principal) is a significant cause of corruption in principal-agent relationships and that the best way to do away with that authority is through e-procurement. Numerous studies (Sohail & Cavill, 2008; Pictet & Bollinger, 2008; WEF as cited by Sharma & Soederberg, 2020) have shown that using online platforms to carry out project delivery activities, among other things, helps to eliminate opportunities for face-to-face requests and payments of bribes and collusion in the bidding process, leading to transparent procurement process. Additionally, it aids in preventing the creation of cartels and bidder collusion, which Oyewobi et al. (2011) identified as one of the ways corruption manifests in the Nigerian construction industry. Furthermore, the study by Zakaria, et al. (2014), confirmed that using e-tendering prevents participants in construction procurement activities from having direct human physical contact with one another and is essential in battling corruption in the execution of construction projects in Malaysia.

### **4.3.2 Transparency and accountability**

Transparency and accountability accounts for 22.1% of the reduction in procurement fraud and corruption in those companies. They consist of three (3) factors, namely: monitoring and tracking audit trail; efficient and secured online exchange of procurement information; and improvement of audit and analysis.

According to the study's findings, procurement fraud and corruption are reduced by transparency and accountability associated with e-procurement. Kolstad and Wiig's (2009) professed that transparency can prevent opportunistic rent-seeking, maintain standards of honesty and trust, and lessen political and administrative corruption. The automation feature of e-procurement, which Sohail and Cavill (2008) identified as a very important feature of e-procurement that reduces the incidence of corrupt practices in procurement process, can be linked to its ability to provide audit services trail. This is because automation, among other things, makes it possible to streamline and speed up the procurement process, share sensitive information securely online and monitor the progress of projects. These elements, in accordance with OECD (2016), facilitate the detection of integrity violations, unlawful payments, embezzlement, and other unethical practices throughout the procurement process. The study finding is affirmed by Neupane et al. (2014) and Aduwo et al. (2020) as well.

### **4.3.3 Breaking of Information Asymmetry**

The study identified breaking of information asymmetry as having the least impact on procurement fraud and corruption reduction with a percentage of 7.4%. It is made up of: standardization of procurement information; Automation of procurement process; and disclosure of procurement information.

An important component in the principal-agent relationship that contributes to an information gap, an incomplete contract, and a problem with contract monitoring is information asymmetry.

Asymmetrical information, according to Singh and Sirdeshmukh (2000), raises the likelihood

of opportunistic action. In a similar vein, Wathne and Heide's (2000) study asserted that information asymmetry creates favorable circumstances for opportunism. Studies (Ibem & Laryea, 2015; Aduwo, et al., 2017) have demonstrated that e-procurement aids in the removal of information asymmetry related to the conventional paper-based technique of procurement. The OECD (2016) asserts that e-procurement prevents the use of bribes and favoritism in the selection of service providers and suppliers by promoting the: disclosure of information; the use of standard and uniform information; and automation of the procurement process. In fact, less information asymmetry directly reduces the likelihood of corruption in the public procurement process. As a result, this study supports the claim that e-procurement helps to prevent corruption and solve asymmetrical information problems. Again, the finding that breaking information asymmetry significantly reduces procurement fraud and corruption is corroborated by Neupane et al. (2014) and Aduwo et al. (2020).

#### **4.4 Conclusion**

The chapter puts forward the data and the statistical analysis of the responses from the research participants. Subsequently, the results are further discussed to provide meaning to the data and the analysis carried out. The next chapter is the summary, conclusion, and recommendation of the research study.

## CHAPTER FIVE

### CONCLUSION AND RECOMMENDATIONS

#### 5.1 Introduction

The purpose of this study was to determine the anti-corruption capability of e-procurement in selected companies in the Ghanaian mining sector. Accordingly, research questions were formulated in line with the research objectives, which the researcher set out to look for answers. This chapter, therefore, presents the study conclusion and recommendations

#### 5.2 Summary of Findings

The introduction emphasized the amount of money that is spent on procurement globally. The effects of fraud and corruption on the economies and quality of life of people living in developing countries are then discussed. The study's main objective is to assess how well e-procurement may reduce procurement fraud and corruption in four (4) Ghanaian mining enterprises. The subsequent assessment of the literature indicated that previous studies in Ghana had made no attempt to identify the anti-corruption elements of e-procurement that lessen fraud and corruption in the procurement process. Therefore, this gap is filled by investigating the anti-corruption capacities of e-procurement in four (4) Ghanaian mining firms. Opinions of 65 vendors and client representatives on the ability of e-procurement to prevent procurement fraud and corruption were then obtained using self-administered questionnaires based on their experience of e-procurement with the selected mining companies. The data was then analyzed using factor analysis, which revealed the breaking of monopoly of power, transparency and accountability, as well as breaking of information asymmetry, as e-procurement anti-corruption variables that combat procurement fraud and corruption in the Ghanaian mining sector. These findings are consistent with other similar research conducted in developing countries. For instance, research by Ojha and Palvia (2012) on five e-government projects (e-procurement project) in India's fight against corruption revealed that e-government initiatives were more successful in doing so. In the same vein, Neupane et al. (2014) and

Aduwo (2020) established that e-procurement combats procurement fraud and corruption in Nepal and Nigeria respectively. Overall, the study's findings imply that e-procurement reduces corruption and fraud in the procurement processes of Ghanaian mining firms.

### **5.3 Conclusion**

The most effective e-procurement factors for preventing procurement fraud and corruption are breaking of monopoly of power, followed by transparency and accountability, and breaking of information asymmetry. The results add to the body of knowledge on e-procurement in underdeveloped countries while also expanding it in Ghana. As a result, the study supports earlier research as well.

