MAKERERE UNIVERSITY

ORGANISATIONAL FACTORS, ICT INFRASTRUCTURE AND IMPLEMENTATION OF ELECTRONIC-PROCUREMENT PROJECTS: A CASE STUDY OF LOCAL GOVERNMENT IN WEST NILE

ALWAYO BELLA FLAVIA

2018/HD10/2357U

E-MAIL: balwayo@mubs.ac.ug

TEL: +256 777 073213

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PLAN A

JULY, 2020

DECLARATION

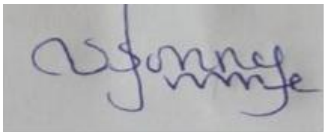
I, **Alwayo Flavia Bella,** declare that this research report is my original work and has not been presented for any award to any other university or higher institution of learning before. Where it is indebted to the work of others, due acknowledgement has been given.

Signed:  Date: 21/12/2020

Alwayo Bella Flavia
2018/HD10/2357U

APPROVAL

This is to certify that this proposal has been submitted for examination with my approval as the University Supervisor.

Signed  Date: 21/12/2020

Dr. Sonny Nyeko
(Supervisor)

Signed  Date: 21/12/2020

Mr. Cosmas Ogenmungu
(Supervisor)

DEDICATION

I dedicate this work to my Husband for the overwhelming support. There is no doubt in my mind that without his support, tolerance and enthusiasm, I could not have completed this process.

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First, I thank the almighty God for the gift of life, his wisdom and for his divine favor and grace. I would also like to acknowledge the support and guidance of my university supervisor Dr. Sonny Nyeko and Mr. Ogenmungu Cosmas their inputs have been very instrumental in enabling me to complete the study. I am deeply grateful to my family especially my parents; Prof. John Enyaru and Mrs Florence Enyaru for their moral encouragement and financial support. Lastly, I would like to appreciate a friend James for all the support he gave me.

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LIST OF ACRONYMS

PPDA	Public Procurement and Disposal Authority
ICTs	Information Communication Technologies
T.O.E	Technological-Organizational Environmental Framework
ISO	International Organization for Standardization
PPOA	Public Procurement Oversight Authority
MBA	Master in Business Administration
IT	Information Technology
TR	Technological Readiness
ICT	Information Communication Technology
CAO	Chief Administrative Officer
PDE	Procuring and Disposing Entity
EP	Electronic Procurement
E-GP	Electronic Government Procurement System
SPSS	Statistical Packages for Social Sciences
NITA-U	National Information Technology Authority of Uganda
MoFPED	Ministry of Finance, Planning and Economic Development
UNRA	Uganda National Roads Authority
KCCA	Kampala Capital City Authority
CAA	Civil Aviation Authority
NSSF	National Social Security Fund

MWE	Ministry of Water and Environment
EDI	Electronic Data Interchange
B2B	Business to Business
DOI	Digital Object Identifier

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ABSTRACT

The study was conducted to examine the relationship between organizational factors, ICT infrastructure and implementation of e-procurement projects in West Nile local governments. The study sought to determine the extent e-procurement projects implementation is attributed to organizational factors and ICT infrastructure.

The study used a cross sectional survey design where 144 usable questionnaires were used to collect the data and was analyzed using SPSS version 25. Pearson correlation and regression analysis were used to determine the degree of relationship between organizational factors, ICT infrastructure and implementation of e-procurement projects in West Nile local governments.

Findings of the study revealed a significant positive relationship between organizational factors, ICT infrastructure and implementation of e-procurement projects. The regression analysis results show that organizational factors and ICT infrastructure predicts 47.4% of the observed variance in e-procurement project implementation. This implies that there are other predictors of e-procurement implementation besides organizational factors and ICT infrastructure; thus, further research is called for to find the other predictors of e-procurement project implementation in addition to what is already in place.

The researcher recommends that to successfully implement e-procurement projects, top management support should be sought and there should be deliberate effort to provide users with IT knowledge and skills through training. Similarly, local government leaders should pay attention to ICT infrastructure by ensuring there is enough hardware and software facilities to support e-procurement in the organization.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Technological advancements have eased ways of doing business, as businesses are able to automate their operations, thereby providing timely services to the customers. Similarly, the organizational progress in information technology (IT) has led to efficiency in procurement through online platforms, also referred to as electronic procurement (Moturi, 2016). The manual tasks have also been blamed for being time consuming and have consistently scored low on achievement of value for money and lack of transparency in the procurement process (Moturi, 2016; Aputo, 2018). Electronic procurement (e-procurement) is the ability of procurement entities to use the Internet technologies to back up their procurement processes. The concept of e-procurement is adopted by literally all industries and all kinds of organizations, and enables a firm to organize interactions with its most crucial suppliers (Odero & Ndolo, 2019).

Nawi, Rafikullah, Jibril, Faisal and Salman (2016) stressed that e-procurement transforms the manual procurement practice into an electronic, Internet-based practice through the automation of the entire procurement cycle within e-procurement framework. Consequently, suppliers benefit significantly from the opportunity to reach a broader base of buyers; coupled with lower operating costs, shorter turnaround time, additional revenue, and increased customer satisfaction (Nawi *et al.,* 2016). Several studies have acknowledged the importance of e-procurement implementation in regard to increased transparency in procurement procedures and practices, and generally, achievement of efficiency in the procurement processes (Lusuli, Bwisa., Were & Kiarie,2017; Tsuma & Kanda, 2017). Besides, Lusuli et *al.,* (2017) support the implementation of e-procurement due to benefits such as minimizing the procurement cycle time, maximizing

value for money, fostering accountability, and improved confidentiality, integrity and authenticity of transactions between the procurement entities and the suppliers. Although, organizational preparedness also determined the level of implementation of technologies, Tornatzky & Fleischer's (1990) technological, organizational environmental (TOE) framework proposes a common set of factors that explain and foretell the likelihood of innovation adoption. The TOE framework explains implementation of e-procurement projects as it embraces both organizational and IT infrastructural factors in technology adoption. Specifically, Mambo, Ombui & Kagiri, (2015) argue that organization top management should be in line with setting the goals, fostering collective commitment for change and mindset, and developing practical policies and strategies that support e-procurement initiative. On the other hand, the presence of adequate ICT infrastructure drives implementation and utilization of technologies. According to Wang *et al.,* (2010), ICT infrastructure delivers the supply for the essential knowledge and skills to implement IT applications.

