

**KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY,
KUMASI, GHANA**

KNUST

Establishment of a Works E-Procurement Framework Procedure for Ghana

Civil Aviation Authority

by

Jibril Dakpo (B.Sc. Building Technology)

**A Thesis submitted to the Department of Building Technology, College of Art
and Built Environment**

in partial fulfilment of the requirements for the degree of

MASTER OF SCIENCE

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DECLARATION

I hereby declare that this submission is my own work towards the MSc Procurement Management and that, to the best of my knowledge, it contains no material previously published by another person, nor material which has been accepted for the award of any other degree of the University, except where due acknowledgement has been made in the text.

JIBRIL DAKPO (PG 3584715)

Student's Name & ID

.....
Signature

.....
Date

Certified by:

REV. PROF. F. D. K. FUGAR

Supervisor(s) Name

.....
Signature

.....
Date

Certified by:

DR. THEOPHILUS ADJEI-KUMI

Head of Department Name

.....
Signature

.....
Date

ABSTRACT

The research was carried out to establish a works electronic procurement framework procedure through National Competitive Tendering Method for Ghana Civil Aviation Authority (GCAA) in the light of policy level, implementation level and contractor-side critical success factors. The aim of the study was to develop a step-by-step works electronic procurement procedure for use by GCAA. The research explored the documented critical factors that ensure the success of electronic procurement. A qualitative research approach was adopted using purposive sampling techniques. Data was obtained through semi-structured interviews of selected Directors and Managers of GCAA and selected Contractors actively working with GCAA. The research findings were that majority of critical success factors existed within GCAA for initiation of e-procurement while GCAA's contractors had in place limited critical success factors. The research conclusion was that GCAA had well enough infrastructure to realign towards e-procurement adoption/implementation, however the contractors did not have all it took to come aboard and will have to be upgraded. It was recommended that; GCAA should without delay start a policy to adopt e-procurement for works and follow up to implement same, develop the capacity of its contractors to participate in the process and adopt the proposed step-by-step framework for implementation.

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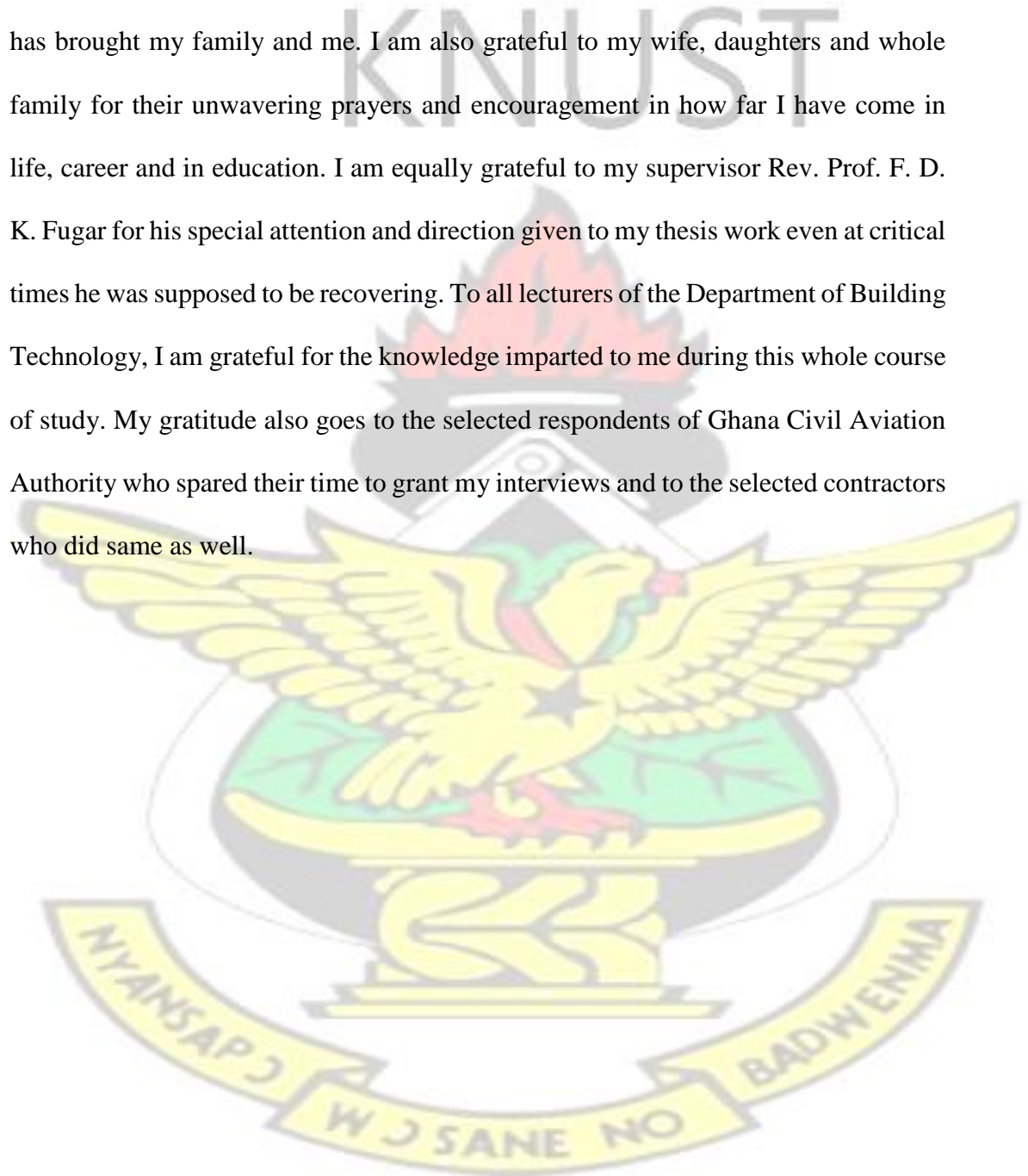
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DEDICATION

This work is dedicated to my Mother and Father and to my Wife and little Daughters whose words of encouragement have geared me up to this stage.

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ABBREVIATIONS

ASPX	Active Server Page Extended
BACS	Bank Automated Clearing System

BO	Briefing Office
CASORT	Civil Aviation Safety Oversight Reporting and Tracking
CDs	Compact Disks
CPBs	Central Purchasing Bodies
CSFs	Critical Success Factors
CSS	Cascading Style Sheets
DF	Director of Finance
DDG (F&A)	Deputy Director-General (Finance and Administration)
DGS	Director of General Services
DHR	Director of Human Resources
EC	European Commission
ERP	Enterprise Resource Planning
FIR	Flight Information Region
GACL	Ghana Airports Company Limited
GCAA	Ghana Civil Aviation Authority
HTML	Hyper Text Mark-Up Language
ICT	Information and Communication Technologies
ICT M	Information and Communication Technology Manager
IT	Information Technology
MRO	Maintenance, Repairs and Operations
MWRWH	Ministry of Water Resources Works and Housing
NCT	National Competitive Tendering
OGC	Office of Government Commerce
PNDC	Provisional National Defense Council
PHP	PHP: Hypertext Processor
PROC. M	Procurement Manager
PROJ. M	Projects Manager

PSA	Professional Services Automation
SPA	State Procurement Agency
UK	United Kingdom
WB	World Bank

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CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND

The Public Procurement Law (2003), Act 663 since its passage into law has been the main legal framework for public procurement activities (including works procurement) by Ghana Government Ministries, Departments and Agencies. All of the tendering procedures set out in Parts IV and V, Sections 35 to 51 of Act 663 generally promote manual (physical paper) procurement procedures with no clear mention of electronic procurement. Generally, Electronic procurement (eProcurement) can be described as using enablers like the web/internet's information and communication technology enablers (ICT enablers) to execute various stages in procurement which mainly include planning, sourcing, contracting, contract management, utilisation, maintenance, disposal and post- procurement process evaluation (Vaidya et. al., 2006). E-procurement of works (works e-procurement) can therefore be described as combined use of internet-based ICT enablers to perform singular or multiple stages of the works procurement process. Globally over the last few decades, Information Communications Technology (ICT) enablers have been employed by several sectors such as academia, automobile, commerce, energy, etc., to enhance previously manual intensive processes. It can therefore be argued that for effective and efficient procurement of works in the 21st Century Electronic Procurement (e-procurement) should be highly encouraged if not totally adopted.

1.2 STATEMENT OF THE PROBLEM

The Ghana Civil Aviation Authority (GCAA), being a Government Public Institution, has been using the traditional methods of works procurement since the inception of the Public Procurement Law 2003, Act 663. The GCAA has traditionally carried out works procurement processes in the old paper-based manner with the following inherent characteristics among others: -

- Waste of paperwork in tender preparation (including several copies),
- tender filling and submission (including photocopies),
- tender opening, evaluation and approval processes,
- contract awards/contract documents preparation,
- contract management (meeting minutes, site instructions/reports, etc.),
- facility utilization (usage, defects, and making good reports, etc.)
- contract closing with the attendant final reports (financial, performance, etc.)
- Waste of precious working hours (filling/submission, opening/evaluation of tenders),
- Risk to human lives (mainly road travel to submit tenders),
- Collusion through person-to-person contacts in the procurement process,
- High cost of tendering; cost of tender document, photocopying/reprinting costs, etc.

It was for the purpose of reduction or elimination of the above setbacks that this research sought to establish a workable works e-procurement model for GCAA.

1.3 RESEARCH AIM

The research was aimed at developing a works e-procurement framework procedure for use by Ghana Civil Aviation Authority.

1.4 RESEARCH OBJECTIVES

To achieve the aim set above the following objectives were expected to be achieved by the end of the research: -

- i. Explore the processes involved in the success of e-procurement in other jurisdictions and/or organisations.
- ii. Explore GCAA's available infrastructure that will support e-procurement.
- iii. Develop (recommend) a framework procedure for works e-procurement for the GCAA.

1.5 RESEARCH QUESTIONS

The following research questions therefore come up for consideration: -

- i. Are there success stories of e-procurement implementation in other jurisdictions?
- ii. What are the prerequisites for adopting e-procurement procedures in the public sector?
- iii. What kind of framework procedure can be adopted for a successful eprocurement implementation at GCAA?

1.6 JUSTIFICATION OF THE STUDY

The benefits associated with e-procurement of works in general has been relegated to the background by the public sector in Ghana causing various state agencies to follow the traditional methods of works procurement with its attendant laborious, wasteful and risky tendencies earlier mentioned. This research hopes to develop a workable solution for works e-procurement for the GCAA which might be

adopted by other public sector institutions. The research can be further enhanced by other researchers in future for adoption by other public sector institutions and eventually the nation as a whole.

1.7 SCOPE/LIMITATION/DELIMITATION

This research sets out primarily to investigate the development of a feasible works e-procurement process for adoption by GCAA. The limitations are therefore as presented below:

Despite the availability of different methods of achieving competition in works procurement, the research is limited to works e-procurement through National Competitive Tendering (NCT) procedure. The e-procurement process starts from advertising stage to contract award stage. Owing to the qualitative approach adopted, the research explores available articles, journals, publications for literature review, and interviews, personal observations, scribbling notes, etc., as basis to develop the proposed e-procurement process. It is therefore devoid of the usual questionnaires and quantitative analysis associated with quantitative research approach.

1.8 STRUCTURE OF THE REPORT

The research is in five chapters as follows;

The Introduction is Chapter One comprising; background to the study, problem statement, research aim, research objectives, research questions, research justification, scope/limitation/delimitation, structure of the report. Chapter two comprises literature review; exploring volumes of literature available on the subject and how aspects of those are brought to bear on the research. Chapter three comprises

the methodology employed for the research. Data presentation is done in Chapter Four, followed by analysis and discussions leading to research findings. A summary of findings, conclusions and recommendations are presented in Chapter Five.

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The logo of Kenya Methodist University (KNUST) is centered in the background. It features a yellow eagle with spread wings, a red flame above its head, and a shield on its chest. The shield contains a green cross and a yellow star. The eagle is perched on a yellow banner with the text 'KNUST' in black. The entire logo is set against a light blue background.