### **5.4 Recommendations**

The following are recommended to Government of Ghana and procurement professionals.

#### **5.4.1 Policy Reform**

This study showed that e-procurement is a crucial electronic tool that aids in modernizing and integrating the outdated paper-based government procurement system. Government of Ghana should urgently consider amending the current procurement regulation to make e-procurement mandatory for public procurement in order to fight against procurement fraud and corruption, which is rampant in the public sector. This recommendation is based on the following reasons:

- i. The use of e-procurement provides real-time information, consistent procurement procedures, fairness and openness, increased competition among bidders and reduces information asymmetry issue between the clients' representatives and bidders.
- ii. The introduction of e-procurement, which provides automation, auditing capabilities, and facilitates accounting control would help to reduce the monopoly power of government officials or clients' representatives.

- iii. Increasing confidence between clients and bidders by using e-procurement provides transaction security, a user-friendly setting, anytime and anywhere bidding, monitoring, and online tracking, among other benefits.
- iv. The implementation of e-procurement contributes to a quicker order procurement cycle, a single management framework, greater competition, avoiding human involvement and reduce transaction costs.

#### **5.4.2 Implications for Practitioners**

The study's findings offer:

- i. The improvement of procurement professionals' knowledge on anti-corruption capabilities of e-procurement and the basis for its incorporation into the design of procurement systems. Thus, e-procurement can be employed as a "watchdog" for the integrity of the procurement process and its ability to cut down on procurement red tape.
- ii. A deeper comprehension of procurement professionals' knowledge on the potential of e-procurement to fight against corruption. Hence, motivating them to advocate for its implementation by government and the private sector as part of an anti-corruption agenda.

## REFERENCES

- Abdullahi, R., & Mansor, N. (2018). Fraud prevention initiatives in the Nigerian public sector: understanding the relationship of fraud incidences and the elements of fraud triangle theory. *Journal of Financial Crime*.
- Aboelazm, K. S. (2022). E-procurement in the international experience: an approach to reduce corruption in administrative contracts in Egypt. *International Journal of Procurement Management*, 15(3), 340-364.
- Addo, S. K. (2019). Challenges of E-Procurement Adoption in the Ghana Public Sector: A Survey of in the Ministry of Finance. *Journal DOI*, 10, 22501991.
- Adjei-Bamfo, P. (2017). *Mainstreaming Sustainable Public Procurement in Ghana's Public Sector: The Role of E-Government (Dissertation, University of Ghana)*.
- Adindu, C., Diugwu, I., Yusuf, S., & Musa, M. (2020). Issues of corruption in construction projects and infrastructure development in Nigeria: An empirical approach. In *Supporting Inclusive Growth and Sustainable Development in Africa-Volume I* (pp. 191-200). Palgrave Macmillan, Cham.
- Aduwo, E. B., Ibem, E. O., Afolabi, A. O., Oluwumi, A. O., Tunji-Olayeni, P. F., Ayo-Vaughan, E. A., & Oni, A. A. (2020). Exploring anti-corruption capabilities of e-procurement in construction project delivery in Nigeria. *Construction Economics and Building*, 20(1), 56-76.
- Aduwo, E. B., Ibem, E. O., Ayo-Vaughan, E. A., Uwakonye, U. O., & Owolabi, J. D. (2017). E-procurement use in the Nigerian building industry. *International Journal of Electronic Commerce Studies*, 8(2), 219-254.
- Afolabi, A., Ibem, E., Aduwo, E., & Tunji-Olayeni, P. (2020). Digitizing the grey areas in the Nigerian public procurement system using e-Procurement technologies. *International Journal of Construction Management*, 1-10.
- Ahsan, K., & Gunawan, I. (2010). Analysis of cost and schedule performance of international development projects. *International journal of project management*, 28(1), 68-78. <https://doi.org/10.1016/j.ijproman.2009.03.005>
- Albrecht, W., Albrecht, C. C., & Albrecht, C. O. (2004). Fraud and corporate executives: Agency, stewardship and broken trust.
- Allen, I. E., & Seaman, C. A. (2007). Likert scales and data analyses. *Quality progress*, 40(7), 64-65.
- Al-Moalla, A., & Li, D. (2010). Organizational issues with electronic government procurement: A case study of the UAE. *The Electronic Journal of Information Systems in Developing Countries*, 41(1), 1-18.
- Amagoh, F. (2009). Information asymmetry and the contracting out process. *The Innovation Journal: The Public Sector Innovation Journal*, 14(2), 1-14.
- Ameyaw, E. E., Pärn, E., Chan, A. P., Owusu-Manu, D. G., Edwards, D. J., & Darko, A. (2017). Corrupt practices in the construction industry: Survey of Ghanaian experience. *Journal of Management in Engineering*, 33(6), 05017006.
- Amponsah, R. (2010). *Improving project management practice in Ghana with focus on agriculture, banking and construction sectors of the Ghanaian economy* (Doctoral dissertation, RMIT University).
- Arminen, H., Pekkanen, T. L., & Sappinen, J. (2021). Corruption, resource policies and