The motivation behind this research is to contribute to existing literature on public e-procurement and to provide valuable insight for researchers, policy makers and

practitioners into future implementation of public e-procurement. E-procurement has tremendous potential for the public sector. However, it is not fully appreciated and has not been exploited within the public sector to the extent that it has been within the private sector. When compared to the private sector, limited research has been conducted on public e-procurement (Schoenherr and Tummala, 2007) and this existing research primarily focuses on the local or national level.

Worldwide, the e-procurement has been growing particularly amongst nations with well-built technology infrastructure (Ngui, 2016). Yet in Africa, e-procurement started gaining approval

recently when the public sector acknowledged the challenges associated with lack of accountability and transparency in the procurement activities (Harelimana, 2018). Despite its great benefits, the implementation of e-procurement technologies is still at an infant stage (Harelimana, 2018; Odero & Ndolo, 2019).

The motivation behind this research is to contribute to existing literature on public e-procurement and to provide valuable insight for researchers, policy makers and practitioners into future implementation of public e-procurement. E-procurement has tremendous potential for the public sector. However, it is not fully appreciated and has not been exploited within the public sector to the extent that it has been within the private sector. When compared to the private sector, limited research has been conducted on public e-procurement (Schoenherr and Tummala, 2007) and this study was therefore, to investigate the extent e-procurement projects implementation in local governments in the Ugandan West Nile districts was influenced by organization factors and ICT infrastructure.

1.2 Statement of the Problem

The Uganda government has prioritized e-procurement as one of the medium-term objectives to be implemented to revolutionize key operations and accordingly improve transparency, efficiency and effectiveness in the procurement activities and functions (Public Procurement and Disposal of Public Assets Authority [PPDA], 2019). However, its implementation is still very slow (Patricia, 2015). This is because successful e-procurement implementation requires candid management support, acquisition of IT knowledge and skills, coupled with the support to the security risk function and organizational technology readiness (Odero & Ndolo, 2019; Ernest & Young, 2019). Nevertheless, information on factors that influence e-procurement implementation

in Uganda is still lacking. This study thus sought to investigate the extent to which e-procurement project implementation is influenced by organizational and ICT infrastructural factors in the context of the Ugandan local governments in West Nile Districts.

1.3 Purpose of the Study

The purpose of this study was to examine how organizational factors and ICT infrastructure affect implementation of electronic procurement projects in the West Nile districts local governments.

1.4 Study Objectives

The research objectives for this study were:

(i) To examine the relationship between organizational factors and e-procurement projects implementation.

(ii) To examine the relationship between ICT infrastructure and e-procurement projects implementation.

(iii) To examine the combined effect of organizational factors and ICT infrastructure on e-procurement projects implementation.

1.5 Hypothesis

The Hypothesis for this study was:

H1: There is a relationship between organizational factors and e-procurement project implementation

H2: There is a relationship between ICT infrastructure and e-procurement project implementation

H3: Organizational factors and ICT infrastructure have an effect on e-procurement project implementation

1.6 Scope of the Study

1.6.1 Conceptual Scope

The study was focused on the relationship between organizational factors and ICT infrastructure on e-procurement projects implementation in the Uganda district local governments in the West Nile region.

1.6.2 Geographical Scope

The study was focused on e-procurement project implementation in the West Nile Districts of Arua, Koboko, Moyo, Nebbi, Pakwach, Madi-Okollo, Adjumani, Koboko, Yumbe, Zombo and Maracha.

1.6.3 Time scope

I started doing this research in February 2020 and completed it in December 2020.

1.7 Significance of the study

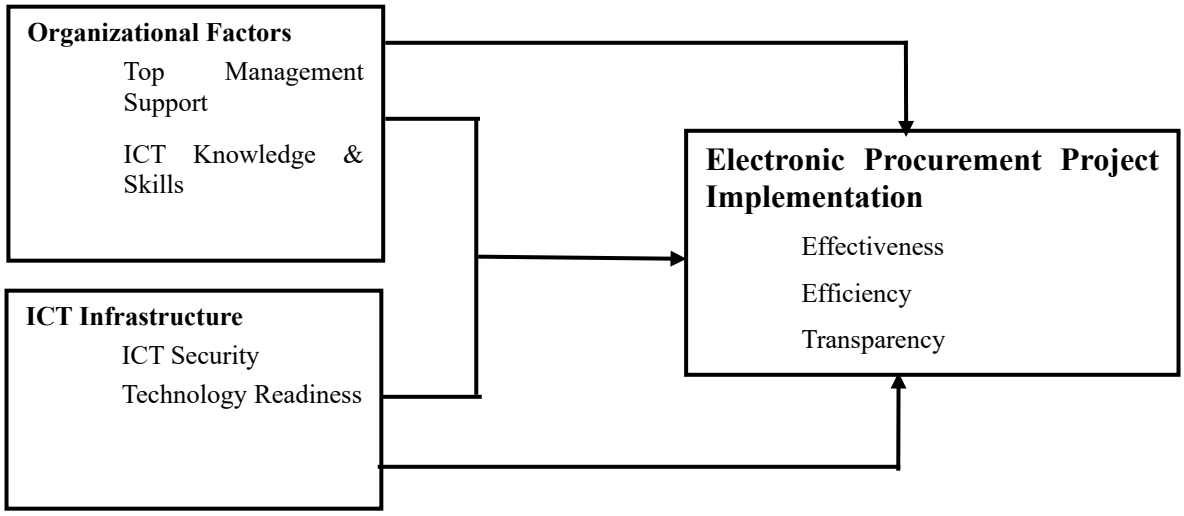
(i) The study findings will provide government agencies with vital information that can be used to formulate e-procurement policies and design appropriate e-procurement implemented projects.

(ii) This study will also avail local governments with information on the required organizational factors and ICT infrastructure effective for e-procurement implementation in the West Nile districts.