CHAPTER TWO

LITERATURE REVIEW

2.1 INTRODUCTION

Electronic procurement with its associated employment of computers and computer applications in procurement is gradually catching up with today's businesses. Muhai et al (2015), indicated that for any modern business firm to be successful there must be an integration of Information Technology (IT) into its daily operations. This motive combined with many other positive ends have prompted many organisations globally to adapt and implement IT in their procurement processes and business in general. To successfully adopt and implement electronic procurement processes there are critical success factors (CSFs) that have to be present at the policy and managerial level (Muhai et al, 2015) and at the implementation level (Basheka et

al, 2012). Advantages of e-procurement can be numerous depending on the context within which e-procurement is being considered or implemented. There are several web-based applications that can ease eprocurement implementation to achieve maximum benefits.

2.2 E-PROCUREMENT CRITICAL SUCCESS FACTORS (CSFs)

In studies carried out in other African countries, for successful complete institutionalization and operation of e-procurement two broad dimensions of critical success factors (CSFs) are needed at the Policy and Managerial level (Muhai et. al., 2015) and at the Implementation level (Basheka et al, 2012). Muhai et al (2015) and Thai et al (2009) identified policy and managerial level CSFs vital such as: -

- Top management support,
- Employees and management assurance to adoption success,
- ICT reliability/service provider performance, □ E-procurement systems performance monitoring □ End user acceptance for use.

Basheka et al (2012) also identified implementation level CSFs include: - Careful supplier involvement, Logical risk management methods, Systematic organizational processes redesign, Use of services of experienced consultants, and Careful selection of software providers.

Vaidya et al (2006), however presented the following CSFs of e-procurement as propositions: -

2.2.1 User Acceptance and Training

Because of the emergence of new technologies which will lead to varying how the traditional paper-based procurement is done, training of end-user staff to handle electronic procurement processes is key if any e-procurement effort will succeed.

2.2.2 Seller (supplier) Adoption

Involving suppliers at an early stage is important in successfully implementing eprocurement by demonstrating the proposed e-solutions to suppliers and discussing important variables that will affect the way they do business with the procurement entity.

2.2.3 Top Management Approval/Leadership

Senior management sponsorship is key to ensure that the expected benefits of eprocurement are realised by participants adapting newer ways of work. Importantly and challenging is the task to realise acceptance (Birks et al, 2001). The show of leadership by senior management is key for e-procurement implementation success (AGV, 2003). It is equally important for executive management to involve key implementation stakeholder consultants, management and staffs in a team to develop an execution strategy (ECOM, 2002) and offer great focus and support for assurance of e-procurement participants' understanding in a procurement reform process in an entity (S&A, 2003). They are also to set the vision and goals, policies and strategies around which the whole organization will gather for the necessary change towards e-procurement (World Bank, 2003).

2.2.4 Integrating Old and New Systems

The extent of integration between existing organisational processes and new eprocurement solutions has to be decided (KPMG, 2001). For more difficult

integration problems changes in the old business processes in an organisation will have to be made to adapt to the new systems (ECOM, 2002).

2.2.5 Security and Authentication

Owing to data sensitivity, the legal nature of orders and payments, security of data is critical in e-Procurement systems. There must be mechanisms for identifying and authenticating the user who places an order so that the supplier knows it is safe to fulfil the order.

2.2.6 Re-engineering the Process

It is necessary to consider e-Procurement as an enabler to make the procurement process more cost and time efficient and value for money realisation (ECOM, 2002). Majority of the benefits obtainable from executing e-procurement arise out of the reengineered processes than in mere implementation, thus there is need for revision of old procurement processes (Stenning and Associates, 2003).

2.2.7 Measuring Performance

It is important to institute the measurement of performance in e-procurement adoption and implementation because it shapes work attitudes and that is vital if any meaningful changes can be made to ensure success (Birks et al, 2001). The lack of capacity for management to measure performance leads to a shortfall in evaluating individual and organisational performance (CGEC, 2002).

2.2.8 Change Management

A lot of attention has to be given to change management in adopting e-procurement through consultation, communication, and issue resolution (OGC, 2002). Change management may not seem an expensive aspect of an e-procurement adoption/implementation but its absence can cause failure (World Bank, 2003).

2.2.9 Strategy for E-Procurement Implementation

It is key to prepare a strategy for execution before deployment of the e-procurement solution (Neef, 2001). The intention of strategy should be to make savings through the use of process and technology (OSD Report, 2001).

2.2.10 Electronic Communication Standards

It is important to have adopted common standards in e-procurement systems to ensure that buyers and sellers (suppliers/contractors) exchange information and electronic documents in a manner acceptable to each side. There seem to be a surfacing agreement that eXtensible Markup Language (XML) should be adopted as basis for standards (S&A, 2003), because it defines communication content data format selection (KPMG, 2001).

2.3 ADVANTAGES OF E-PROCUREMENT

The European Commission (EC) has indicated that the growing use of public e-procurement will present advantages such as increased accessibility and transparency arising from the automation and centralization of information flow on individual tender opportunities, leading to improved access of firms to public tenders. Additionally, there are expected benefits from administrative costs reduction and restructuring of procurement procedures. Further, there is the prospect of merging of public procurement markets, as distance barriers and information gaps reduce encouraging wider involvement, increasing the number of potential suppliers, and possibly widening the markets.

All of the above benefits contribute to achieving the desired results by creating better conditions for taxpayers and by saving costs in public expenditure management (Floridis, 2015).

According to Nozadze (2015), the European State of Georgia through the support of the World Bank introduced its e-procurement system to show how critical strong political will and commitment was for public procurement reforms. The State Procurement Agency (SPA) of Georgia, in a year, had proceeded to test an eprocurement system leading to its compulsory use and completely eliminating paper-based tenders. Their e-procurement system increased competition among suppliers, increased procurement system transparency, decreased bureaucracy, and decreased discrimination. Corruption risk was greatly reduced and great savings were made. Their positive strides led to international recognition with respect to corruption perception. Some key features of their e-procurement system were that: -

- E-reverse auction did not apply
- Estimated tender prices were disclosed, with a tenderer free to price up or down,
- The system disclosed tenders with the agreement of tenderers, and □ Tender disclosures only followed the contract award.

Georgia's story demonstrated the following benefits of an e-procurement system: -

- Environmentally friendly procurement owing to reduced paper-based procurement as tenderers were not required to submit printed originals and copies of tenders.
- Transparency; as the whole world could observe the tendering process in real time and obtain essential information on tenders.

- Four times reduced participation fee; in the conventional procurement tenderers paid a non-refundable fee for obtaining bidding documents in the amount of \$100-150, while in the new procurement systems tenderers obtain tender documents free of charge, only paying a \$30 participation fee.
- Simplified and accelerated review process, as specialist reviewers could be granted special access to download tenders electronically.
- Remote participation; tenderers at distant locations could submit tenders remotely from their offices, thus greatly reducing transportation time, cost and risk.
- Greatly reduced risk of tenderers' collusion; a tenderer's identity remains confidential and is only disclosed after the bid opening (Nozadze, 2015).

Malaysia introduced *e-Procurement* application since 1999 in stages, as part of electronic governance promotion, to encourage small businesses to enter into new procurement systems being adopted. The application afforded suppliers the opportunity to introduce and display their products and services over the internet twenty-four hours a day, and also documented procurement transactions from the initial stage to the payment stage (Norma, 2016). This increased the number of registered suppliers, increased revenue and generated a lot of on-line transactions.

The Malaysian experience generated the following benefits: -

- Process acceleration (efficiency) eliminating human time losses and paper work.
- Ability of state agencies to view newest products and prices led to effectiveness.
- Reducing the process times reduces costs to a minimal level, improving overall procurements management.
- Promotion of societal an IT literate workforce and business.

- Better supplier access to the contracts, better cost-savings, improved speed and product specification accuracy.
- Improved government agencies payment timelines.

2.4 INTERNET/WEB-BASED PROMOTERS OF E-PROCUREMENT

To successfully adopt and implement e-procurement requires certain internet/web-based systems. Siita (2004), researches that there were three types of eprocurement Systems: Buyer e-Procurement Systems, Seller e-Procurement Systems, and Online Intermediaries (Koorn et al, 2001). Subramanian and Shaw (2004), in a related research, defined an e-procurement system as a Web-based client/server application employed to replace the traditional procurement process. Their study further revealed that e-procurement solutions covered three major procurement areas: Procurement Transactions, Procurement Management and Market Making. They further revealed that e-procurement impacts four major operative procurement activities, which are: searching of products or services, order processing, monitoring and control, and coordination of relevant information. On the buyer side the e-procurement solution is usually linked to other existing information systems such as Enterprise Resource Planning (ERP), affording companies the opportunity to leverage critical enterprise data present on these systems. On the supplier side, the solution is mostly connected to the supplier's order fulfilment system or product catalogues on the website of the supplier. Akabite (2014) researched that existing types of e-Procurement infrastructure could be summarized as follow (EC, 2010):-

2.4.1 E-Procurement platform:

A solution designed specifically for an individual organisation to support its eprocurement processes. It comes at a high development cost and as such is commonly used by large organisations with a high number of procurement processes.

2.4.2 Multi-organisation platform:

A solution developed by a service provider then runs the service for other organisations who subscribed to the service and used it for e-procurement purposes.

2.4.3 Central Purchasing Bodies'(CPBs) framework platform:

A system that supports the provision of goods and services to public offices under framework agreements signed by a CPB. Products and services covered by each framework contract were normally placed in a catalogue. Interacting with such a catalogue, individual public offices issued specific orders selecting how much of products they wanted to buy and what type of services assignment they wanted performed.

2.4.4 Marketplace:

A common catalogue of products and services offered by a CPB to public buyers in a country or region. Interested suppliers subscribing to these services publish their products in the catalogue offered by the CPB specifying price, delivery time, areas served, guarantee period, etc. Procurers explored the catalogue, identifying items of choice, the suppliers, terms and conditions, then choosing the product by dropping it into a "shopping cart".

2.4.5 Procurement portal:

A web based solution that offered a single entry point to a number of procurement platforms similar to those explained above. The portal may provide useful information

in addition to its services open to the procurement platforms. According to Siita (2004), even though various forms of e-procurement existed that concentrated on one or more stages of the procurement process, e-Procurement could be viewed more broadly as a thorough solution that integrated and streamlined many procurement processes throughout the organization. De Boer et al (2002) identified each of the following systems made for a special purpose with its own specific functionality and characteristics: -

2.4.6 E-Informing/E-notification:

Collecting and distributing purchasing information from and to internal and external sources using internet technology. An entity electronically notified potential sellers of future tendering opportunity, typically facilitated through an online notification system; for instance, the Office of Government Commerce (OGC) website in the UK.

2.4.7 E-Sourcing:

The identification of new sellers for specific categories of purchasing requirements through the use of internet technology.

2.4.8 E-Tendering:

The process of dispatching requests for information/prices to sellers and receiving the response through the use of internet technology. An entity must have the capacity to receive tenders electronically from potential sellers, supported through online tender receipt systems, similar to that used for the tender notification.

2.4.9 E-Reverse auctioning:

Internet-based reverse auction technology aiming at the price of the goods and services auctioned. Prices quoted by sellers generally decrease.

2.4.10 E-Awarding:

It involved a secure opening of tenders submitted by a given deadline, tender evaluation and tender award; it is usually facilitated through similar systems as used for e-notification and e-tendering.

2.4.11 E-Contract Management:

The use of information technology to improve the efficiency and effectiveness of contracting processes. It involved the establishment of an agreement with a seller and can be the result of e-notification, e-tendering and e-awarding procedures.

2.4.12 E-Ordering

The use of the internet to simplify operational purchasing procedure, which include ordering (requisitioning), order approval, order receipt and payment process. An organisation makes orders from agreed contracts or catalogue (following from the stages above) and the transmission and acceptance of this by sellers.

2.4.13 E-Markets

These are meeting venues for component sellers and buyers, who use exchange mechanisms to electronically support the procurement process. Early e-procurement solutions were biased towards this aspect of e-procurement (e.g. electronic data interchange, e-catalogue and e-marketplaces) because it was perceived that maximum efficiency could be achieved owing to direct link with e-ordering.

Technologies in this area include: Coupa procurement system, Exostar, Hubnool, Oracle, Ariba, Ketera, etc.