- economic growth. In *Handbook of Sustainable Politics and Economics of Natural Resources* (pp. 218-229). Edward Elgar Publishing.
- Asare, E. N., & Prempeh, K. B. (2017). An empirical assessment of factors that influence the implementation of e-procurement in technical universities in Ghana. *Journal of Logistics Management*, 6(2), 52-60.
- Asian Development Bank (ADB) (2006). *Economic & Social Commission for and the Pacific Development Bank Institute Public Procurement Service of the Republic of Korea, E-procurement*, United Nations Publication, Thailand.
- Aspinal, E. (2016). The Corruption Morass in Indonesia: Adverse Selection, Electoral Clientelism and Bureaucratic Corruption. In *American Political Science Association Annual Meeting, Philadelphia*.
- Azanlerigu, J. A., & Akay, E. (2015). Prospects and challenges of e-procurement in some selected public institutions in Ghana. *Prospects*, 7(29), 61-76.
- Kenya. *International Journal of Business & Law Research in African Literatures*, 1.
- Babbie, E. R., Halley, F., & Zaino, J. (2007). *Adventures in social research: Data analysis using SPSS 14.0 and 15.0 for Windows*. Pine Forge Press.
- Bacharach, S.B. (1989). 'Organizational theories: Some criteria for evaluation', *Academy of management review*, vol. 14, no. 4, pp. 496-515.
- Bachmann, R., & Inkpen, A. C. (2011). Understanding institutional-based trust building processes in inter-organizational relationships. *Organization Studies*, 32(2), 281-301.
- Baily, P., Farmer, D., Crocker, B., Jessop, D. and Jones, D. (2008). *Procurement Principles And Management, 10th ed.* Prentice Hall, Harlow: Pearson.
- Bals, L., & Turkulainen, V. (2017). Achieving efficiency and effectiveness in Purchasing and Supply Management: Organization design and outsourcing. *Journal of Purchasing and Supply Management*, 23(4), 256-267.
- Bandalos, D. L., & Finney, S. J. (2018). Factor analysis: Exploratory and confirmatory. In *The reviewer's guide to quantitative methods in the social sciences* (pp. 98-122). Routledge.
- Basheka, B., Oluka, P. N., & Mugurusi, G. (2012). Adopting new approaches for public procurement efficiency: critical success factors (CSFs) for the implementation of e-procurement in Uganda's public sector.
- Bassioni, H. A., Abd El-Razek, M. E., & Mobarak, A. M. (2008). Causes of delay in building construction projects in Egypt. *Journal of construction engineering and management*, 134(11), 831-841.
- Barratt, M. (2004). Understanding the meaning of collaboration in the supply chain. *Supply Chain Management: an international journal*.
- Bello, W. (2018). *Project performance diagnostics: a model for assessing construction project performance in Nigeria* (Doctoral dissertation, University of Salford, Manchester).
- Belisari, S., Appolloni, A., & Cerruti, C. (2019). Positive and negative impacts of the adoption of e-procurement solutions: The Italian market case. *International Journal of Procurement Management*, 12(2), 219-241.
- Bhattacharjee, A. (2012). *Social science research: Principles, methods, and practices*, 2nd edition, Open Access Textbooks, Book 3, [http://scholarcommons.usf.edu/oa\\_textbooks/3/](http://scholarcommons.usf.edu/oa_textbooks/3/).
- Boakye, H.M, Asante, D, & Dadzie, E.B. (2019). The Role of Electronic Procurement in

- Enhancing Responsiveness of Procurement Management: An Empirical Study on Selected Mining Companies in Ghana. *European Journal of Business and Management*, 11(25), 67-72.
- Bondzi, T. (2010). 'Benefit of e-procurement', *E-Procurement Bulletin*, Vo1. No. 4, p.6.
- Bukari, E. N. (2014). *Safeguards against corruption in roads sector procurement of works in Ghana (MSc. Dissertation, KNUST)*.
- Burton, L. J., & Mazerolle, S. M. (2011a). Survey instrument validity part I: Principles of Survey instrument development and validation in athletic training education research. *Athletic Training Education Journal*, 6(1), 27-35.
- Burton, L. J., & Mazerolle, S. M. (2011b). Survey instrument validity part II: validation of a Survey instrument examining athletic trainers' knowledge and practice beliefs regarding exertional heat stroke. *Athletic Training Education Journal*, 6(1), 36-45.
- Burton, R. A. (2005). Improving integrity in public procurement: the role of transparency and accountability. *Fighting Corruption and Promoting Integrity in Public Procurement*, 23-8.
- Carifio, J., & Perla, R. (2008). Resolving the 50-year debate around using and misusing Likert scales. *Medical education*, 42(12), 1150-1152.
- Collis, J., & Hussey, R. (2013). *Business research: A practical guide for undergraduate and postgraduate students*. Macmillan International Higher Education.
- Cooper, D. R., & Schindler, P. S. (2001). *Business Research Methods: Avenue of The Americas*, New York: The McGraw-Hills Companies.
- Cooper, D. R., Schindler, P. S., & Sun, J. (2006). *Business research methods* (Vol. 9, pp. 1-744). New York: Mcgraw-hill.
- Cressey, D.R. (1953). *A study in the social psychology of embezzlement: Other people's money*, Glencoe, IL: Free Press.
- Creswell, J. W., & Creswell, J. D. (2017). *Research design: Qualitative, quantitative, and mixed methods approaches*. Sage publications.
- Dainty, A. (2008). Methodological pluralism in construction management research. *Advanced research methods in the built environment*, 1, 1-13.
- Dauda, H., Sayibu Suhuyini, A., & Antwi-Boasiako, J. (2020). Challenges of the Public Accounts Committee of Ghana's Parliament in ensuring an efficient public financial management. *The Journal of Legislative Studies*, 26(4), 542-557.
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS quarterly*, 319-340.
- Dennis, A. R., Fuller, R. M., & Valacich, J. S. (2008). Media, tasks, and communication processes: A theory of media synchronicity. *MIS quarterly*, 575-600.
- Dubelaar, C., Sohal, A., & Savic, V. (2005). Benefits, impediments and critical success factors in B2C E-business adoption. *Technovation*, 25(11), 1251-1262.
- Dyer, J. H. (1997). Effective interim collaboration: how firms minimize transaction costs and maximise transaction value. *Strategic management journal*, 18(7), 535-556.
- Dza, M., Kyeremeh, E., Dzandu, S. S., & Afran, S. (2018). Corruption in Public Procurement in Ghana: societal norm or deviant behaviour?. *Archives of Business Research*, 6(12).
- Ellram, L. M., Tate, W. L., & Billington, C. (2008). Offshore outsourcing of professional services: A transaction cost economics perspective. *Journal of operations Management*, 26(2), 148-163.
- Essel, E. A. (2021). The Consequences of Public Procurement and Its Associated