(iii) The study will also be of much significance for future research to research institutions, students and other researchers towards contribution to the knowledge gap in e-procurement projects implementation literature and in generating new research ideas.

(iv) The successful implementation of e-procurement lead to better service delivery in local governments to the society /communities

1.8 Description of the Conceptual Framework



Source: *Adopted and modified from Tornatzky & Fleischer (1990); Olivera & Martins (2010); Tippin & Sohi (2003); Tsuma & Kanda, (2017**),** Kananu (2015)*

Figure 1: Conceptual Framework

This conceptual framework is about organizational factors, ICT infrastructure and electronic procurement implementation. An organizational factor is an independent variable with top management and ICT knowledge and skills as the identified measures in the variable. Organization factors here influences e-procurement project implementation. ICT infrastructure is also another independent variable with two constructs of ICT security and technological readiness. ICT Infrastructure also influences electronic procurement project implementation in this relationship. Lastly, the electronic procurement implementation is the dependent variable in the study, with effectiveness, efficiency and transparency as constructs. Consequently, the combination of both the organizational factors and ICT infrastructure influence the implementation of e-procurement projects in the overall relationship.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter reviews and examines the empirical literature on the relationship between organization factors, information and communication technology (ICT) infrastructure and e-procurement project implementation.

2.2 Concept of E- Procurement in Uganda

Khan and Shah (2016) defined E-procurement as the electronic acquisition of goods and services including all processes from the identification of a need to purchase of products, to the payment for these purchases, including post-contract/payment activities such as contract management, supplier management and development. While there are various forms of e-Procurement that concentrate on one or many stages of the procurement process such as e-Tendering, e-Marketplace, e-Auction/Reverse Auction, and e-Catalogue/Purchasing, e-Procurement can be viewed more broadly as an end-to-end solution that integrates and streamlines many procurement processes throughout the organization (Mose, Njihia & Magutu, 2013).

In order to ensure timely and quality service delivery to Ugandan citizens, the Government has developed the National Electronic Government (e-Government) Policy Framework. Adopted in 2008, the Policy Framework has facilitated the introduction of new technologies in e-government services, with the support of the World Bank in implementation (UNCTAD, 2018). Some of the projects included in the e-Government Framework are the Electronic Government Procurement. The success of the e-government procurement system project largely relies on stakeholder or management engagement. It's the management and people in organizations who make or fail

systems, which in this case mean management. There is need to equip key stakeholders with relevant information on the new system and their role throughout the life- cycle of the project.

More recently, on 5th February 2018, the PPDA, which is the public procurement regulator in Uganda, unveiled the contracted vendor for the supply, Installation, Commissioning and Maintenance of the electronic Government Procurement (eGP) System in Uganda (PPDA, 2018). Overall, a recent bidders' readiness analysis by NITA-U (2018) revealed a high degree of readiness among the bidders with; 76% of the bidders having internet access, 78% of bidders reported having access to ICT infrastructure such a computers and 76% of the bidders reported that their staff were computer literate. This notwithstanding, 61.6% of bidders said they needed training and sensitization to start using e-procurement systems and 13% reported that they needed internet services in order to start using the e-GP system (NITA-U, 2018). As part of the reforms in public Procurement and Disposal management, PPDA in partnership with Ministry of Finance, Planning and Economic Development (MoFPED) and the National Information Technology Authority of Uganda (NITAU) with funding from the World Bank spearheaded plans to harness the potential of new technology through the implementation of the Electronic Government Procurement (e-GP) (PPDA, 2019). E-procurement is to be piloted in 2020 and envisaged to promote both Transparency and Efficiency in the Public procurement and Disposal transactions. In Uganda, the e-GP shall be piloted in ten (10) selected public entities. These include: Uganda National Roads Authority(UNRA); PPDA; NITA-U, MoFPED, Kampala Capital City Authority(KCCA); Civil Aviation Authority(CAA), National Social Security Fund and Ministry of Water and Environment. Among local government entities, only Mpigi and Jinja

District Local Government have been piloted with the project. It has to be noted that none of the districts that form West Nile region has been part of the pilot project.

Although e-procurement provides a platform for: Increased transparency in procurement procedures and practices, improved efficiency in procurement, by minimizing the procurement cycle time, maximizing value for money, and fostering accountability and improved confidentiality, integrity and authenticity of transactions between the procurement entities and the suppliers (Public Procurement and Disposal Authority [PPDA], 2014), it has just gained currency as a topical issue for discussion on several platforms in recent times (Harelimana, 2018). Additionally, its potential is remains less researched in Uganda and particularly in West Nile. Most of the existing literature involving less developed countries is relatively young, speculative and anecdotal, and still lacks sound theoretical explanations for limitations of adopting e-procurement (Ahimbisibwe, Tusiime & Tumuhairwe, 2016).

2.3 Theoretical Context

2.3.1 Diffusion of Innovation Theory

The Diffusion of Innovation theory (DOI) proposed by Everett Rogers in 1962 is a fundamental approach to investigations of how a new technology diffuses (Hsu et al, 2006). This theory provides a conceptual and analytical framework for describing the acceptability of innovation and explains its evolution from the invention stage to extended use. For Rogers (1995), the adoption rate of innovation is "the relative speed with which an innovation is adopted by members of a social system". This rate is influenced firstly by the perceived attributes of the innovation, which include its relative benefits, compatibility, complexity, observability and testability. According to Rogers, these five attributes can explain 49-87 % of the variance in the

rate of implementation. Secondly, the implementation rate is influenced by the characteristics of the organization itself, like as centralization, formalization, and size, slack and interconnectedness. Although Rogers's theory seems to be quite applicable to an investigation of innovation adoption, many researchers continue to search other contexts which can influence this subject. Alomar & Visscher, 2017.

2.3.2 Technology, Organization, Environment Framework

In 1990, Tornatzky and Fleischer developed the Technology, Organization, Environment framework (TOE) to analyze and measure the adoption of technology at the organizational level (Tornatzky & Fleischer, 1990). According to the authors, the process by which an organization adopts and implements technological innovations is influenced by three contexts: the technological context, the organizational context and the environmental context. These three elements represent "both constraints and opportunities for technological innovation" (Tornatzky & Fleischer, 1990). TOE framework proposes three main facets to explore the factors that affect the organization's acceptance of innovation technology. The technological context includes the characteristics and the usefulness of the innovative technology; the organization context contains the internal issues within the company such as management, employee, products and services; and the environmental context involves the issues exist in the business related field, such as the competitors and business partners.