2.4.14 E-Maintenance, Repairs and Operations and Web based ERP

The process of generating and approving purchasing requisitions, placing purchase orders and receiving goods or services ordered through an internet technology based

software system. E-MRO is concerned with indirect items (MRO), while web-based ERP is concerned with product-related items.

2.4.15 E-Invoicing:

This involves an entity receiving invoices from sellers electronically arising from electronic matching (e.g. against purchase and goods received notes) and making electronic payment through a Bank Automated Clearing system (BAC). Paying sellers electronically has been identified as one of e-procurement's quick wins, given the processes/activities. E-invoicing is performed alongside E-MRO and ERP above.

2.5 PERSPECTIVES OF E-PROCUREMENT IN THE PUBLIC SECTOR

Muhai et al (2015) indicated that leading countries in Europe and Asia have productively executed e-procurement systems for the public sector with great success. A number of public entities have adapted the use of computers in managing their procurement processes realizing many benefits. In Tanzania the e-procurement system adapted by the government institutions, enables e-checking and monitoring of procurement processes; it is a web-based system for online submission of annual procurement plans and reports on implementation of the plan by procuring entities; Requires Internet, computers and IT skilled users.

Having achieved rapid growth in the public sector in recent years, entities in public sector across the world use e-procurement for contracts to gain advantages such as increased efficiency (speed), cost savings (economy) and improved transparency (reduced corruption). In Louisiana (United States of America), since 2008 the law obliges political subdivisions to make provisions for the receipt of electronic bids. Similar ventures have been applied in the European Union, United Kingdom, Australia, Singapore and Malaysia among other countries. For instance, in

Singapore the implementation of e-procurement was done as part of their eGovernment master plan. (Muhai et al, 2015).

According to Floridis (2015), public procurement comprises eight stages: 1) publication of notices, 2) access to tender documents, 3) submission of tenders, 4) tender evaluation, 5) contracting, 6) execution, 7) invoicing, and 8) payment. Some stages, such as the invitation, submission and evaluation stages, require adapted solutions. The submission, evaluation and order stages are the most difficult, necessitating a common set of procedures and principles in order to organise the exchange of complex documents and the interaction between public purchasers and suppliers. Some aspects of public procurement, still necessitate manual processing. For example, some stages of complex contracts can be difficult to reduce to standard formats and may require human intervention. However, there are possibilities for a large part of the procurement activities to be transferred to an electronic database. The experience of South Korea, where more than 90% of total government procurement is achieved by the use of a centrally managed platform demonstrates what can be accomplished with determination.

2.6 OVERVIEW OF GHANA CIVIL AVIATION AUTHORITY

2.6.1 Background

Ghana Civil Aviation Authority (GCAA) is the regulatory agency of the Republic of Ghana for air transportation in the country. It also provides air navigation services within the Accra Flight Information Region (FIR). The GCAA was established in 1930 as a unit with Public Works Department (PWD); in 1953 GCAA was granted Departmental Status. It became an Authority under PNDC Law 151 from 16th May, 1986. In the year 2004 the GCAA Act was enacted to replace PNDC Law 151. The Civil Aviation Act, Act 678 of November 2004 provides for the establishment of a Civil Aviation Authority, which will focus on the core functions of Airspace management and Safety Regulations whilst allowing for a different organization to handle Airport development and operations. Pursuant to the above, the GCAA was restructured into two bodies, that is, the new Ghana Civil Aviation Authority (GCAA) and the Ghana Airports Company Limited (GACL) on 1st January, 2007 (GCAA, official website).

The organogram of the Ghana Civil Aviation Authority is presented below highlighting the chain of command/authority through which procurement activities are carried out; from Director-General, through Deputy Director-General (finance and administration), Director of General Services, Projects Manager, Procurements Manager and ICT manager among others:

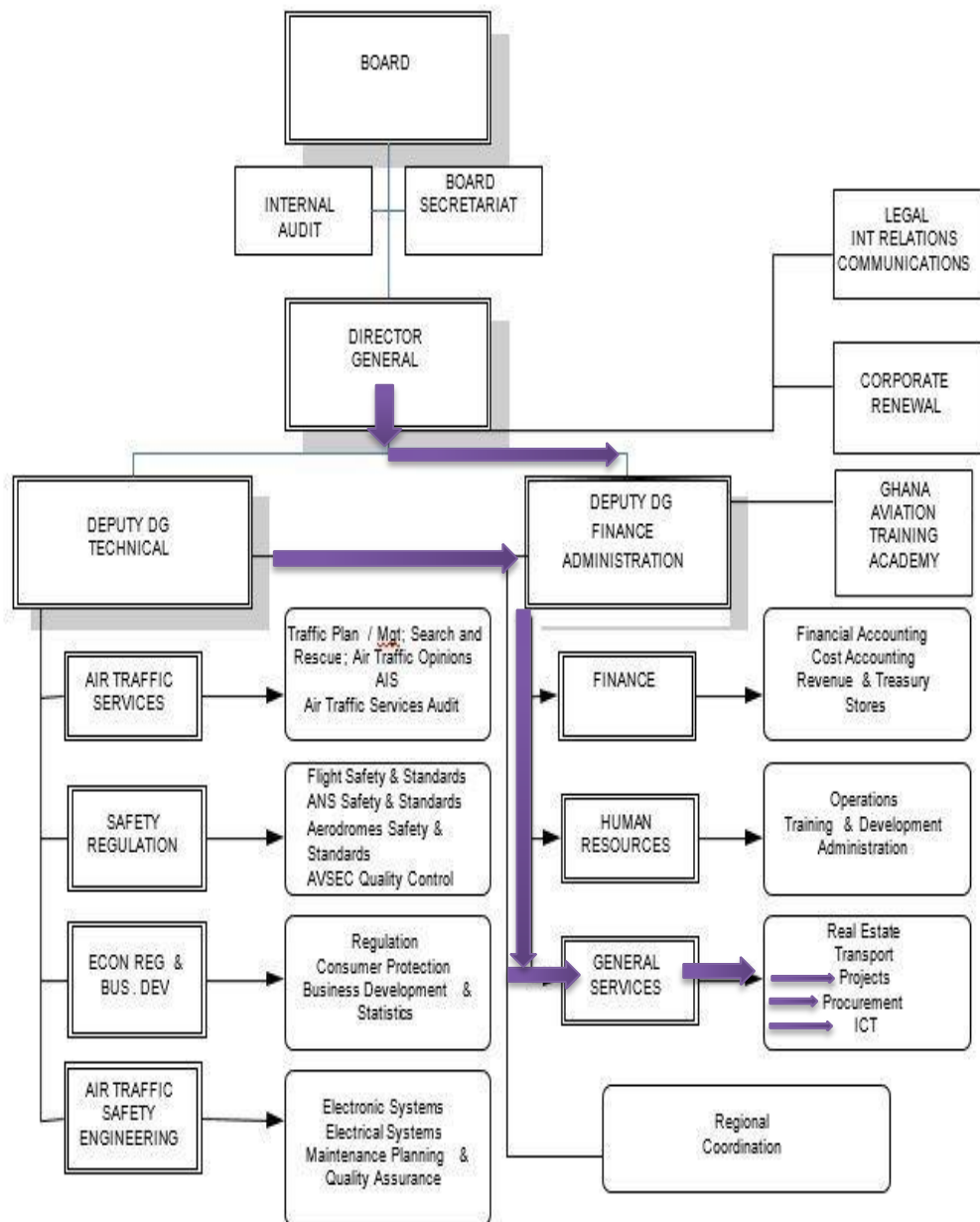


Figure 2.1: Organogram of GCAA

Source: Ghana Civil Aviation Website

2.6.2 GCAA's Current Works Procurement Procedure

Works procurement by NCT in GCAA has been the traditional paper-based process stipulated by sections 44 - 65 of the Public Procurement Act, 2003 (Act 663) comprising: -

1. Tender advertisement/publication;
2. Sale of tender documents;
3. Purchase of tender documents;
4. Submission/opening of tenders;
5. Evaluation of tenders/approval;
6. Award of contract;
7. Contract management; and
8. Contract closure.

The closest the Authority has come to using ICT enablers in procurement processes is interaction with the Public Procurement Authority's website during the preparation of annual procurement plans which is an internet/web based interactive platform. In recent times (since 2013) some NCT tender documents have been copied on CDs, at least doing away with paper-based tender documents, however tender submissions and the processes after that are carried out by printed paper documentation.

2.6.3 Internet/Web Based Systems in Operation at GCAA

The use of internet/web-based systems for business processes are not an entirely new phenomenon to staff of GCAA. A number of departments and sections use such applications in their daily assignments. The following web applications in use are explained below: -

2.6.4 Civil Aviation Safety Oversight Reporting and Tracking Database

This is also termed "CASORT" and is an internet/web-based application software (domain is in the United States of America) used by Aviation Safety Inspectors of the Safety Regulations Department. A Safety Inspector with a unique username and password logs on to the application to feed in data from a safety check sheet gathered

during a safety inspection. The information is hosted on the web and can be accessed by the inspector any time for further analysis to generate various reports.

2.6.5 Enterprise Resource Planning (ERP)

This is an internet/web-based application software used by the Human Resource and Finance Departments. An administrator grants different access levels to staffs who can log-on even in the comfort of their homes, working via the internet. While the Finance Department uses mostly the Professional Services Automation (PSA) system of the ERP for balance sheet, profit and loss accounts, and cash flow, the Human Resource Department uses the Employee Self Service (ESS) of the ERP for staff appraisals, incident reporting, and pay slip report.

2.6.6 “Briefing Office (B.O.) Billing”/“Finance (Fin.) Billing”

This is an internet/web-based application software developed in-house by the ICT Section. It uses billing information gathered on airlines that use GCAA’s services to send invoices to the airlines for payment to GCAA. It is used by two main staff groups, Finance and Briefing Office within GCAA; thus the acronyms (Fin. and B.O.).

2.6.7 “Personnel Licensing Examination Software (Pelexam)”

This is a web-based application software developed in-house by the ICT Section. It is an interactive application that allows various categories of air crew seeking certification, once provided with a username and password, to answer randomly selected questions to obtain a pass mark for further consideration by Licensing Staff of the Personnel Licensing Office.

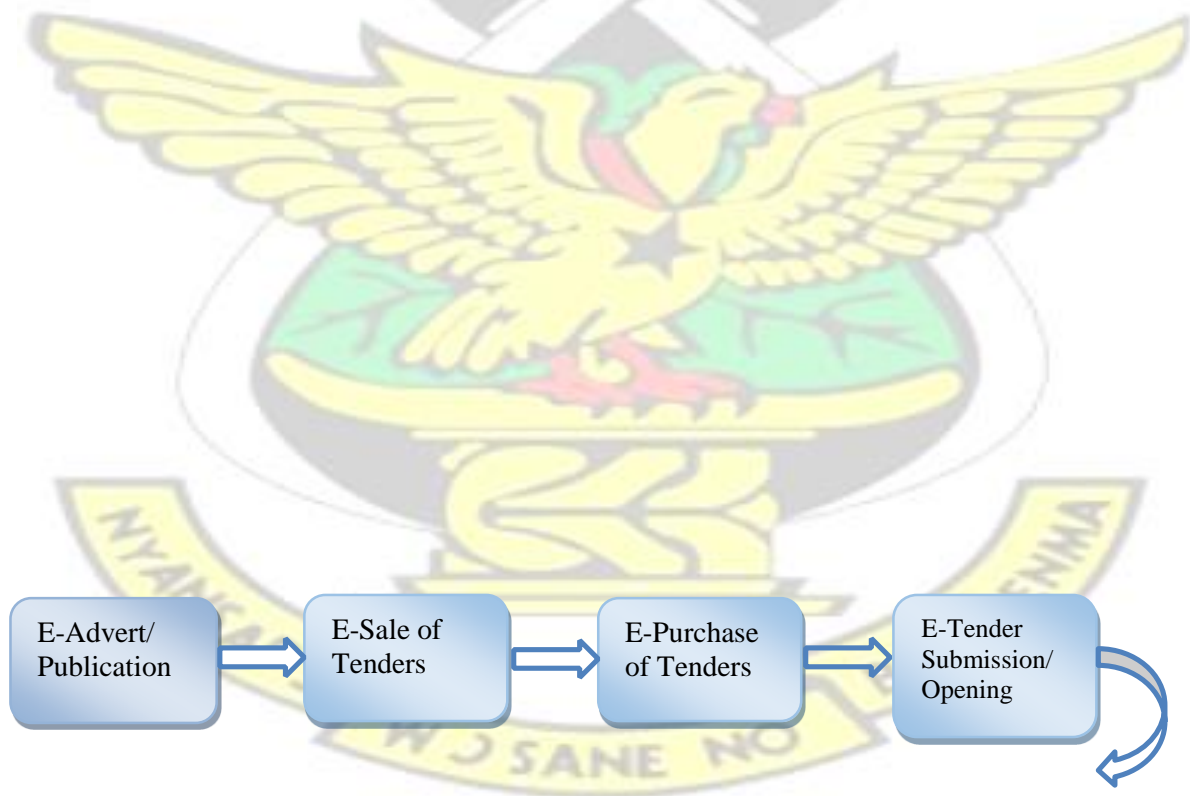
2.7 RESEARCH CONCEPTUAL FRAMEWORKS

Having reviewed literature (Floridis, 2015; Nozadze, 2015; Muhai et al,

2015 and GCAA's overview), combining generic public procurement steps in other jurisdictions plus the GCAA's PPA model in use and within the scope, a summary of works e-procurement procedures can be fashioned for GCAA as outlined below: -