- Irregularities in Ghana. *Academic and Applied Research in Military and Public Management Science*, 20(1), 55-65.
- Eric, H. M. B. D. A., & Dadzie, B. (2019). The Role of Electronic Procurement in Enhancing Responsiveness of Procurement Management: An Empirical Study on Selected Mining Companies in Ghana.-level of adoption and role of procurement
- Fellows, R. F., & Liu, A. M. (2021). *Research methods for construction*. John Wiley & Sons.
- Fidell, S., Silvati, L., Howe, R., Pearsons, K. S., Tabachnick, B., Knopf, R. C., ... & Buchanan, T. (1996). Effects of aircraft overflights on wilderness recreationists. *The Journal of the Acoustical Society of America*, 100(5), 2909-2918.
- Finkle, A. (2005). Relying on information acquired by a principal. *International Journal of Industrial Organization*, 23(3-4), 263-278.
- Frimpong, S. (2014). Ghana begins electronic procurement system. *Ghana Business News, Daily Graphic*. [Online] Available from <https://www.ghanabusinessnews.com>.
- Furneaux, B. (2012). Task-technology fit theory: A survey and synopsis of the literature. *Information systems theory*, 87-106.
- Gauld, R. (2007). Principal-agent theory and organisational change: lessons from New Zealand health information management. *Policy Studies*, 28(1), 17-34.
- Goodhue, D. L., & Thompson, R. L. (1995). Task-technology fit and individual performance. *MIS quarterly*, 213-236.
- Grover, V., & Malhotra, M. K. (2003). Transaction cost framework in operations and supply chain management research: theory and measurement. *Journal of Operations management*, 21(4), 457-473.
- Gulbrandsen, B., Sandvik, K., & Haugland, S. A. (2009). Antecedents of vertical integration: Transaction cost economics and resource-based explanations. *Journal of Purchasing and Supply Management*, 15(2), 89-102.
- Ibem, E. O., Aduwo, E. B., Afolabi, A. O., Oluwunmi, A. O., Tunji-Olayeni, P. F., Ayo-Vaughan, E. A., & Uwakonye, U. O. (2021). Electronic (e-) procurement adoption and users' experience in the Nigerian construction sector. *International Journal of Construction Education and Research*, 17(3), 258-276.
- Ibem, E. O., & Laryea, S. (2015). e-Procurement use in the South African construction industry. *Journal of Information Technology in Construction (ITCon)*, 20(23), 364-384.
- Hallowell, M. R., & Gambatese, J. A. (2009). Construction safety risk mitigation. *Journal of Construction Engineering and Management*, 135(12), 1316-1323.
- Hayes, A. F. (2017). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. Guilford publications.
- Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2006). *Multivariate data analysis* 6th Edition. Pearson Prentice Hall. New Jersey.
- Hair Jr, J.F., Sarstedt, M., Hopkins, L. and Kuppelwieser, V.G. (2014). Partial least squares structural equation modeling (PLS-SEM): An emerging tool in business research. *European business review*.
- Hobbs, J. E. (1996). A transaction cost approach to supply chain management. *Supply Chain Management: An International Journal*.
- Hooper, M. J., & Pornelli, C. M. (2010). Deterring and detecting financial fraud: A platform For action. *Center for audit quality*.
- Hosseini, R. (2012). *Appraising of critical success factors for customer relationship management in Islamic Republic of Iran* (Doctoral dissertation, National Agrarian University of Armenia).