The first two contexts within TOE are similar to the two categories of variables proposed in the DOI theory. However, TOE adds another very important dimension: the environmental context – which refers to the environment in which the organization operates. The TOE framework makes the DOI better able to explain innovation diffusion at the organizational level (Hsu et al, 2006).

Over time, however, inter-organizational systems, such as e-commerce, B2B and Electronic Data Interchange (EDI), turn out to be significant instruments in the business world. DOI and TOE may not be able to cover all the characteristics of the new factors which can influence a firm's adoption of technology. Zhu, Kraemer and Xu (2006a) indicated that the TOE framework has proven to be fairly effective from the past research. A lot of studies about innovation technologies have been done by adopting the TOE research method, including information systems (DePietro et al., 1990), e-commerce (Rowe, Truex and Huynh, 2012), web service (Lippert and Govindarajulu, 2015), e-CRM (Racherla and Hu, 19 Chiu et al. 2008), and cloud computing (Lian, Yen and Wang 2014). From the above literature, it can be well informed that the TOE framework is widely used on the adoption of different innovative technologies and proven to be validated (Ramdani and Kawalek, 2007). Given that the theme of this study is in regard to the application of innovative technology and from the enterprises perspective, the TOE framework is adopted as the main research model in this research.

2.2 ICT Infrastructure and E-Procurement Implementation

ICT infrastructure is a category of information technology structure that is used to provide network services that allow devices to connect and communicate. This includes foundational networking hardware, software, services and facilities. ICT infrastructure in terms of existing IT systems and the IT security applications have been consistently identified as an important factor for successful information systems implementation. According to Abdul & Lyimo (2019), ICT infrastructures influence e-procurement implementation. Mehrtens, Cragg & Mills, (2001)

revealed that adequate computer system infrastructure within the firm to access and browse the Internet without any problems influences implementation of a new system. ICT infrastructure also has influence on the volume of a nation's Internet transactions or the number of e-business websites in a country (Laudon & Laudon 2016). Businesses with ready and appropriate hardware and software have a potential for successful implementation of e-procurement. With adequate number of infrastructure and technological readiness, the utilization of IT systems like e-procurement can be on the rise.

Mehrtens *et al.,* (2001), defined technological readiness to include the adequate computer system infrastructure within the firm to access and browse the Internet without any problems. In this case, the firm should be ready with an appropriate hardware, software and the required capability for successful implementation of electronic procurement. Besides, organizational readiness also consists of organizational resources such as financial resources and human capital. Technology readiness also involves the degree to which technological infrastructure and human resources are ready to support technology implementation. Non-IT staff and stakeholders who are ready to use a technological innovation are more prepared to adopt technology innovation (Nyeko & Ogenmungu, 2017).

Investigation by Parasuraman & Colby (2009) pointed to the fact that technology readiness is a key factor in the adoption of innovative products and services. Technology readiness is highly predictive of the speed of technology adoption and level of usage of technology in consumer households and organizations. IT readiness in an organization with technological infrastructure and IT human resources influences the adoption of new technology (Olivera & Martins, 2010). According to Pan & Jang (2008) the organizational readiness to purchase and install network technologies and other enterprise systems coupled with procurement functionalities influence e-

procurement implementation. Similarly, organizations that implement e-procurement ought to have substantial investments in appropriate technology systems and also have the ability to integrate these technologies with current platforms to avoid job duplications (Davila *et al.,* 2014). However, when not handled properly, implementation of e-procurement experience performance disabilities due to the virtualization of platforms and incomplete technological growth (Beauvallet *et al,* 2011).

ICT security is also another major determinant of the success of e-procurement implementation. According to the classification of Ring & Van de Ven's (1994) classification, risks are both technology-driven, and thus derived from the underlying infrastructure (environmental risks), relational, resulting from the trading partner (behavioral risks). It is repeated behavior where uncertainty arises because web retailers (suppliers) have the chance to behave in an opportunistic manner by taking advantage of the distant and impersonal nature of e-commerce in this context e-procurement and the buyer's inability to monitor adequately all transactions. It is important for organizations to ensure that all the perceived risks are handled properly to ensure success of the e-procurement project. (Mose, Njihia & Magutu, 2013)

In their study, Saeed & Leith (2003) examined the perception of buyers in e-procurement risks and arrived at three dimensions of security, privacy and transaction risks. They viewed transaction risks as resulting from wrong products purchased due to incomplete or misleading information on the other hand, security risks as resulting from unauthorized penetration of trading platforms and failure to protect transaction related data while being transmitted or stored. Lastly, they viewed privacy risks arising from inappropriate information collection and information transparency. It is possible these risks limit the implementation of e-procurement in organizations because these perceptions are shared by both suppliers and buyers.

According to Kiogoro & Makau (2016), there exists threats arising from buying and paying of products and the unauthorized penetration frustrates of users in an e-procurement environment associated with implementation and use of e-procurement. Also, the presence of security risks resulting from the procurement transaction data is also a major factor inhibiting the implementation of e-procurement by the public sector (Kibet & Mugambi, 2016). Individual end users and entire business units will naturally resist any change in business processes that poses uncertainty in security and privacy of their transactions (Edie *et al.,* 2007). The balance between transparency, protection against unauthorized data disclosure, ensuring the authenticity of a data source and the impact of disclosure of procurement process remains are serious security threat (Edie *et al.,* 2007). Most of the organizations keep their business information secret as a protective mechanism to effectively compete and remain competitive in the business environment. Public sector organizations on the other have limits to the amount and nature of information to be shared with other third parties.

2.3 Organizational Factors and Implementation of E-Procurement

Organizational factors like top management support, firm's size, staff skills and knowledge, organizational culture, complexity of managerial structure, communication and organization policy are considered to be factors that influence firms' willingness to adopt of e-procurement. Further, ICT adoption literature review by Jeyaraj, Rottman & lacity (2006) suggests top management support as one of the three best predictors for IT innovation adoption at the organizational level and can contribute to the adoption of innovations by creating a fertile environment and by providing resources.