- E- tender advertisement/publication;
- E-sale of tender documents;
- E-purchase of tender documents;
- E-submission/opening of tenders;
- E-evaluation of tenders/approvals
- E-Contract Award

From the preceding discussions a simple diagram can be deduced (figure 2.2) for a proposed works e-procurement framework as presented below:



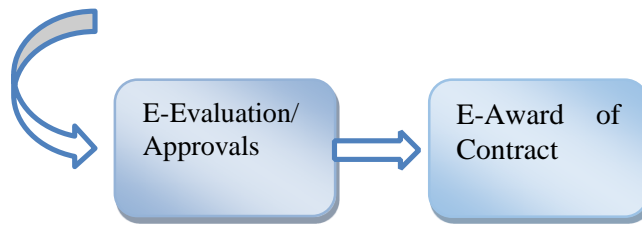


Figure 2.2: Proposed Works e-Procurement Steps

Additionally, from the reviewed literature (Akabite, 2014; and Siita, 2004), a conceptual framework can be generated for a web-based platform for GCAA to facilitate its e-procurement interactive steps with various sellers (contractors) who might be respondents to the new e-procurement system as presented in Figure 2.3 below:

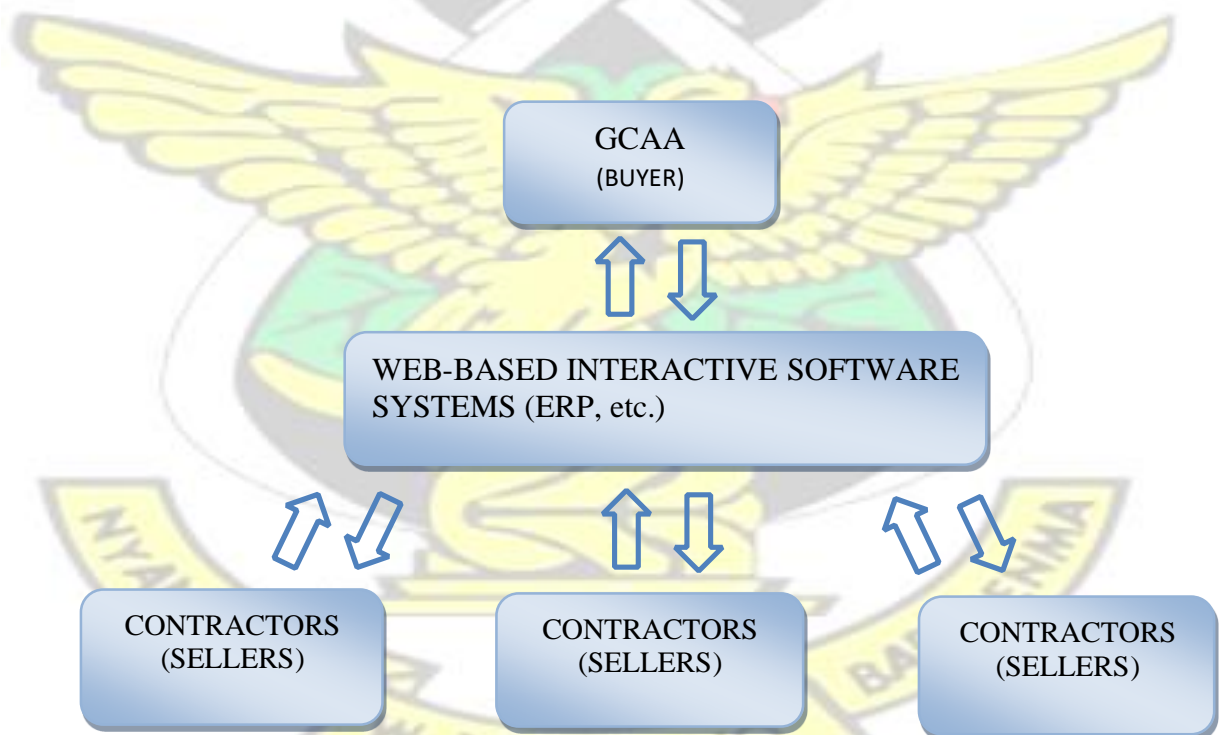


Figure 2.3: Proposed Buyer-Seller Web-Based Interactive System

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 INTRODUCTION

This chapter describes procedures used to acquire important data to achieve the set objectives. The methodology tackles the research population, research design, sampling methods/instrument, data analysis, and data presentation.

3.2 RESEARCH DESIGN

By purpose, an exploratory research was carried out using a qualitative research process. This process was chosen because of its use to gain an understanding of underlying reasons, opinions, and motivations. It provides insights into the problem or helps to develop ideas or hypotheses for potential quantitative research. Qualitative data collection methods vary using unstructured or semistructured techniques (Wise, 2011). Available literature was thoroughly perused and analysed to exude key factors that affect the subject area. Additionally, informal interviews were conducted with key staffs in user or implementing Departments/Sections especially to gain insight into current procurement steps and software infrastructure available within the research population, while external contractors were interviewed to get seller insights on the research topic.

3.3 RESEARCH POPULATION

The focus of the research was the Ghana Civil Aviation Authority (GCAA) as a unique public sector procurement entity. Relevant policy level Executive Directorates like Finance and Administration under which falls the General Services and Finance Directorates, and implementing end-user units like Procurement Section, ICT Section, Projects Section, and Finance Credit Control Sections were also

contacted to obtain internal information, especially concerning current paperbased procurement methods, web-based applications and end user software applications. External stakeholders; selected works contractors who do business with the GCAA, were also interviewed to obtain data from other perspectives outside of the GCAA.

3.4 SAMPLING PROCEDURE

A judgmental sampling technique was used for this study; specifically purposive sampling technique because of the objective of the assignment; that is, to establish a framework procedure for works e-procurement for GCAA. A total of seventeen (17) people were selected for interview. Four (4) GCAA Directors and three (3) Managers were selected because they are the top and middle level executives respectively, who are directly responsible for works procurement, ICT/Web applications and projects. Ten (10) of the most active contractors from GCAA's standing list were selected because they have been executing works contracts in the last five years. Some of the data gathered from internal stakeholders was through internal phone calls and face-to-face interviews, while scribbling notes and keeping mental records. With the selected group of contractors, further interviews were conducted to gather data for the research.

3.5 SOURCES OF DATA

Both primary and secondary data were employed for this research. The primary data was obtained directly from the one-on-one interactions and phone inquiries the researcher made with targeted interviewees; this made available credible first-hand information useful to this study. Secondary data was gathered from printed documents within departments/sections of GCAA.

CHAPTER FOUR

DATA PRESENTATION AND ANALYSIS

4.1 INTRODUCTION

Chapter Four focuses on presentation and analysis of the data gathered while conducting the semi-structured interviews. During the interviews personal observations about the office space and facilities within were made and mental pictures were kept as much as possible for recollection and addition to observed data. Key points and observations were scribbled on the researcher's scribbling pad so as not to lose count of such details. Where one-on-one interview was not possible, telephone interviews were conducted instead. Where specific targeted interviewees were unavailable, arrangements were made to interview the next person in the chain of command. The above secondary arrangements were made to ensure that replacements for the targeted professionals to be interviewed would at least match up to the standard of the intended persons.

4.2 OBSERVATIONS/MENTAL NOTES DURING INTERVIEWS

All respondents interviewed within GCAA (Deputy Director-General Finance and Administration; Directors of General Services, Finance and Human Resources; Managers of Procurement, ICT and Projects had computers in their offices. There were a mixture of desktops and laptops while in some situations both types were found within the same office. Particularly in the ICT Manager's office there were two desktops and a laptop. It was also observed that each office had internet connection through network cables and in some cases routers with signals blinking. These observations were confirmed by the affirmative 100% YES response that all

the Directors/Managers mentioned above gave when interviewed on the availability of computer-literate staff and internet connectivity within GCAA.

Similar observations as mentioned above could not be made in the case of the ten selected contractors, however follow up questions during the interview sessions were used to probe to verify the presence or absence of the above ICT enablers identified at the GCAA offices. Five out of the ten contractors were interviewed one-on-one but at neutral locations on their day-to-day business sojourns while the other five were interviewed on phone owing to physical nonavailability to grant one-on-one interviews.

4.3 BACKGROUND OF INTERVIEWEES

Seventeen (17) respondents were interviewed in all; seven (7) from the GCAA and ten (10) from most active contracting firms. The seven respondents from the GCAA were highly literate, had qualifications between University Degree and University Masters level and belonged to different professional bodies in engineering, accounting, marketing and procurement as shown in Table 4.1 below. Two respondents however had no professional qualifications aside their University Degrees and Masters as shown in Table 4.2. All seven respondents had general work experiences between ten and over twenty years and they have specifically worked in GCAA from two years up to above sixteen years as shown in Table 4.3. The ten respondents from contracting firms were those who have been most actively executing GCAA contracts in the last five years. Eight out of ten respondents interviewed within the contractors' outfits belonged to Technical and Financial classifications D1, K1 and D2, K2 (the top two levels in Ministry of Water Resources Works and Housing (MWRWH) certification for Building works) while two belonged to classes D3, K3

as shown in Table 4.4. All contractors have been in business for more than ten (10) years as indicated in Table 4.4. The above profile of contractor-side respondents placed them in fairly good positions to offer credible primary data on the subject of e-procurement.

All respondents therefore within the GCAA and contracting firms affirmed having knowledge about e-procurement buttressing the point raised earlier about their position to talk to the subject and offer credible data for the research.

Table 4.1: Interviewee Academic Qualification

ACADEMIC QUALIFICATIONS		
Qualification	Occurrence	Percentage
MASTERS LEVEL	6	85.71
DEGREE LEVEL	1	14.29
DIPLOMA LEVEL	0	0.00
TOTAL	7	100.00

Source: Data from Research Field Work, July/August, 2016

Table 4.2: Interviewee Professional Qualification

Professional Qualification

Interviewee	Response	Occurrence	Percentage
DDG (F&A)	Yes	5	71.43
DGS	Yes		
DF	Yes		
DHR	Yes		
PROC. M	Yes		
PROJ. M	No	2	28.57
ICT M	No		
TOTAL		7	100.00

Source: Data from Research Field Work, July/August, 2016

Legend

DDG (F&A)	Deputy Director-General (Finance and Administration)
DGS	Director of General Services
DF	Director of Finance
DHR	Director of Human Resources
PROC. M	Procurement Manager
PROJ. M	Projects Manager
ICT M	ICT Manager

Table 4.3: Interviewee Work Experience

OVERALL WORK EXPERIENCE		
Work Experience	Occurrence	Percentage

0 – 5 YEARS	0	0.00
6 – 10 YEARS	1	14.29
11 – 15 YEARS	1	14.29
16 – 20 YEARS	2	28.57
OVER 20 YEARS	3	42.85
TOTAL	7	100.00

Source: Data from Research Field Work, July/August, 2016

Table 4.4: Contractor Qualifications and Experience

CONTRACTOR QUALIFICATIONS		
Classification / Work Experience	Occurrence	Percentage
CLASS D1, K1	4	40.00
CLASS D2, K2	4	40.00
CLASS D3, K3	2	20.00
TOTAL	10	100.00
CONTRACTOR WORK EXPERIENCE		
0 – 5 YEARS	0	0.00
6 – 10 YEARS	0	0.00
OVER 10 YEARS	10	100.00
TOTAL	10	100.00

Source: Data from Research Field Work, July/August, 2016

4.4 POLICY LEVEL CRITICAL SUCCESS FACTORS WITHIN GCAA

4.4.1 Executive Approval/Leadership

Four top level management persons were interviewed to obtain data on this Critical Success Factor; one Executive position (Deputy Director-General for

Finance and Administration), and three Director Positions (General Services, Human Resources and Finance). Their choice was based on the premise that knowing the policy direction of the organization, these top management persons can best answer whether executive approval can be obtained for an e-procurement venture which will inevitably commit resources of the organization. In response to the interview question, all four responded in the affirmative YES to the possibility of obtaining executive approval for e-procurement adoption and implementation as shown in Table 4.5. The general insight gained at the interviews was that GCAA is on a mission to modernize its business processes and that adoption and implementation of e-procurement can add to achieving that aim.