- Howard, M. C., & Rose, J. C. (2019). Refining and extending task–technology fit theory: Creation of two task–technology fit scales and empirical clarification of the construct. *Information & Management*, 56(6), 103134.
- Howe, M. A., & Malgwi, C. A. (2006). Playing the ponies: A \$5 million embezzlement case. *Journal of Education for Business*, 82(1), 27-33.
- Huck, S. W., & Cormier, W. H. (1996). Principles of research design. *Reading statistics and research*, 578-622.
- Hui, W. S., Othman, R., Omar, N. H., Rahman, R. A., & Haron, N. H. (2011). Procurement Issues in Malaysia. *International journal of public sector Management*, 24(6), 567–593.
- Ives, B., Olson, M. H., & Baroudi, J. J. (1983). The measurement of user information satisfaction. *Communications of the ACM*, 26(10), 785-793.
- Jamieson, S. (2004). Likert scales: How to (ab) use them?. *Medical education*, 38(12), 1217-1218.
- Kaliannan, M., Awang, H., & Raman, M. (2009). Electronic procurement: a case study of Malaysia's e-Perolehan (e-procurement) initiative. *International Journal of Electronic Governance*, 2(2), 103.
- Kashap, S. (2004, October). Public procurement as a social, economic and political policy. In *International public procurement conference proceedings* (Vol. 3, No. 1, pp. 133-147).
- Kartika, D. (2022). The Impact of E-Procurement Implementation on Public Procurement's Corruption Cases; Evidence from Indonesia and India. *Jurnal Kajian Wilayah*, 11(2), 193-212.
- Ketchen Jr, D. J., & Hult, G. T. M. (2007). Bridging organization theory and supply chain management: The case of best value supply chains. *Journal of operations management*, 25(2), 573-580.
- Kierkegaard, S. M. (2006). Going, going, gone! E-procurement in the EU. *International Journal of Computing & Information Sciences*, 4(1), 30-39.
- Kim, J. S. (2016). An extended technology acceptance model in behavioral intention toward hotel tablet apps with moderating effects of gender and age. *International Journal of Contemporary Hospitality Management*.
- Klitgaard, R. (1988). *Controlling corruption*. Univ of California Press.
- Kolstad, I., & Wiig, A. (2009). Is transparency the key to reducing corruption in resource-rich countries?. *World development*, 37(3), 521-532.
- Korir, S., Afande, F., & Mathenge, M. (2015). Constraints to Effective Implementation of E-Procurement in the Public Sector: A Survey of Selected Government Ministries in Kenya. *Journal of Information Engineering and Applications*, 5(4).
- Kouzes, J. & Posner, B. (1995). *An instructor's guide to the leadership challenge [Electronic Version]*. *The Jossey-Bass Management Series*. Retrieved January 14, 2006 from [http://media.wiley.com/assets/57/11/lc\\_jb\\_instructors\\_guide.pdf](http://media.wiley.com/assets/57/11/lc_jb_instructors_guide.pdf)
- Kraemer, K. L., & Dedrick, J. (1994). Payoffs from investment in information technology: Lessons from the Asia-Pacific region. *World Development*, 22(12), 1921-1931.
- Larbi, G. A. (2006). New public management as a template for reforms in low-income countries: issues and lessons from Ghana. *International Journal of Organization Theory & Behavior*.
- Lee, D. Y., & Lehto, M. R. (2013). User acceptance of YouTube for procedural learning: An extension of the Technology Acceptance Model. *Computers & Education*, 61, 193-208.

- Leedy, P. D., & Ormrod, J. E. (2005). *Practical research* (Vol. 108). Saddle River, NJ, USA: Pearson Custom.
- Lidow, D. (1999). Duck alignment theory: Going beyond classic project management to maximize project success. *Project Management Journal*, 30(4), 8-14.
- Lin, G., Shen, G. Q., Sun, M., & Kelly, J. (2011). Identification of key performance indicators for measuring the performance of value management studies in construction. *Journal of Construction Engineering and Management*, 137(9), 698-706.
- Lin, W. S. (2012). Perceived fit and satisfaction on web learning performance: IS Continuance intention and task-technology fit perspectives. *International Journal of Human-Computer Studies*, 70(7), 498-507.
- Lio, M. C., Liu, M. C., & Ou, Y. P. (2011). Can the internet reduce corruption? A cross-Country study based on dynamic panel data models. *Government information quarterly*, 28(1), 47-53.
- Lister, L. M. (2007). A practical approach to fraud risk: comprehensive risk assessments can enable auditors to focus antifraud efforts on areas where their organization is most vulnerable. *Internal auditor*, 64(6), 61-66.
- Mathonsi, M. D., & Thwala, W. D. (2012). Factors influencing the selection of procurement systems in the South African construction industry. *African Journal of Business Management*, 6(10), 3583.
- McMillan, J.H., & Schumacher, S. (2000). *Research in education: A conceptual introduction 5edn*, New York: Longman.
- Miller, G. J. (2005). The political evolution of principal-agent models. *Annual Review of Political Science-Palo Alto-*, 8, 203.
- Min, S., So, K. K. F., & Jeong, M. (2019). Consumer adoption of the Uber mobile application: Insights from diffusion of innovation theory and technology acceptance model. *Journal of Travel & Tourism Marketing*, 36(7), 770-783.
- Mir, F. A., & Pinnington, A. H. (2014). Exploring the value of project management: linking project management performance and project success. *International journal of project management*, 32(2), 202-217. <https://doi.org/10.1016/j.ijproman.2013.05.012>
- Mohd Daud, N., Mohammad, N., Azmi, A. E., & Mohamed, I. S. (2013). Factors influencing the usage of e-Procurement among contractor companies in Malaysia. *Business and Management Quarterly Review (BMQR)*, 4(3&4), 62-80.
- Morosan, C., & DeFranco, A. (2014). When tradition meets the new technology: An examination of the antecedents of attitudes and intentions to use mobile devices in private clubs. *International Journal of Hospitality Management*, 42, 126-136.
- Motulsky, H. J. (2003). Prism 4 statistics guide—statistical analyses for laboratory and clinical researchers. *GraphPad Software Inc., San Diego, CA*, 122-126.
- Moyes, G., Lin, P., & Landry-Jr, R. (2005). Raise the red flag: Internal Auditor.
- Mutangili, S. K. (2019). Role of E-Procurement Practices in Fighting Fraud and Corruption in Public Procurement. *Journal of Procurement & Supply Chain*, 3(2).
- Nawi, M. N. M., Roslan, S., Salleh, N. A., Zulhumadi, F., & Harun, A. N. (2016). The benefits and challenges of E-procurement implementation: a case study of Malaysian company. *International Journal of Economics and Financial Issues*, 6(7), 329-332.
- Neupane, A., Soar, J., Vaidya, K., & Yong, J. (2014). Willingness to adopt e-procurement to reduce corruption: Results of the PLS Path modeling. *Transforming Government: People, Process and Policy*.
- Neupane, A., Soar, J., & Vaidya, K. (2012). The potential of e-procurement technology for