Previous studies on ICT innovation adoption based on TOE framework have also suggested that top management support has an influence to the organizational decision to adopt an innovation

(Teo, Ranganathan, &Dhaliwal 2006). In organizations where top management support is lacking, technological adoption may not succeed. Furthermore, based on the outcome of study by Mirchandani & Mowarni, (2001), the support from top management is essential and can be clearly differentiated between the adopters and non-adopters of Technology. In the first instance, powerful top management support can make sure of the ample distribution of organizational resources (e.g., financial, technical, and human) for flawless implementation of an IT innovation (Oliveira & Martin, 2011) and also have the ability to send innovation importance and acceptance messages across the organization (Wang, Wang & Yang, 2010). Secondly, such support lessens organizational disagreement on adopting an IT innovation as top management can provide long-term vision, proposals, support, and the obligation to generate an affirmative environment for the IT innovation (Ramdani *et al.,* 2009). According to Mambo *et al.,* (2015), top management can stimulate change by communicating and reinforcing values through an articulated vision for the organization and thus, top management support is critical for creating a supportive climate for the adoption of new technologies like e-procurement. Presence of leadership and management support is likely reason for implementation of e-procurement initiatives to succeed (Karungani & Ochiri, 2017).

Management support is important due to the approval of funding for specific procurement initiatives by top management. Additionally, the management has the sole responsibility of rallying employees behind any e-procurement initiatives leading to its eventual success (Chong *et al.,* 2009). The top management is charged with the responsibility coming up with goals and visions of the organization, enhancing commitment to change in the organization's structure and processes as well as in formulating strategies and policies necessary in enhancing procurement performance (Karungani & Ochiri, 2017). Innovations that receive management support are

therefore easily adopted in organizations. Therefore, it would be highly likely that the organizations with stronger top management support for e-procurement adoption would also be more likely to implement such systems.

On the other hand, the Literature on IT knowledge and experience according to Dholakia & Kshetri (2002) suggest that the experience of already available technologies in the organization will influence the adoption of similar technology in the future. Moreover, Kuan & Chou (2001) also found that prior information system (IS) experience influences the adoption of new technologies. Previous researchers identified their technology knowledge as a crucial factor influencing adoption decisions (Grover, 1993). Considering that increasingly non-IT employees or at least their management are involved in strategic ICT decisions, their perception and understanding of the targeted technologies is important. Van Grembergen & De Haes (2003) also state that IT knowledge within business divisions contributes to a creative and innovative environment. There is also some empirical evidence that shows the positive relationship between employees' IS knowledge and the decision to adoption and implementation technological innovation.

Wang *et al.,* (2010) and Oliveira & Martins, (2010) also support the notion that the organizational factors involving top management support and IT knowledge/skill influence the adoption and implementation of new technology. Kiogora & Makau (2016) also stress the fact that successful implementation of e-procurement system requires the full support of top management. Thus, considerable attention and support should be provided by senior management to ensure that the procurement reform has been well understood in the organization (Abdul & Lyimo, 2019). Top management support reduces likely barriers to technological

resistance and resulting organizational change created by new technology (Kiogora & Makau, 2016).

Kiogora & Makau (2016) argue that top management provides the necessary resources on time and follow up on the e-procurement initiatives influences implementation of e-procurement. They further suggest that top management provide dedicated commitment, authority, and direction for the implementation effort of e-procurement and also ensuring the overall success of technological adoption in organizations. Similarly, Hawking, Stein & Forster (2014) discovered the hindrances to implementation of e-procurement due to insufficient leadership engagement, insufficient technical infrastructure, and absence of qualified staff, insufficient organizations partners and technological facilities. Other factors that hindered implementation are absence of integration with business partners, insufficient e-procurement procedures, and regulatory and legal controls. Hawking *et al.,* (2014) also found that leadership commitment and organizational features were important motivators to implement e-procurement. Project managers should have direct access to top management and senior management invariably must support the project managers to provide resources, give authority, support in crises, and develop competencies through training and development programs, in order to ensure the likelihood of project success (Kuesten, 2013).

There is a lot of weakness among many employees in public organizations due to their failure to use proper technology to further the goals of their organizations and this makes many of them take no notice of the new technology of adopting e-procurement (Schoenherr & Tummala, 2007). The staffs of an organization need to attain the essential skills that can support them to operate effectively and efficiently while using the new e-procurement system. Incompetently trained staff may not own the e-procurement system and thus contribute to failure. The

realization of e-procurement advantages to the public sector organizations depends on the adoption of new processes and adoption of systems.

According to Barsemoi1, Mwangagi1 & Odero (2014), many procurement bodies do not have competent human resource critical to manage procurement processes. The shortage of the right capacity of employees to brings about adoption of quality standards, monitor e-procurement processes, determination of specifications, defining requirements, conducting supervisory roles eventually culminate to cause shortages in government budgets. The lack of IT technology knowledge and skills can occur when the organization has an older generation of employees that are change resistant regarding IT related issues, relying on traditional forms and means of procurement, inadequate knowledge sharing centers to spread the IT concept of e-procurement through the organization or key personnel (Kibet *et al.,* 2016). IT knowledge and skills forms organization IT human resources and infrastructure of an organization. Knowledge about information technology/Information systems empowers organizations to manage effectively the risks associated with investing in an innovation (Teo *et al.,* 2006). On the contrary, businesses that do not have adequate IT knowledge, skills, expertise and experience may not be aware of new technologies and may not desire to take a risk by adopting those (Ramdani *et al.,* 2009).