Table 4.5 Availability of Executive Approval/Leadership

AVAILABILITY OF EXECUTIVE APPROVAL/LEADERSHIP			
Interviewee	Response	Occurrence	Percentage
DDG (F&A)	Yes	4	100.00
DGS	Yes		
DF	Yes		
DHR	Yes		
TOTAL		4	100.00

Source: Data from Research Field Work, July/August, 2016

4.4.2 General Management Assurance of Adoption and Implementation

Placed just below and reporting to the Executive Positions, General Management assurance and adoption for implementation was tested in the interviews as shown in Table 4.6. The researcher premised that once the Executive directly oversees Top Management activities then the two groups are best posited to answer the feasibility of General management adoption and implementation knowing the policy direction of the organization. The researcher targeted the interview of the four

(4) top level management persons mentioned previously in 4.5, to obtain data on this Critical Success Factor. In response to the interview question, all four (4) responded in the affirmative YES to general management's assurance of adoption and implementation of e-procurement procedures. The general insight gained for the answers was that GCAA is on a mission to modernize its business processes and that adoption and implementation of e-procurement can add to achieving that aim.

Table 4.6: General Management Assurance of Adoption and Implementation

GENERAL MANAGEMENT ASSURANCE OF ADOPTION AND IMPLEMENTATION			
Interviewee	Response	Occurrence	Percentage
DDG (F&A)	Yes	4	100.00
DGS	Yes		
DF	Yes		
DHR	Yes		
TOTAL		4	100.00

Source: Data from Research Field Work, July/August, 2016

4.4.3 Reliability of ICT Systems

The test for this CSF during the interviews was solicited from all seven (7) respondents from the GCAA since they relate to it directly and practically as shown in Table 4.7. All seven (7) respondents answered YES when asked about the reliability of ICT systems to support e-procurement adoption/implementation as a policy issue. From Executive and top management, the explanation for such emphatic YES was that the aviation industry to which GCAA belongs thrives to a large extent on modern ICT systems and GCAA's competitors are all international and none local. It was therefore the responsibility of GCAA to ensure its ICT systems are among the best with little room for down times. This was buttressed by the ICT Manager in his YES answers to indicate availability of most of the critical success factors except e-

procurement software providers. He further explained there is conscious effort from top management to make ICT facilities in-house largely reliable; constant provision/replacement of desktop/laptop computers, provision of scanners to all Sections within Departments, regular ICT training programmes for staffs, reliable internet and the fact that some departments already do on line transactions with the outside world on behalf of GCAA albeit not directly within the express framework of e-procurement. For example, it was revealed from the Finance Director that there is some e-invoicing from GCAA to the airlines who in turn make e-payments to GCAA. The Human Resources Director also revealed that some tickets for staff travels were bought on line and GCAA makes electronic payments (e-payments) to the airlines involved.

Table 4.7: Reliability of ICT Systems

RELIABILITY OF ICT SYSTEMS			
Interviewee	Response	Occurrence	Percentage
DDG (F&A)	Yes	7	100.00
DGS	Yes		
DF	Yes		
DHR	Yes		
PROC. M	Yes		
PROJ. M	Yes		
ICT M	Yes		
TOTAL		7	100.00

Source: Data from Research Field Work, July/August, 2016

4.4.4 End User Acceptance through Orientation, Training and Refreshers

When interviewed about this CSF all seven (7) respondents within the GCAA answered YES as shown in Table 4.8. The underlying reasons gathered further was

that as a Ghanaian public organisation policies are handed down from the management level to the staff level for implementation, so once orientation, training and further training was done the end user (staff) acceptance was a matter of course. Examples were given of several policies which are being implemented at the user level including; switch to Enterprise Resource Planning (ERP) software, moves to scan and keep electronic copies of all existing paper files (paperless records management/archival system), electronic cheque issuing, on-line pay slip check, online computer incident reporting, and so on.

Table 4.8 End User Acceptance through Orientation, Training and Refreshers

END USER ACCEPTANCE THROUGH ORIENTATION, TRAINING AND REFRESHERS			
Interviewee	Response	Occurrence	Percentage
DDG (F&A)	Yes	7	100.00
DGS	Yes		
DF	Yes		
DHR	Yes		
PROC. M	Yes		
PROJ. M	Yes		
ICT M	Yes		
TOTAL		7	100.00

Source: Data from Research Field Work, July/August, 2016

4.4.5 Performance Monitoring/Measurement of E-procurement Processes

Six (6) out of the seven (7) respondents interviewed from GCAA answered NO when asked about the existence of this CSF, indicating the non-existence of performance

monitoring/measurement for e-procurement processes as presented in Table 4.9. Further probes to the six interviewees for understanding revealed that there is already in-house, implementation of employee work plans and performance appraisal system on the ERP platform but nothing specifically e-procurement is on the platform. It was generally gathered that any e-procurement performance monitoring/measurement system can be migrated unto the current ERP software in use without the need for a totally different system, so far as the inputs of employee objectives and appraisal requires human inputs into the software. The singular YES as shown in Table 4.9 from the Director of General Services was further probed for which the explanation was that current procurement processes are already measured for performance and it has elements of electronic processes; example, preparing procurement plans and sending for approval from Public Procurement Authority and issuing out tender documents on CDs.

Table 4.9 Performance Monitoring/Measurement of E- Procurement Processes

Performance Monitoring/Measurement of E- Procurement Processes			
Interviewee	Response	Occurrence	Percentage
DGS	Yes	1	14.29
DDG (F&A)	No	6	85.71
DF	No		
DHR	No		
PROC. M	No		
PROJ. M	No		
ICT M	No		
TOTAL		7	100.00

Source: Data from Research Field Work, July/August, 2016

4.5 IMPLEMENTATION LEVEL CRITICAL SUCCESS FACTORS IN GCAA

4.5.1 Computer Literate Staffs using Computers Routinely

All respondents interviewed within GCAA answered YES to this CSF to indicate that there are computer literate staff who routinely use computers as presented in Table 4.10. When the interviewees were questioned to gain further understanding of the answers it came to light from a key implementation Section (ICT) that out of a staff population of 397 about 201 (51%) use computers as routine. It was further mentioned that not all staffs need to use computers on a regular basis. The estimated non-regular users of computers are about 70 staff, therefore making computer usage among the regular users about 62% (201 out of 327). It further came to light that typical non-regular users of computers were drivers and janitors, but even in that situation they at least check their pay slips online.

Table 4.10 Availability of Routine Computer Literate Staff

Availability of Routine Computer Literate Staff			
Interviewee	Response	Occurrence	Percentage
DDG (F&A)	Yes	7	100.00
DGS	Yes		
DF	Yes		
DHR	Yes		
PROC. M	Yes		
PROJ. M	Yes		
ICT M	Yes		
TOTAL		7	100.00

Source: Data from Research Field Work, July/August, 2016

4.5.2 Reliable Internet Connection to Staff Computers

When asked during the interviews whether this CSF was available all respondents within the GCAA answered a YES as shown in Table 4.11. It was realized that as users they experience the use of internet on a daily basis. In the interview with the ICT Manager he explained that reliable internet connection to staffs was achieved using different means; through data cable connections and through Wi-Fi. He further reiterated that service is obtained from different internet service providers and in the past where a service provider is noticed to be unreliable the GCAA engages alternative providers to ensure reliability.

Table 4.11 Availability of Reliable Internet Connection

Availability of Reliable Internet Connection			
Interviewee	Response	Occurrence	Percentage
DDG (F&A)	Yes	7	100.00
DGS	Yes		
DF	Yes		
DHR	Yes		
PROC. M	Yes		
PROJ. M	Yes		
ICT M	Yes		
TOTAL		7	100.00

Source: Data from Research Field Work, July/August, 2016

4.5.3 Internet/Web Based Systems Usage as Daily Routine

All seven of GCAA's respondents answered YES when asked during the interviews whether internet/web based systems were used daily in GCAA as shown in Table 4.12. Probing further the ICT Manager explained that there were a number of internally developed web based applications which was used by the finance and human resource

departments; they include the GCAA intranet containing various forms and documents and from where pay slips could be checked, “Briefing Office Billing”/“Finance Billing,” “Personnel Licensing Examination Software” and He further explained that some other web based applications which use the internet (external) include Civil Aviation Safety Oversight Reporting and Tracking (CASORT) Database and Enterprise Resource Planning (ERP). In the interview with the Procurement Manager he explained that the preparation, submission and reviews of GCAA’s annual procurement plans to the Public Procurement Authority is a web based activity and done through the use of the internet.

Table 4.12 Daily Usage of Internet/Web Based Systems

Daily Usage of Internet/Web Based Systems			
Interviewee	Response	Occurrence	Percentage
DDG (F&A)	Yes	7	100.00
DGS	Yes		
DF	Yes		
DHR	Yes		
PROC. M	Yes		
PROJ. M	Yes		
ICT M	Yes		
TOTAL		7	100.00

Source: Data from Research Field Work, July/August, 2016

4.5.4 Carefully Designed On-line Security and Authentication Protocols

When asked during the interviews whether there was availability of carefully designed on-line security and authentication protocols, six (6) respondents answered YES while one said NO as indicated in Table 4.13, indicating majority agreement that there was some form of such facility within GCAA. The ICT manager explained, in

the interview with him, that already not all staff have access to all information on the internal web and that different categories of staff can access various applications depending on the level of permission granted to them. He gave the example that in performance appraisals on the EPR platform managers who evaluate staff performances have access to the front end of the application while the back end was only accessible to the Director of Human Resources. The projects and procurement managers, in their interviews, confirmed same front end situation for the performance appraisals. He further explained that in the finance department certain financial reports generated on the ERP platform which are sent to the GCAA Executive can only be generated at the back end by the Director of Finance while at the front end different managers and officers use different authentication protocols to feed in basic data during their daily routine entries. The dissenting NO view was of the opinion that simply feeding in staff numbers and passwords are not strong enough security/authenticating protocols.

Table 4.13 Carefully Designed On-Line Security and Authentication Protocols

Carefully Designed On-Line Security and Authentication Protocols			
Interviewee	Response	Occurrence	Percentage
DGS	No	1	14.29
DDG (F&A)	Yes	6	85.71
DF	Yes		
DHR	Yes		
PROC. M	Yes		
PROJ. M	Yes		
ICT M	Yes		
TOTAL		7	100.00

Source: Data from Research Field Work, July/August, 2016

4.5.5 Standardised Electronic Communication Systems

Asked in the interviews whether GCAA had standardised electronic communication systems, six (6) respondents answered YES while one answered NO as shown in Table 4.14. The ICT Manager further explained that for example in GCAA's external web (gcaa.com.gh) the text display interface is achieved by a standard Hyper Text Mark-up Language (HTML) which uses HTML tags (documents) for describing different web document content. He explained further that the interactive interface is achieved by PHP: Hypertext Processor (PHP) language which is a general-purpose scripting language suited to server-side web development and used to create the dynamic images used on the website, while the graphics displayed on the same webpage is achieved by Cascading Style Sheets (CSS) which is a style sheet language used for describing the presentation of a document written in a mark-up language. He said all the above languages have been used just to create the GCAA external website to function the way it does. On the ERP software platform contains Active Server Page Extended (ASPX) files are used for pay slips.