- reducing corruption. *International Journal of Information Technology and Management*, 11(4), 273-287.
- Ngai, E. W. T., Lai, K. H., & Cheng, T. C. E. (2008). Logistics information systems: the Hong Kong experience. *International Journal of Production Economics*, 113(1), 223-234.
- Nunnally, J. C., & Bernstein, I. (1978). *Psychometric Theory*, ed. New York McGraw.
- Obat, K. G. (2016). *Critical success factors in the implementation of e-Procurement in public entities in Kisumu county, Kenya* (Doctoral dissertation, University Of Nairobi).
- Odago, M. O., & Mwajuma, A. A. (2013). Factors affecting effective implementation of e-procurement in county governments: A case study of Kajiado County, Kenya. *International Journal of Business & Law Research in African Literatures*, 1.
- Odulana, A. O., & Oyewobi, L. O. (2019). Effect of Implementation Of E-Procurement on Corrupt Practices in Nigerian Construction Industry. International Conference of Environmental Sciences, ICES 2019. 1st International Conference of the Faculty of Environmental Sciences, University of Ilorin, Nigeria.
- OECD. (2016). Preventing Corruption in Public Procurement. [online]. Available at: [www.oecd.org/gov/public-procurement/](http://www.oecd.org/gov/public-procurement/). [Accessed 10 October 2022].
- Ofori, D., & Fuseini, O. I. (2020). Electronic government procurement adoption in Ghana: critical success factors. *Advances in Research*, 21(3): 18-34.
- O'Rourke, N., Hatcher, L. and Stepanski, E. J. (2005), A step-by-step approach to using the SAS system for univariate and multivariate statistics. Cary, NC: SAS Institute Inc.
- Osei-Tutu, E., Kissi, E., Osei-Tutu, S., & Desmond, A. (2019). Evaluating critical factors for the implementation of e-procurement in Ghana. *International Journal of Procurement Management*, 12(1):1
- Osei-Tutu, E., Badu, E., & Owusu-Manu, D. (2010). Exploring corruption practices in public procurement of infrastructural projects in Ghana. *International Journal of Managing Projects in Business*.
- Owusu, E. K., Chan, A. P., & Ameyaw, E. (2019). Toward a cleaner project procurement: Evaluation of construction projects' vulnerability to corruption in developing countries. *Journal of cleaner production*, 216, 394-407. <https://doi.org/10.1016/j.jclepro.2019.01.124>
- Oyewobi, L. O., Ganiyu, B. O., Oke, A. A., Ola-awo, W. A., & Shittu, A. A. (2011). Determinants of unethical performance in Nigerian construction industry.
- Pallant, J. (2020). *SPSS survival manual: A step by step guide to data analysis using IBM SPSS*. Routledge.
- Panda, D., & Sahu, G. P. (2012). E-Procurement implementation: critical analysis of success factors' impact on project outcome. Available at SSRN 2019575.
- Parigi, V. K., & Kailasam, R. (2004). Ushering in transparency for good governance.
- Parker, D., & Hartley, K. (2003). Transaction costs, relational contracting and public private partnerships: a case study of UK defence. *Journal of Purchasing and supply Management*, 9(3), 97-108.
- Patel, P., Satrindraku, D., & Khajuria, R. (2016). A study to identify factors that affect e-procurement implementation. *International Journal of Science Technology & Engineering*, 2(9), p264-268.
- Pelzer, P., Arciniegas, G., Geertman, S., & Lenferink, S. (2015). Planning support systems and task-technology fit: A comparative case study. *Applied Spatial Analysis and Policy*, 8(2), 155-175.
- Peris, B., Kourtidis, S. I., & Saky, L. K. (2013). E-Procurement Golden Book of Good