2.4 Organizational Factors, ICT infrastructure and E-Procurement Implementation

Kiogora & Makau (2016) point out that in e-procurement implementation, all the parties involved in implementation of E-procurement should be considered when laying down structures on implementing the system. The parties range from organization factors such as management support, ICT infrastructure and business process alignment. Incorporating all factors in e-procurement implemetation will create positive interest among component stakeholders and

hence make them develop positive attitude toward the system implementation (Panayiotou *et al.,* 2004). Although most organization are committed to e-procurement skills development through providing strategic training, it is evident that training may influence to a large extent how e-procurement is adopted and implemented in an organization. This is so because the appropriate training skills and knowledge to utilize IT innovations also depends on heavy investment in appropriate ICT infrastructure (Wang *et al.,* 2010). Thus, management support through resource investments in appropriate IT technologies improves and influences organization ability to adopt and implementation of e-procurement. Top management, therefore, have an important role in that circumstance to set goals, strategies and baselines that are necessary for the implementation of the e-procurement. IT investment without proper alignment to organization processes, goals and objectives will negatively impact on adoption and full utilization of IT system (Kuan & Chau, 2001). Accordingly, the implementation of e-procurement should be based on strategies set by top management that matches with appropriate ICT infrastructure and organizational goals (Kiogoro & Makau, 2016). Similarly, technological changes, e-procurement brings alterations in an organization that requires executive managers to adopt change management policies towards making the renovation process a success in procurement. One way in which managers in organizations can reveal commitment to change is to have change management team structures that identify individuals performing the change management work (Yildirim & Soner. 2000).

E-procurement is being implemented by many organizations seeking better business processes (Aberdeen Group, 2001). Mose, Njihia & Magutu, (2013) identified benefits in cost saving, improved efficiency, measurement and single data entry as three catalysts driving growth in the implementation of e-procurement. Leveraging organization factors and improvement of ICT infrastructure determine the extent of implementation of e-procurement in organizations.

(Hawkins & Wyld, 2003). Khanapuri *et al.,* (2011) assert that there are a number of requirements relating to the implementation of e-procurement system. They include technology, objectives, information, staffing and skills. The above-mentioned requirements make the implementation process to face a number of challenges such as compatibility, integration, implementation and regular use by employees and lack of capacity by small suppliers (Mose, Njihia & Magutu, 2013).

People consciously determine whether they engage in or do not engage in certain behavior. In this sense the adoption and use intentions are usually conceptualized as major outcome variables that are influenced by various independent variables; organization factors and ICT infrastructure. Individual's ICT adoption and use can be understood in 3 different stages; pre-adoption, adoption and post adoption. At the pre-adoption stage, people may examine a new technology and consider adopting it. At the adoption stage, they form an intention to adopt the technology, and they eventually purchase and use it. At the post adoption stage, people can either continue to use the technology or abandon it. If they abandon a technology, they may start to examine another technology at the same time in order to substitute their old technology and this could be due to inability to meet organization goals anymore (Fichman & Kemerer, 1997; Orlikowski, 1993). According to Comline (2008), pre-adoption, adoption and post adoption of technological innovations is influenced by the relative advantage it has in an organization through efficiencies. Organizations that do not perceive relative advantage from technological innovations are likely to be reluctant to adopt such technologies while organizations' management that recognizes the benefits of the new system proposed will be more likely to adopt the system and enjoy higher impacts (Heck & Ribbers, 1999); (Iacovou *et al.,* 1995). When perceived benefit of e-procurement is high, there are higher chances that the organization will support the

implementation and usage of this technological innovation (Agarwal & Prasad, 1998). It is therefore possible to suggest that the advantages that e-procurement renders an organization would influence its rate of adoption.

2.5 Conclusion

The literature reviewed reveal that organizational Factors and ICT infrastructure are fundamental in enhancing e-procurement implementation. This implies that high level of organization factors and ICT Infrastructure are associated with high level implementation of e-procurement. This increases efficiency, effectiveness, cost savings and improved business operations by Ugandan government agencies.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This section presents the methods and procedure on how the research was executed. It included the research design, study population, sample population, data collection instruments, and measurement of research variables, the validity and reliability of instruments, data processing and presentation.

3.2 Research Design

According to Tsum & Kanda (2017) defines a research design as the outline that is used to produce answers to research problems. A cross sectional survey design using quantitative approach was used to study organization factors and ICT Infrastructure in local governments in West Nile Region with the objective of establishing whether they affect e-procurement Implementation. This method was chosen as it is appropriate for collecting data at a point in time and where the research has certain issue to be described by the respondents about the problem (Singleton, 2003).

3.3 Study population

According to Harelimana (2018), a population is discussed as the total group of elements about which the researcher wishes to make some interpretations from. The study population was ten (10) districts, as indicated in appendix 2 in the appendix. The composition of a typical Local Government has no standard number because the number of staff in a particular District Local Government will vary according to the number of sub counties in that district. Given the size of the district local government, the researcher is expected to have 18 respondents per district,

across the available 10 districts, drawn from 13 user departments' members, 1 Accounting officer, 10 council members, 5 contract committee members, and 2 procurement and disposal unit members in the PDE.

3.4 Sample Size

The research used both simple random sampling and purposive sampling. According to Halima Abdul & Benson James Lyimo (2019) defines simple random sampling as a probability sampling whereby all members in a population have equal chance of being selected to form a sample. Simple random sampling approach is suitable for this study because of its advantages like minimization of bias results, improver liability and validity of data from respondents who represents the population. According to Etikan, Abubakar & Rukayya (2016) purposive sampling technique, also called judgment sampling, is the deliberate choice of a participant due to the qualities the participant possesses. It is a nonrandom technique that does not need underlying theories or a set number of participants. Simply put, the researcher decides what needs to be known and sets out to find people who can and are willing to provide the information by virtue of knowledge or experience. Sampling is a process used in statistical analysis in which a predetermined number of observations are taken from a larger population. This implies that all participants in the study population will have an equal chance of being selected. Based on the population of 10 districts, and guided by (Krejcie & Morgan, 1970) table of sample size determination (Refer to appendix 2), the sample size was 123 LG staff. Therefore, the study expects a total of 180 respondents, with 18 from each district drawn from the 13 user departments' members, 1 Accounting officer, 10 council members, 5 contract committee members, and 2 procurement and disposal unit members in the PDE.

3.5 Sources of Data

The researcher used primary and secondary data. A knowledgeable person was identified to collect primary data from the respondents through the use of questionnaires. The source of secondary data for this research were reports and documents which were gathered through the review of available literature, previous research paper findings, Newspapers, reports and conference proceedings or publications regarding the implementation of project electronic procurement in West Nile Region.