Table 4.14 Standardized Electronic Communication Systems

Standardised Electronic Communication Systems			
Interviewee	Response	Occurrence	Percentage
DGS	No	1	14.29
DDG (F&A)	Yes	6	85.71
DF	Yes		
DHR	Yes		
PROC. M	Yes		
PROJ. M	Yes		
ICT M	Yes		
TOTAL		7	100.00

Source: Data from Research Field Work, July/August, 2016

4.5.6 Carefully Selected E-procurement Software Providers

All seven GCAA respondents answered NO when asked whether this critical success factor existed as shown in Table 4.15. Further search for reasons for this response from the respondents yielded the explanation that there are already some software systems in use, however, none clearly contained e-procurement products. From the ICT Manager it was gathered that even though it is not available it is possible to know what e-procurement software is available on the market to merge it into existing software if need be.

Table 4.15 Carefully Selected E-Procurement Software Providers

Carefully Selected E-Procurement Software Providers			
Interviewee	Response	Occurrence	Percentage
DDG (F&A)	No	7	100.00
DGS	No		
DF	No		
DHR	No		
PROC. M	No		
PROJ. M	No		
ICT M	No		
TOTAL		7	100.00

Source: Data from Research Field Work, July/August, 2016

4.5.7 Internal Staff Capacity to Manage E-procurement Systems

This interview question was purposely asked the ICT manager because of the dependence of electronic procurement on ICT systems and ICT staff. He answered emphatically YES to the question explaining that the ICT Section has championed

other systems mentioned earlier (B.O. /Fin. Billing, Pelexam, etc.) which are still in use at GCAA up to the present. Even though this question was not posed expressly to the other GCAA respondents the YES answer from the ICT Manager can be buttressed by the YES answers other GCAA respondents gave to questions on availability of computer literate staff, reliable internet connection and internet/web based systems usage on a daily basis.

4.5.8 Need for External Consultant to Aid Implementation

All seven GCAA respondents answered YES to this interview question indicating the need for an external consultant to help with implementation of eprocurement processes should it be adopted as indicated in Table 4.16. Probing each respondent further there was a follow up question for example why they indicated in other questions that there is availability of computer literate staff, reliable internet connection and internet/web based systems usage on a daily basis, and why in the case of the ICT Manager he indicated availability of internal capacity to handle e-procurement systems and yet there is the need for an external consultant. The general explanation obtained from all respondents was that like all new systems the GCAA staff will need to be introduced and guided through implementation so that internal capacity will be realigned for success of the new systems.

Table 4.16 Need for External Consultant to Aid Implementation

Need for External Consultant to Aid Implementation			
Interviewee	Response	Occurrence	Percentage
DDG (F&A)	Yes	7	100.00
DGS	Yes		
DF	Yes		

DHR	Yes		
PROC. M	Yes		
PROJ. M	Yes		
ICT M	Yes		
TOTAL		7	100.00

Source: Data from Research Field Work, July/August, 2016

4.6 SUPPLIER (CONTRACTOR) READINESS

4.6.1 Computer Literate Contractor Staff using Computers Routinely

All ten contractors interviewed answered YES to the availability of computer literate staffs within their firms who routinely use computers as presented in Table 4.17. Further probing by the researcher to gain understanding of the answers revealed that a wide range of activities were being done within contractor organisations using desktop and laptop computers; correspondence between contractors and their clients, sending and receiving e-mails from clients, browsing on-line in search of construction products, typing out various forms to support their tenders, scanning and storing copies of various certificates for attachment to tenders, pricing bills of quantities, and other administrative duties. The above CSF question inadvertently achieved two discoveries; the availability/use of computers in the contractors' organizations and revealing the availability of literate staff to handle computers.

4.6.2 Reliable Internet Connection to their Computers

All ten contractors interviewed answered YES to the availability of reliable internet connection for their computers as shown in Table 4.17. Further probing by the researcher to gain understanding of the answers given by the contractors uncovered that they most often believe that internet reliability is more dependent on

which service provider each contractor utilizes and that there is good competition for the contractor to choose which service to use and which to avoid. All of the respondents confirmed using different means for internet connection but specially mentioned were modems, routers and mobile phone hotspots because they occasionally had to travel around and still need to be in touch via the internet to conduct business.

4.6.3 Internet/Web Based Systems in Use

All ten contractors interviewed answered NO to the availability of internet/web-based systems in their firms as shown in Table 4.17. The researcher's further questioning revealed that the answer stems from their lack of self-built web applications and systems for their own business uses on a daily basis. Probing further, seven out of ten indicated that occasionally they used web-based applications on platforms of other clients like their bankers for on-line banking, web searches for construction products, and so on.

4.6.4 On-line Security and Authentication Protocols

All ten contractors interviewed answered NO to the availability of on-line security and authenticating protocols in their firms as presented in Table 4.17. It further came to light that the underlying reason for that situation was the lack of active activities on-line and on-web. Additionally, none of the contractors interviewed had consciously created self-built on-line systems that required much of such authentications and protocols but that these were only occasioned by their use of platforms of other clients as mentioned in the immediate point above.

4.6.5 Standardised Electronic Communication Systems

All ten contractors interviewed answered NO to the availability of standardised electronic communication systems within their firms as presented in Table 4.17. It further came to light that none of the contractors interviewed had purposely built systems that required others to use standardized electronic communication systems to access the contractors. Much of what they had been exposed to was from they using platforms of other clients as mentioned above.

4.6.6 Carefully Selected E-procurement Software Providers

All ten contractors interviewed answered NO to the availability of carefully selected e-procurement software providers for their firms as shown in Table 4.17; the reasons solicited being that all of them confirmed they had not participated in eprocurement before and for that matter had no e-procurement software providers.

Table 4.17 Supplier (Contractor) Readiness

CONTRACTORS	CLCS		RICC		IWBS		OSAP		SECS		CSESP	
	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO
CONTRACTOR 1	√		√		√			X		X		X
CONTRACTOR 2	√		√		√			X		X		X
CONTRACTOR 3	√		√		√			X		X		X
CONTRACTOR 4	√		√		√			X		X		X
CONTRACTOR 5	√		√		√			X		X		X
CONTRACTOR 6	√		√		√			X		X		X
CONTRACTOR 7	√		√		√			X		X		X
CONTRACTOR 8	√		√		√			X		X		X
CONTRACTOR 9	√		√		√			X		X		X
CONTRACTOR 10	√		√		√			X		X		X
TOTAL	10	0	10	0	10	0	0	10	0	10	0	10

Source: Data from Research Field Work, July/August, 2016

Legend

CLSC - Computer literate contractor staff using computers routinely

OSAP - On-line security and authentication protocols

RICC - Reliable internet connection to computers

SECS - Standardised electronic communication systems

CSESP - Carefully selected e-procurement service providers

IWBS - Internet/Web-Based systems in use



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CHAPTER FIVE

RESEARCH FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

Chapter Five discloses the main research findings arising out of the study, which set out to establish a works e-procurement framework procedure for Ghana Civil Aviation Authority. From the research findings conclusions were made which led to recommendations on how the framework procedure can be achieved.

5.2 Research Findings

The research aim from the outset sought to achieve the following objectives;

- i. explore the processes involved in the success of e-procurement in other jurisdictions and/or organisations, ii. ii) explore GCAA's available infrastructure that will support e-procurement,
- and iii. iii) develop (recommend) a framework procedure for works e-procurement for the GCAA.

The first research finding that satisfied the research objective of exploring the processes involved in success of e-procurement in other jurisdictions was achieved largely through literature review. These success-promoting processes were called critical success factors (CSFs) as promulgated by Muhai et al, (2015), Basheka et al, (2012) and Vaidya et al, (2006). These CSFs are summarized as follows;

Policy and managerial level critical success factors characterized by executive approval/financial and managerial leadership, general (top) management assurance of

adoption/implementation, reliability of ICT systems, end user acceptance through orientation/training/refreshers and performance monitoring/measurement of eprocurement processes.

Implementation level critical success factors characterized by employing services of an experienced consultant, organizational process re-engineering via change management, carefully designed on-line security and authentication protocols, standardized electronic communication systems, carefully selected e-procurement software providers, and careful involvement of existing contractors (sellers)/seller systems.

The second research finding that satisfied the objective of exploring GCAA's available infrastructure to support e-procurement was achieved through data gathered during the interviews conducted. The interviewee responses with underlying reasons led to key findings on GCAA's available infrastructure (including organization) which were that there are policy level possibilities of; obtaining executive approval, management assurance of adoption/implementation, reliable ICT systems (computers, internet, the web, etc.), end user acceptance of eprocurement through orientation/training/refreshers. There was however a gap at the policy level of non-availability of performance monitoring/measurement of eprocurement processes which respondents were emphatic did not exist in GCAA. The interviewee responses also led to findings that there exist implementation level requirements of; needing the services of an experienced consultant, reengineering organizational processes, designed on-line security/authentication protocols, standard electronic communication systems, and supplier/supplier systems involvement. There was also a gap at the implementation level of non-availability of e-procurement software providers which respondents were emphatic did not exist in GCAA. Interviewee

responses from the contractor-side further led to findings that there is availability of ICT enablers (computers, computer literate staff and reliable internet connection) that can support e-procurement efforts; however, there were large gaps owing to absence of self-developed internet/web based systems, on-line security/authentication protocols, standard electronic communication systems, and e-procurement software providers.

5.3 Research Conclusions

The aim of this research from the outset was to establish a works e-procurement framework for Ghana Civil Aviation Authority (GCAA) by achievement of three main objectives of exploring the success factors involved in e-procurement in other jurisdictions/organisations, exploring GCAA's available e-procurement support infrastructure and development (recommendation) of a framework procedure for works e-procurement for the GCAA.

The first conclusion is that based on the critical success factors (CSFs) promulgated by Muhai et al, (2015), Basheka et al, (2012) and Vaidya et al, (2006), GCAA already has in place good enough infrastructure to realign towards initiation of policy level e-procurement procedures; however, the gap in performance monitoring/measurement procedures must be put in place specifically for eprocurement processes.

The second conclusion is that based on the same CSFs propounded in the first, GCAA has in place good enough infrastructure to realign towards initiation of implementation level e-procurement procedures; however, the services of eprocurement software providers must be sought to bridge that gap identified.

The third conclusion is that GCAA's contractors are equipped with basic ICT enablers that can support e-procurement efforts; however, they must be helped extensively to get acquainted with internet/web based systems, on-line security protocols, electronic communication standard systems and e-procurement software providers.