- Practice–Final Report. *Directorate General Internal Market and Services (DG MARKT) of the European Commission.*
- Persson, A., Rothstein, B., & Teorell, J. (2013). Why anticorruption reforms fail—systemic corruption as a collective action problem. *Governance*, 26(3), 449-471.
- Pi, S. M., Liao, H. L., & Chen, H. M. (2012). Factors that affect consumers' trust and continuous adoption of online financial services. *International Journal of Business and Management*, 7(9), 108.
- Pictet, J., & Bollinger, D. (2008). Extended use of the cards procedure as a simple elicitation technique for MAVT. Application to public procurement in Switzerland. *European Journal of Operational Research*, 185(3), 1300-1307.
- Polit, D. F., & Beck, C. T. (2014). Essentials of nursing research. *Appraising evidence for nursing practice*, 8.
- Pongpeng, J., & Liston, J. (2003). Contractor ability criteria: a view from the Thai Construction industry. *Construction management and economics*, 21(3), 267-282. <https://doi.org/10.1080/0144619032000049647>
- Public Procurement Authority (PPA) (2011). *Electronic Procurement Bulletin*, Vol. 1, p.11.
- Rasha, K., & Andrew, H. (2012). The new fraud triangle. *Journal of Emerging Trends in Economics and Management Sciences*, 3(3), 20-33.
- Rea Louis, M., & Parker, R. A. (1997). Designing and Conducting Survey Research-A Comprehensive Guide, 2.
- Rogers, E.M. (2002). "Diffusion of preventive innovations." *Addictive behaviors* 27, no. 6: 989-993.
- Rogers, E. M., Singhal, A., & Quinlan, M. M. (2014). Diffusion of innovations. In *An integrated approach to communication theory and research* (pp. 432-448). Routledge.
- Rotich, G. K., & Okello, B. (2015). Analysis of use of e-procurement on performance of the procurement functions of county governments in Kenya. *International Journal of Economics, Commerce and Management*, 3(6), 1381-1398.
- Ruth, D., Brush, T. H., & Ryu, W. (2015). The use of information technology in the provision of HR compensation services and its effect on outsourcing and centralization. *Journal of Purchasing and Supply Management*, 21(1), 25-37.
- Said, J., Ishak, M. W., & Omar, N. (2017). The effectiveness of e-procurement system in reducing lobbyist involvement in public procurement. *Asia-Pacific Management Accounting Journal (APMAJ)*, 12(1), 1-27.
- Sánchez-Rodríguez, C., Martínez-Lorente, A. R., & Hemsworth, D. (2019). E-procurement in small and medium sized enterprises; facilitators, obstacles and effect on performance. *Benchmarking: An International Journal*, 27(2), 839-866.
- Sarker, S., & Wells, J. D. (2003). Understanding mobile handheld device use and adoption. *Communications of the ACM*, 46(12), 35-40.
- Sarpong, P. B., Jianguo, D., Musah, A. A. I., & Boamah, K. B. (2018). Evaluation of the Use of E-Procurement System on Procurement Practices and Performance of Public Hospitals in Ghana. *BRITISH JOURNAL OF INTERDISCIPLINARY RESEARCH*, 9(2).
- Saunders, M., Lewis P., & Thornhill, A. (2009). *Research methods for business students*. 5th ed. Prentice Hall: London
- Schmidt, C. G., & Wagner, S. M. (2019). Blockchain and supply chain relations: A Transaction cost theory perspective. *Journal of Purchasing and Supply Management*, 25(4), 100552.

- Sharma, S., & Soederberg, S. (2020). Redesigning the business of development: the case of The World Economic Forum and global risk management. *Review of International Political Economy*, 27(4), 828-854.
- Simon, H. A. (1972). Theories of bounded rationality, decision and organization. *CBR a. R. Radner. Amsterdam, NorthHolland*.
- Singh, J., & Sirdeshmukh, D. (2000). Agency and trust mechanisms in consumer satisfaction and loyalty judgments. *Journal of the Academy of marketing Science*, 28(1), 150-167.
- Siti, F., & Habiburrochman, H. (2020). The impact of monopoly power, and asymmetric information to adopt E-procurement. *Opción: Revista de Ciencias Humanas y Sociales*, (27), 57.
- Sohail, M., & Cavill, S. (2008). Accountability to prevent corruption in construction projects. *Journal of Construction Engineering and management*, 134(9), 729-738.
- Srivastava, S. K., & Agrahari, A. (2017). Benchmarking approach to improve public procurement process. *Samir K Srivastava and Amit Agrahari, Benchmarking approach to improve public procurement process, Economic and Political Weekly*, 52(20), 58-67.
- Taylor, P. (2005). Do public sector contract catering tender procedures result in an auction for "lemons"? *International Journal of Public Sector Management*.
- Toktaş-Palut, P., Baylav, E., Teoman, S., & Altunbey, M. (2014). The impact of barriers and benefits of e-procurement on its adoption decision: An empirical analysis. *International Journal of Production Economics*, 158, 77-90.
- Tongco, M. D. C. (2007). Purposive sampling as a tool for informant selection. *Ethnobotany Research and applications*, 5, 147-158.
- Trochim, W. and Donnelly, J.P. 2008. *The research methods knowledge base* Mason. OH: Cengage Learning.
- Ujakpa, M. M., Rajesh, A., Fianko, K. S., & Asirifi, G. O. (2016). Challenges of adoption and acceptance of e-procurement on supply chain management practices on multinational companies in the oil and gas industry: the case of developing countries–Eni Oil Exploration Company-Ghana. *Int. J. Sales Mark. Manage.(IJSMM)*, 13(2), 1-25.
- Vaidya, K., Callender, G. C., & Sajeev, A. S. M. (2017). Facilitators of Public E-procurement: Lessons learned from the UK, US, and Australian Initiatives. In *International handbook of public procurement* (pp. 473-490). Routledge.
- Van der Heijden, H. (2003). Factors influencing the usage of websites: the case of a generic portal in The Netherlands. *Information & management*, 40(6), 541-549.
- Van Teijlingen, E. R., & Hundley, V. (2001). The importance of pilot studies. *social research UPDATE*,(35). Guildford: University of Surrey.
- Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Management science*, 46(2), 186-204.
- Vona, L. W. (2012). *Fraud risk assessment: Building a fraud audit program*. John Wiley & Sons.
- Wang, Y. S., Wu, S. C., Lin, H. H., Wang, Y. M., & He, T. R. (2012). Determinants of user adoption of web"Automatic Teller Machines': an integrated model of'Transaction Cost Theory'and'Innovation Diffusion Theory'. *The Service Industries Journal*, 32(9), 1505-1525.
- Wathne, K. H., & Heide, J. B. (2000). Opportunism in interfirm relationships: Forms, outcomes, and solutions. *Journal of marketing*, 64(4), 36-51.
- Wicaksono, A. P., Urumsah, D., & Asmui, F. (2017). The implementation of E-procurement