3.6 Unit of Analysis

My unit of analysis was the ten (10) District Local Governments in West Nile Region.

3.7 Unit of Inquiry

The unit of inquiry was local government staff involved in the procurement process at the district.

3.8 Data Collection

The main data collection technique for primary data was a questionnaire survey physically administered among the selected respondents at the various local governments. Simple structured questionnaires are suitable for the reason that they can yield a high response rate because they are easy to understand and simple to fill in (Oliver, 2010). Questionnaires are popular with researchers because information can be obtained easily and responses can be easily coded (Amin, 2005). Questionnaires contained structured questions, and respondents were required to rate each question on a five-point Likert scale where 1 represents ‘Strongly disagree’, 2 for ‘Disagree’, 3 for ‘Not sure’, 4 for ‘Agree’, and 5 for ‘Strongly agree’. Likert scale questions are widely used

tools in researching popular opinion. A Likert Scale questionnaire developed by Rensis Likert (1932) uses a universal method of collecting data, is easy to understand, and draw conclusion. It uses a scale, people are not forced to express an either-or opinion, and rather allowing them to be neutral should they so choose. The secondary data was obtained from reports, journals and web sites to supplement primary data.

Table 1: Measurement of variables

Variables	Constructs	Supporting literature
Organizational factors	1. Top Management Support 2. ICT Knowledge and Skill	(Tornatzky & Fleischer's,1990; Jeyaraj, Rottman & lacity, 2006; Teo, Ranganathan, & Dhaliwal, 2006; Mirchandani & Mowarni, 2001; Oliveira & Martin, 2011; Wang, Wang & Yang, 2010; Karungani & Ochiri, 2017).
ICT infrastructure	1. ICT Security 2. Technological Readiness	(Abdul & Lyimo, 2019; Laudon & Laudon 2016; Nyeko & Ogenmungu, 2017; Olivera & Martins, 2010; Mose, Njihia & Magutu, 2013; Saeed & Leith, 2003; Kiogoro & Makau, 2016; Kibet & Mugambi, 2016).
Electronic procurement Project Implementation	1. Efficiency 2. Effectiveness 3. Transparency	(Kuan & Chau, 2001; Kiogoro & Makau, 2016; Hawkins & Wyld, 2003; Yildirim & Soner, 2000; Khanapuri *et al.,* 2011).

3.9 Reliability and validity of the instrument

Reliability refers to the degree to which the instrument produces consistent findings over time which is determined by internal consistency of items that are used to measure variables-internal reliability (Saunders *et al,* 2007). An instrument is said to be reliable if it produces the same results whenever is repeated. The reliability of the instrument was tested using Cronbach's Alpha and the results are indicated in the table below.

Table 2: Reliability of the instrument

	Cronbach's Alpha	No. of Items
Organizational Factors	0.934	14
ICT infrastructure	0.823	12
E-Procurement Implementation	0.879	12

Source: Output from Data Analysis

Based on Grayson (2004) and Nunnally (1978) assertion, a cut-off alpha coefficient of 0.7 is sufficient to prove that the instrument is reliable. Therefore, the reliability coefficients of the research instruments are higher than 0.7, implying that the instrument was reliable.

To establish validity of the questionnaire, the items in the instruments were discussed with the procurement and IT experts to check for internal accuracy and relevancy and based on the discussions; a consensus was reached on the items that were included in the final instrument to ensure that the instrument was valid. Accordingly, content validity test was computed using the formula $\mathrm{CVI} = \frac{K}{N}$ where N = Total number of items in the questionnaire and K = number of items in the questionnaire declared valid; and the results are tabulated below.

Table 3: Validity of the instrument

Variable	Total number of Items (N)	Total number of item valid (K)	CVI=K/N
Organizational Factors	16	14	0.88
ICT infrastructure	17	12	0.71
E-procurement project implementation	19	12	0.63

From the table above, the computed content validity index for all the constructs range between 0.63 and 0.88 which are above the threshold of 0.6. Thus, the variables under each construct are relevant and accurate to measure the constructs

3.10 Data Analysis and Presentation

Data was collected using a questionnaire and was sorted, edited, coded and analyzed using SPSS version 20 software. Descriptive, frequency, Pearson correlation coefficient and regression analysis statistics were used to examine the study variables. Regression Analysis was also used to indicate if independent variables have a significant relationship with the dependent variable, the relative strengths of the independent variables, and the effect on the dependent variable and make predictions (Sarstebt & Mooi, 2014). Statistical tools such as frequency distributions and tables were used to describe and present the demographic characteristics of the sample. Regression and correlation analysis were conducted to find out the impact of organizational factors and ICT infrastructure on project e-procurement. According to Harelimana (2018), SPSS is one of the most widely used available and powerful statistical software packages that cover a broad range of statistical procedures, which allows a researcher to summarize data. Pearson product-moment correlation analysis was used to determine the existence and strength of the relationship between organizational factors, ICT Infrastructure and e-procurement projects implementation.

3.11 Ethical Considerations

The researcher obtained an introductory letter from Makerere University Business School that was presented to the office of the Chief Administrative Officers (CAOs) of Arua, Koboko, Nebbi, Maracha, Pakwach, Yumbe, Moyo Adjumani, Zombo and Madi Okollo District Local

Governments to seek permission to undertake the study in West Nile sub region districts. Assurance was made to the office of the CAOs that the information obtained was meant for only academic purposes. Therefore, measures where be taken to safeguard the respondent's interest by not disclosing any information about them.

Another ethical consideration is plagiarism which is unethical practice of using words or ideas either planned or accidental of another researcher or even your own previous works without proper acknowledgment. The researcher managed it through understanding the context, used quotes that indicated that the text was got from another paper and above all maintaining records of the sources I referred to.

CHAPTER FOUR

ANALYSIS AND INTERPRETATION OF THE FINDINGS

4.1 Introduction

This chapter contains the presentation, analysis and interpretations of the research findings. The purpose of the study was to investigate the relationship organizational factors, ICT infrastructure and electronic procurement project implementation. Therefore, the presentation of the findings was guided by the following research objectives:

(i) To examine the relationship between organizational factors and e-procurement projects implementation.