5.4 Research Recommendations

Based on the research findings made and conclusions drawn above the following recommendations were made:

- GCAA's Executive/Top Management should start the process of implementing electronic procurement processes without delay both at the policy level and at the implementation level.
- GCAA should make efforts to establish, as part of its internal business processes, the policy level shortfall (absent e-procurement performance monitoring/measurement systems) and implementation level shortfall (absent software providers) identified in the research.
- Furthermore, GCAA should put in place measures to develop the capacity of its participating contractors whose preparedness has serious gaps, yet who form key response-side players in the e-procurement process.
- Finally, GCAA should adopt the e-procurement framework suggested below:-

RECOMMENDED E-PROCUREMENT FRAMEWORK PROCEDURE

Table 5.1 Recommended E-Procurement Framework Procedure

1.0 E-TENDER PUBLICATION/ADVERTISEMENT STEP		ACTIVITIES
	(per ACT 663)	KEY ICT REQUIREMENTS
1.	a) GCAA sends NCT advert to (computers, on-line widely circulated newspaper (e.g. Graphic on-BFT, etc.)	<input type="checkbox"/> Buyer side basic ICT enablers internet/web, trained staff) <input type="checkbox"/> Seller side basic ICT enablers line,
	b) Newspaper sends e-invoice to GCAA, and GCAA makes E-procurement software providers electronic payment	<input type="checkbox"/> Standard electronic communication systems GCAA, <input type="checkbox"/> E-procurement software providers electronic payment Electronic invoicing systems
2.	c) Newspaper publishes advert	Electronic payment systems <input type="checkbox"/>
	a) Sellers view adverts on-line and send inquiries to GCAA internet/web, trained staff) about the e-tenders (NCT)	<input type="checkbox"/> Buyer side basic ICT enablers (computers, and internet/web, trained staff) <input type="checkbox"/> Seller side basic ICT enablers
3.	b) GCAA responds to all inquiries on-line copied to all bidders	<input type="checkbox"/> On-line security/authentication protocol <input type="checkbox"/> Standard electronic communication systems <input type="checkbox"/> E-procurement software providers
	a) Advert stays open till allowable time elapses per Act 663 (max. 4 weeks)	Disabling e-transaction systems
2.0 E-SALE/PURCHASE OF TENDERS STEP		ACTIVITIES (per ACT 663)
		KEY ICT REQUIREMENTS
	a) Interested bidders make epayment for tender documents per directions in the on-line instructions.	<ul style="list-style-type: none"> • Buyer side basic ICT enablers (computers, internet/web, trained staff) • Seller side basic ICT enablers
	b) A prompt is generated to 4. GCAA's Finance Department and Procurement Section for release of a set of e-tender documents into bidders e-mail address.	<ul style="list-style-type: none"> • On-line security/authentication protocol • Standard electronic communication systems • E-procurement software providers • Electronic invoicing systems • Electronic payment systems

3.0 E-COMPLETION OF TENDERS		
STEP	ACTIVITIES (per ACT 663)	KEY ICT REQUIREMENTS
5.	a) Bidders fill-in all required areas of the e-tender documents (MS WORD, EXCEL, etc.) and scanned originals of all attaching documents (PDF, RTF, etc.)	<ul style="list-style-type: none"> □ Seller side basic ICT enablers (computers, internet/web, trained staff)

4.0 E-SUBMISSION OF TENDERS

STEP	ACTIVITIES (per ACT 663)	KEY ICT REQUIREMENTS
a)	Bidders submit completed tender documents to an eaddress (repository) on or before deadline stated in the etender documents.	<ul style="list-style-type: none"> • Buyer side basic ICT enablers (computers, internet/web, trained staff) • Seller side basic ICT enablers • On-line security/authentication protocol
b)	Attempts to submit late bids is 6.	<ul style="list-style-type: none"> • Standard electronic communication systems • E-procurement software providers

5.0 E-OPENING OF TENDERS

STEP	ACTIVITIES (per ACT 663)	KEY ICT REQUIREMENTS
	blocked automatically by GCAA's security system	<ul style="list-style-type: none"> • Disabling e-transaction systems
c)	E-message of closure is immediately sent to such bidders and registered in erecords centre.	<p>7.</p> <ul style="list-style-type: none"> a) The Entity Tender Committee (ETC) appoints a Tender Opening Panel (TOP) by email before the deadline for tender submission/opening. b) The TOP arranges a venue for public e-opening, per Act 663 c) Tender opening meeting notice e-mailed to all participants d) Tenders opened immediately upon expiry of deadline. e) Details of each tender; price, bid security, discounts, etc., projected on screen and mentioned as in regular tender. f) Observe Tender Opening protocols per Act 663; e.g. signing bid forms, minutes, etc.

- Buyer side basic ICT enablers (computers, internet/web, trained staff)
- Bulk document receiving software
- Buyer side on-line security/authentication protocols
- Standard electronic communication systems
- E-procurement software providers
- Disabling e-transaction systems
- Buyer side electronic signatures
- Projectors

6.0 E-EVALUATION OF TENDERS		
STEP	ACTIVITIES (per ACT 663)	KEY ICT REQUIREMENTS
8.	<p>a) The ETC appoints a Tender Evaluation Panel (TEP) by email before deadline for tender submission/opening.</p> <p>b) The TEP arranges venue for evaluation, projecting evaluation tables onto a screen, discussing and filling in while compiling the report.</p> <p>c) Completed Evaluation Reports are forwarded to Awarding Body (ETC).</p>	<ul style="list-style-type: none"> • Buyer side basic ICT enablers (computers, internet/web, trained staff) • Bulk document receiving software • Buyer side on-line security/authentication protocols • Standard electronic communication systems • E-procurement software providers • Disabling e-transaction systems • Buyer side electronic signatures • Projectors



7.0 E-AWARD OF CONTRACT		
STEP	ACTIVITIES (per ACT 663)	KEY ICT REQUIREMENTS
9.	<p>a) Awarding Body reviews evaluation report and approves recommendations if no objection</p> <p>b) If objection, report is reversed to TEP to reassess and re submit.</p> <p>c) Awarding Body approves recommendations.</p>	<ul style="list-style-type: none"> • Buyer side basic ICT enablers (computers, internet/web, trained staff) • Bulk document receiving software • Buyer side on-line security/authentication protocols • Standard electronic communication systems • E-procurement software providers • Disabling e-transaction systems • Buyer side electronic signatures • Projectors

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APPENDICES Semi-Structured Interview Questions for DDG (F&A) - (Critical Success Factors;

Executive Approval/Leadership)

GENERAL INFORMATION

1. Kindly confirm your designation in the GCAA.
2. Kindly indicate your highest educational qualification?
3. Kindly indicate any professional qualifications?
4. How many years of work experience do you have with GCAA?
5. Overall, how many years of experience have you served in executive management positions?
6. Do you have knowledge about e-procurement; where Clients and Contractors/Suppliers procure electronically through the internet/the World Wide Web using computers and other ICT enablers?

YES

NO

CRITICAL SUCCESS FACTORS

Kindly indicate the **existence (YES)** or **non-existence (NO)** of the following **Policy Level Critical Success Factors** that will promote adoption of e-procurement for GCAA: -

7. Possibility of Executive Approval to use e-procurement for all Works Contracts by National Competitive Tendering (NCT) method? **YES** **NO**

Researcher probes for further explanation from respondent

8. General Management Assurance of adoption/implementation? **YES** **NO**

Researcher probes for further explanation from respondent

9. Reliability of ICT systems (computers, internet, webpage, etc.)? **YES** **NO**

Researcher probes for further explanation from respondent

10. End User Acceptance through training, orientation, refreshers, etc? **YES** **NO**

Researcher probes for further explanation from respondent

11. Performance monitoring/measurement of e-procurement processes? **YES** **NO**

Researcher probes for further explanation from respondent

Kindly indicate the **existence (YES)** or **non-existence (NO)** of the following **Implementation Level Critical Success Factors** to help implement e-procurement for GCAA: -

12. Need for Services of an experienced consultant for implementation? **YES** **NO**

Researcher probes for further explanation from respondent

13. Organizational Process Re-engineering via change management? **YES** **NO**

Researcher probes for further explanation from respondent

14. Carefully designed on-line security and authentication protocols? **YES** **NO**

Researcher probes for further explanation from respondent

15. Standardized Electronic Communication systems? **YES** **NO**

Researcher probes for further explanation from respondent

16. Carefully selected e-procurement software providers? **YES** **NO**

Researcher probes for further explanation from respondent

17. Careful involvement of existing Contractors/suppliers systems? **YES** **NO**

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Structured Interview Questions for DGS - (Critical Success Factors;

Executive Approval/Leadership & Top Management Leadership)

GENERAL INFORMATION

1. Kindly confirm your designation in the GCAA.
2. Kindly indicate your highest educational qualification?
3. Kindly indicate any professional qualifications?
4. How many years of work experience do you have with GCAA?
5. Overall, how many years of experience have you served in Top Management positions?
6. Do you have knowledge about e-procurement; where Clients and Contractors/Suppliers procure electronically through the internet/the World Wide Web using computers and other ICT enablers? YES NO

CRITICAL SUCCESS FACTORS

Kindly indicate the **existence (YES)** or **non-existence (NO)** of the following **Policy Level**

Critical Success Factors that will promote adoption of e-procurement for GCAA: -

7. Possibility of Executive Approval to use e-procurement for all Works Contracts by National Competitive Tendering (NCT) method? YES NO

Researcher probes for further explanation from respondent

8. General Management Assurance of adoption/implementation? YES NO

Researcher probes for further explanation from respondent

9. Reliability of ICT systems (computers, internet, webpage, etc.)? YES NO

Researcher probes for further explanation from respondent

10. End User Acceptance through training, orientation, refreshers, etc? YES NO

Researcher probes for further explanation from respondent

11. Performance monitoring/measurement of e-procurement processes? YES NO

Researcher probes for further explanation from respondent

Kindly indicate the **existence (YES)** or **non-existence (NO)** of the following

Semi-

Implementation Level Critical Success Factors to help implement e-procurement for GCAA: -

12. Need for Services of an experienced consultant for implementation? **YES** **NO**

Researcher probes for further explanation from respondent

13. Organizational Process Re-engineering via change management? **YES** **NO**

Researcher probes for further explanation from respondent

14. Carefully designed on-line security and authentication protocols? **YES** **NO**

Researcher probes for further explanation from respondent

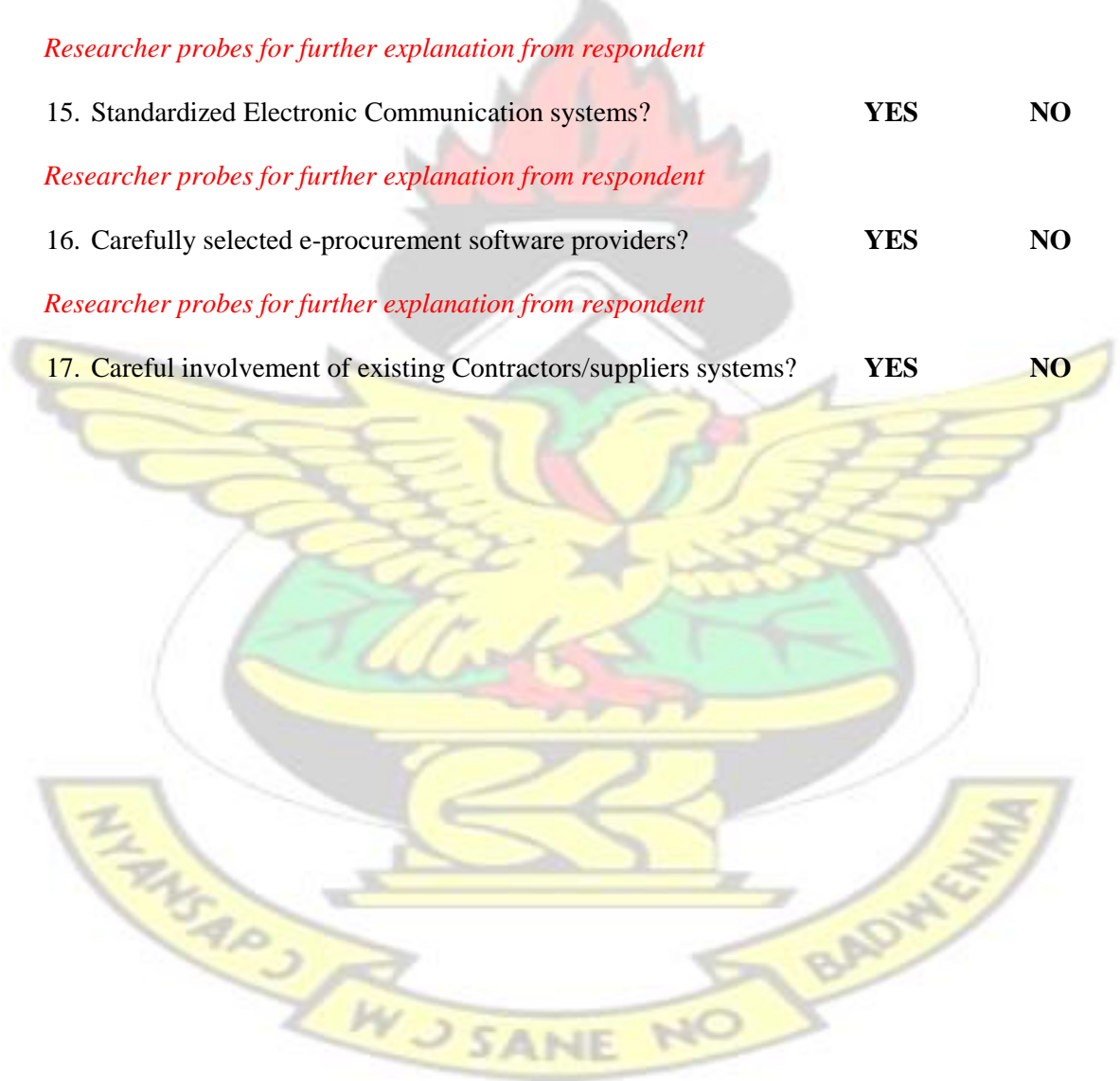
15. Standardized Electronic Communication systems? **YES** **NO**

Researcher probes for further explanation from respondent

16. Carefully selected e-procurement software providers? **YES** **NO**

Researcher probes for further explanation from respondent

17. Careful involvement of existing Contractors/suppliers systems? **YES** **NO**



Structured Interview Questions for DHR - (Critical Success Factors;

Executive Approval/Leadership & Top Management Leadership)

GENERAL INFORMATION

1. Kindly confirm your designation in the GCAA.
2. Kindly indicate your highest educational qualification?
3. Kindly indicate any professional qualifications?
4. How many years of work experience do you have with GCAA?
5. Overall, how many years of experience have you served in Top Management positions?
6. Do you have knowledge about e-procurement; where Clients and Contractors/Suppliers procure electronically through the internet/the World Wide Web using computers and other ICT enablers?