- system: Indonesia evidence. In *SHS Web of Conferences* (Vol. 34, p. 10004). EDP Sciences.
- Williamson, O. E. (1998). Transaction cost economics: how it works; where it is headed. *De Economist*, 146(1), 23-58.
- Woods, P. (2006). *Successful writing for qualitative researchers*. Psychology Press.
- Wynstra, F., Rooks, G., & Snijders, C. (2018). How is service procurement different from goods procurement? Exploring ex ante costs and ex post problems in IT procurement. *Journal of Purchasing and Supply Management*, 24(2), 83-94.
- You, J. S. (2015). *Democracy, inequality and corruption*. Cambridge University Press.
- Zakaria, R., Kwong, I. Z., Nilashi, M., Majid, A., Zaimi, M., Ibrahim, O., & Zin, R. M. (2014). Ethical behaviors in e-tendering process for construction project in Malaysia. *Journal of Theoretical & Applied Information Technology*, 70(1).
- Zaum, D., Taxell, N., & Johnson, J. (2012). Mapping evidence gaps in anti-corruption: Assessing the state of the operationally relevant evidence on donors' actions and approaches to reducing corruption.
- Zigurs, I., & Khazanchi, D. (2008). From profiles to patterns: A new view of task-technology fit. *Information systems management*, 25(1), 8-13.



## **APPENDIX THESIS QUESTIONNAIRE**

School of Graduate Studies  
Kwame Nkrumah University of Science and Technology  
Kumasi.  
July 15, 2022.

Dear Sir/Madam,

### **A MSC RESEARCH QUESTIONNAIRE: EXAMINING THE ANTI-CORRUPTION CAPABILITY OF E-PROCUREMENT IN SELECTED COMPANIES IN THE GHANAIAN MINING SECTOR**

I am Chelteau Barajei and a Master of Science student of the Kwame Nkrumah University of Science and Technology (KNUST), Kumasi. The goal of my research is to examining the anti-corruption capability of e-procurement in selected companies in the Ghanaian mining sector. The specific research objectives are:

- i. To evaluate the impact of breaking of monopoly of power by e-procurement on the reduction of procurement fraud and corruption in selected Ghanaian mining companies.
- ii. To assess the impact of breaking of information asymmetry by e-procurement on the reduction of procurement fraud and corruption in selected Ghanaian mining companies.
- iii. To examine the impact of transparency and accountability by e-procurement on the reduction of procurement fraud and corruption in selected Ghanaian mining companies.

Please note that your participation is voluntary and your responses shall be kept confidential in line with School of Graduate Studies ethical consideration applicable to research work. All submissions shall be securely kept and destroyed after the completion of the research study. The published paper from this study shall be the summary of all submissions to ensure confidentiality and protection of respondent's privacy.

Respondents should leave no identification marks or names on the questionnaire to ensure anonymity. Filling and returning this questionnaire shall be considered as respondent's consent in taking part in the research study. Also, indicate your address at the end of the questionnaire if you are interested in receiving a copy of the research findings.

Very grateful for your time and extremely thankful for your participation in this important study.

Yours faithfully,

Chelteau Barajei.  
(Research Student)

**QUESTIONNAIRE: EXAMINING THE ANTI-CORRUPTION CAPABILITY OF E-PROCUREMENT IN SELECTED COMPANIES IN THE GHANAIAN MINING SECTOR**

**INSTRUCTIONS**

Please answer all questions. There are two (2) sections, A and B. Section A seeks general information about you and B seeks your opinion on the extent to which e-procurement anti-corruption factors reduces procurement fraud and corruption.

**SECTION A: DEMOGRAPHIC INFORMATION**

1. What is your gender?  
Male ( )                  Female ( )
  
2. What is your highest level of academic achievement?  
Secondary ( )      Certificate ( )                  Diploma ( )  
Bachelors ( )      Masters ( )                  Doctorate ( )  
Other (Please specify) :.....
  
3. Please indicate your designation.  
Client ( )                  Vendor ( )                  Other (Please specify):.....
  
4. Please indicate your years of field experience? ..... years
  
5. Please indicate your years of experience in e-procurement? ..... years
  
6. Professional membership?  
CIPS ( )                  GhIE ( )                  GhIS ( )  
None ( )                  Other (Please specify):.....

**SECTION B: EXTENT TO WHICH E-PROCUREMENT REDUCE PROCUREMENT FRAUD AND CORRUPTION**

This section assesses views of practitioners on the extent to which e-procurement anti-corruption factors listed below reduces procurement fraud and corruption. Please tick  to indicate your views as follows:

**1 – not significant; 2 – slightly significant; 3 – moderately significant; 4 – very significant and 5 - extremely significant**

S/N	E-Procurement Anti-corruption Factors	Your opinion				
		1	2	3	4	5
1	Reduction in the levels of human interactions in the bidding process					
2	Automation of procurement process					
3	Reduction of cartel formation, collusion and bid riggings					
4	Increase competition among the bidders/suppliers /vendors					
5	Access to procurement information on real time basis or real time bidding					
6	Easier and faster procurement process					
7	Monitoring and tracking audit trail					
8	Efficient and secured online exchange of procurement information					
9	Improvement of audit and analysis					
10	Standardization of procurement information					
11	Obtain the best quality services/product at competitive price					
12	Disclosure of procurement information					
13						
14						
15						
16						
17						

End of questionnaire.

Very grateful for your time.

Please provide your contact details if you require a copy of the results of this survey:

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