YES	NO
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CRITICAL SUCCESS FACTORS

Kindly indicate the **existence (YES)** or **non-existence (NO)** of the following **Policy Level Critical Success Factors** that will promote adoption of e-procurement for GCAA: -

7. Possibility of Executive Approval to use e-procurement for all Works Contracts by National Competitive Tendering (NCT) method?

YES	NO
<i>Researcher probes for further explanation from respondent</i>	
8. General Management Assurance of adoption/implementation?

YES	NO
<i>Researcher probes for further explanation from respondent</i>	
9. Reliability of ICT systems (computers, internet, webpage, etc.)?

YES	NO
<i>Researcher probes for further explanation from respondent</i>	
10. End User Acceptance through training, orientation, refreshers, etc?

YES	NO
<i>Researcher probes for further explanation from respondent</i>	
11. Performance monitoring/measurement of e-procurement processes?

YES	NO
<i>Researcher probes for further explanation from respondent</i>	

Kindly indicate the **existence (YES)** or **non-existence (NO)** of the following

Implementation Level Critical Success Factors to help implement e-procurement for GCAA: -

Semi-

12. Need for Services of an experienced consultant for implementation? **YES** **NO**

Researcher probes for further explanation from respondent

13. Organizational Process Re-engineering via change management? **YES** **NO**

Researcher probes for further explanation from respondent

14. Carefully designed on-line security and authentication protocols? **YES** **NO**

Researcher probes for further explanation from respondent

15. Standardized Electronic Communication systems? **YES** **NO**

Researcher probes for further explanation from respondent

16. Carefully selected e-procurement software providers? **YES** **NO**

Researcher probes for further explanation from respondent

17. Careful involvement of existing Contractors/suppliers systems? **YES** **NO**



Structured Interview Questions for DF - (Top Management Financial Leadership)

GENERAL INFORMATION

1. Kindly confirm your designation in the GCAA.
2. Kindly indicate your highest educational qualification?

3. Kindly indicate any professional qualifications?
4. How many years of work experience have you served in GCAA?
5. How many years of experience overall have you served in top management positions?
6. Do you have knowledge about e-procurement; where Clients and Contractors/Suppliers procure electronically through the internet/the World Wide Web using computers and other ICT enablers? **YES** **NO**

CRITICAL SUCCESS FACTORS

Kindly indicate the **existence (YES)** or **non-existence (NO)** of **financial commitment** for the following **Policy Level Critical Success Factors** that will promote adoption of eprocurement for GCAA: -

7. Top Management Assurance of financial leadership? **YES** **NO**
Researcher probes for further explanation from respondent
8. Reliable ICT systems (computers, internet, webpage, etc.)? **YES** **NO**
Researcher probes for further explanation from respondent
9. End User Acceptance through training, orientation, refreshers, etc.)? **YES** **NO**
Researcher probes for further explanation from respondent
10. Performance monitoring/measurement of e-procurement processes? **YES** **NO**
Researcher probes for further explanation from respondent

Kindly indicate the **existence (YES)** or **non-existence (NO)** of **financial commitment** for the following **Implementation Level Critical Success Factors** to help implement eprocurement for GCAA: -

11. Services of an experienced consultant for implementation? **YES** **NO**
Researcher probes for further explanation from respondent
12. Organizational Process Re-engineering via change management? **YES** **NO**
Researcher probes for further explanation from respondent
13. Carefully designed on-line security and authentication protocols? **YES** **NO**
Researcher probes for further explanation from respondent

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14. Standardized Electronic Communication systems? **YES** **NO**

Researcher probes for further explanation from respondent

Carefully selected e-procurement software providers? **YES** **NO**

Researcher probes for further explanation from respondent

15. Careful involvement of performing contractors/suppliers? **YES** **NO**

Researcher probes for further explanation from respondent



**Structured Interview Questions for ICT Manager (Critical Success Factors;
System Integration, Security & Authentication and Electronic Communication
Standards)**

GENERAL INFORMATION

1. Kindly confirm your designation in the GCAA?
2. Kindly indicate your highest educational qualification?
3. Kindly indicate any professional qualifications?
4. How many years of work experience have you served with GCAA?
5. How many years of work experience overall have you served similar management positions?
6. Do you have knowledge about e-procurement; where Clients and Contractors/Suppliers procure electronically through the internet/the World Wide Web using computers and other ICT enablers?

YES

NO

CRITICAL SUCCESS FACTORS

Kindly indicate the **existence (YES)** or **non-existence (NO)** of the following

Implementation Level Critical Success Factors to help implement e-procurement for GCAA: -

7. Computer literate staff using computers on routine basis?

YES

NO

Researcher probes for further explanation from respondent

- Reliable internet connection to staff computers?

YES

NO

Researcher probes for further explanation from respondent

- Internet/Web-based systems usage in staffs' daily routines?

YES

NO

Researcher probes for further explanation from respondent

- Carefully designed on-line security and authentication protocols?

YES

NO

Researcher probes for further explanation from respondent

- Standardized Electronic Communication systems?

YES

NO

Researcher probes for further explanation from respondent

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8. Carefully selected e-procurement software providers? **YES** **NO**

Researcher probes for further explanation from respondent

Internal ICT staff capacity to manage e-procurement systems? **YES** **NO**

Researcher probes for further explanation from respondent

Need for external consultant to aid e-procurement implementation? **YES** **NO**

Researcher probes for further explanation from respondent



Structured Interview Questions for Procurement Manager (Critical Success Factors; End User Uptake & Training, Change Management Process, Performance Measurement)

GENERAL INFORMATION

1. Kindly confirm your designation in the GCAA?
2. Kindly indicate your highest educational qualification?
3. Kindly indicate any professional qualifications?
4. How many years of work experience have you served with GCAA?
5. How many years of work experience overall have you served similar management positions?
6. Do you have knowledge about e-procurement; where Clients and Contractors/Suppliers procure electronically through the internet/the World Wide Web using computers and other ICT enablers? YES NO

CRITICAL SUCCESS FACTORS

Kindly indicate the **existence (YES)** or **non-existence (NO)** of the following **Implementation Level Critical Success Factors** at the Procurement Section to aid implementation: -

7. Computer literate procurement staff using computers on routine basis? YES NO

Researcher probes for further explanation from respondent

8. Reliable internet connection to Procurement staff computers? YES NO

Researcher probes for further explanation from respondent

9. Internet/Web-based systems usage in staffs' daily routines? YES NO

Researcher probes for further explanation from respondent

10. Preparation and submission of procurement plans on-line? YES NO

Researcher probes for further explanation from respondent

11. Any on-line security and authentication protocols? YES NO

Researcher probes for further explanation from respondent

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- | | | |
|---|------------|-----------|
| 12. Any standardized electronic communications systems? | YES | NO |
| <i>Researcher probes for further explanation from respondent</i> | | |
| 13. Any e-procurement software providers? | YES | NO |
| <i>Researcher probes for further explanation from respondent</i> | | |
| 14. Need for external consultant to aid e-procurement implementation? | YES | NO |
| <i>Researcher probes for further explanation from respondent</i> | | |
| 15. Organizational Process Re-engineering via change management? | YES | NO |
| <i>Researcher probes for further explanation from respondent</i> | | |
| 16. Performance monitoring/measurement on e-procurement processes? | YES | NO |
| <i>Researcher probes for further explanation from respondent</i> | | |
| Careful involvement of performing contractors/suppliers? | YES | NO |
| <i>Researcher probes for further explanation from respondent</i> | | |



**Structured Interview Questions for Projects Manager (Critical Success Factors;
End User Uptake & Training, Performance Measurement)**

GENERAL INFORMATION

1. Kindly confirm your designation in the GCAA?
2. Kindly indicate your highest educational qualification?
3. Kindly indicate any professional qualifications?
4. How many years of work experience have you served with GCAA?
5. How many years of work experience overall have you served similar management positions?
6. Do you have knowledge about e-procurement; where Clients and Contractors/Suppliers procure electronically through the internet/the World Wide Web using computers and other ICT enablers? YES NO

CRITICAL SUCCESS FACTORS

Kindly indicate the **existence (YES)** or **non-existence (NO)** of the following

Implementation Level Critical Success Factors at the Projects Section to aid implementation: -

- | | | |
|---|-----|----|
| 7. Computer literate Projects staff using computers on routine basis? | YES | NO |
| <i>Researcher probes for further explanation from respondent</i> | | |
| 8. Reliable internet connection to Projects staff computers? | YES | NO |
| <i>Researcher probes for further explanation from respondent</i> | | |
| 9. Internet/Web-based systems usage in staffs' daily routines? | YES | NO |
| <i>Researcher probes for further explanation from respondent</i> | | |
| 10. Any on-line security and authentication protocols? | YES | NO |
| <i>Researcher probes for further explanation from respondent</i> | | |
| 11. Any standardized electronic communications systems? | YES | NO |
| <i>Researcher probes for further explanation from respondent</i> | | |
| 12. Any e-procurement software providers? | YES | NO |
| <i>Researcher probes for further explanation from respondent</i> | | |

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13. Need for external consultant to aid e-procurement implementation? **YES** **NO**

Researcher probes for further explanation from respondent

14. Organizational Process Re-engineering via change management? **YES** **NO**

Researcher probes for further explanation from respondent

15. Performance monitoring/measurement on e-procurement processes? **YES** **NO**

Researcher probes for further explanation from respondent

16. Careful involvement of performing contractors/suppliers? **YES** **NO** *Researcher*

probes for further explanation from respondent



**Structured Interview Questions for Select Contractors (Critical Success Factors;
Contractor/Supplier Adoption)**

GENERAL INFORMATION

1. Kindly confirm the company name?
2. What is the Technical and Financial category of your firm (D1,K1; D2,K2; etc.)?
3. How many years of experience does the firm have in works construction?
4. How long has your firm been dealing with Ghana Civil Aviation Authority (GCAA)?
5. Do you have knowledge about e-procurement; where Clients and Contractors/Suppliers procure electronically through the internet/the World Wide Web using computers and other ICT enablers? **YES** **NO**
6. Have you taken part in any e-procurement procedures the past? **YES** **NO**

CRITICAL SUCCESS FACTORS

Kindly indicate the **existence (YES)** or **non-existence (NO)** of the following **Implementation Level Critical Success Factors** that will aid your participation in eprocurement implementation: -

7. Computer literate staffs who use computers routinely? **YES** **NO**
Researcher probes for further explanation from respondent
8. Reliable internet connection for your computers? **YES** **NO**
Researcher probes for further explanation from respondent
9. Internet/Web-based systems in use? **YES** **NO**
Researcher probes for further explanation from respondent
10. On-line security and authentication protocols? **YES** **NO**
Researcher probes for further explanation from respondent
11. Standardized electronic communications systems? **YES** **NO**
Researcher probes for further explanation from respondent
12. Reliable e-procurement software providers? **YES** **NO**

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Researcher probes for further explanation from respondent

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