(ii) To examine the relationship between ICT infrastructure and e-procurement projects implementation.

(iii) To examine the combined effect of organizational factors and ICT infrastructure on e-procurement projects implementation.

4.2 Response Rate

The researcher issued 123 questionnaires to respondents in 10 local governments of West Nile, 105 were received and a total of 98 questionnaires were duly filled and returned representing a response rate of 80%, which is suitable to draw valid and reliable conclusions. This is consistent with Amin's (2005) assertions that, a response rate of 70% and above is representative of the population, and can be relied on to draw valid conclusions.

4.3 Demographic Characteristics

The characteristics of the respondents included; gender, Age and level of education. The aim was to understand various categories of respondents that participated in this study.

4.3.1 Gender of the respondents

The results in the table below show the distribution of respondents by gender.

Table 4: Characteristics of the respondents by gender

		Frequency	Valid Percent	Cumulative Percent
Valid	Male	62	63.2	63.2
	Female	36	36.8	100.0
	Total	**98**	**100.0**	

Source: Output from data analysis

Table 4 indicates that 63.2% of the respondents were male and 36.8% of the respondents were female. This shows that the majority of the respondents were males. This implies that more men are involved running the affairs of the local governments in West Nile compared to women.

4.3.2 Level of Education

The results in the table below show the distribution of respondents by academic qualification.

Table 5: Level of education of the respondents

	Frequency	Percent	Cumulative Percent
Certificate	2	2.1	2.1
Diploma	30	30.6	32.6
Degree	38	38.2	70.8
Master's degree	14	14.6	85.4
Post graduate	14	14.6	100.0
Total	**98**	**100.0**	

Source: Output from data analysis

The results in table 5 revealed that 38.2% of the respondents completed their first degree, 14.6% were Master degree holders, 30.6% had diploma while 14.6% were had postgraduate diploma. Therefore, on the basis of the above results, the respondents were literate and were able to read and write, as well as comprehend the questions. This further indicates that the local governments had qualified staff in the various positions.

4.3.3 Age of the respondent

The results in the table below show the age of respondents in the local governments of West Nile.

Table 6: Age of respondents

	Frequency	Percent	Cumulative Percent
20 Years and below	1	.7	.7
21-35	52	53.5	54.2
36-45	31	31.9	86.1
46 Years above	14	13.9	100.0
Total	**98**	**100.0**	

Source: Output from data analysis

Table 6 above shows that 53.5% of the respondents were between the age brackets 21 – 35 years, 31.9% were between 36 – 45 years, 13.9% were 46 years and above while 0.7% below 21 years. This shows that the majority of respondents between 21 – 35 years of age and can easily accept change and adopt new technologies.

4.4 Factor Analysis

Factor analysis was carried out for all the variables that comprised of factors to identify their factor structure. Specifically, the analysis established; 1) the hierarchy of importance of the components of the major constructs and 2) the indicators of the constructs that best explain the constructs by virtue of the factor loadings associated with them. Factor analysis was also used for data reduction by only retaining factors with factor loading above 0.5 for the subsequent analysis. Using the Promax method for principal components measurement, only those factors with an Eigen value greater than 1 were retained according to Guttmann-Kaiser rule.

From the results of analysis below, the Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO = 0.869 > 0.5), and the Bartlett's Test of Sphericity with Approx. Chi-square = 3611.98; Degree of Freedom (DF) = 325 and P-value = 0.00 < 0.01 meet the requirement in completing factor analysis.

Table 7: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.869
Bartlett's Test of Sphericity	Approx. Chi-Square	3611.983
	Df	703
	Sig.	.000

Source: Output from data analysis

Table 8: Factor Structure of Organizational Factors

	Component	
	Top mgt support	IT Knowledge & Skills
Top managers encourage the users to utilize the e-procurement system	.830	
Top managers are committed in the use of e-procurement	.857	
Top managers are interested in the use of e-procurement	.871	
Top managers effectively communicate its support to the e-procurement implementation	.860	
Top managers are willing to invest the necessary resources for improving e-procurement implementation in the government	.957	
Top managers are willing to take risks involved with e-procurement implementation	.849	
Top managements freely delegates to lower management level on issues of e-procurement	.673	
Top management rewards employees who excel in e-procurement; practices	.671	
Top management considers e procurement implementation important	.700	
I have basic knowledge about e-procurement.		.829
I have already used e-procurement systems before		.826
There is at least one employee who has formal training in the use of e-procurement in my department		.685
In comparison to other departments, my understanding level of e-procurement systems is high.		.891
The organization organizes training on e-procurement		.621

Eigen Value	***7.644***
1.619	
Variance (%)	***54.603***
11.563	
Cumulative variance (%)	***54.603***
66.166	

Extraction Method: Principal Component Analysis; Rotation Method: Promax with Kaiser Normalization; a. Rotation converged in 3 iterations.

Source: Output from data analysis

From the table 8 above, of the two constructs of organizational factors (top management support and IT knowledge and skills) as depicted in the conceptual framework, top management support (Eigen value = 7.644, Variance = 54.603%) was the more prominent explaining 54.6% and IT knowledge and skills (Eigen value = 1.619, Variance = 11.563%) contributes 11.6%. Notable is the fact that both factors explained approximately 66.3% of organizational factors, which is evidence of considerable level of validity of the items captured in the factor structure. The magnitude or level of importance of each item is illustrated by the factor loadings, where a higher value indicates a higher magnitude. To this effect, items with factor loadings below 0.5 were eliminated and as shown in table 8, all items loaded above 0.6, which signifies considerable validity of measurement.

Table 9: Factor Structure of ICT infrastructure

	Technological Readiness	Security Risks
There are enough hardware and software facilities to support e-procurement in the organization	.808	
The computers in offices are connected to the internet	.822	
There is standby generator or solar system to use in case of power outage.	.628	
There are modems for use in offices that do not have Local Area Network connection	.731	
The money allocated for the e-procurement implementation enough	.748	
The money set aside for Computer hardware repair is enough in case of breakdown	.815	
The money set aside for e-procurement software repair is enough in case of breakdown.	.814	
Supply partners do not trust e-procurement transactions		.751
There is fear of dealing with unknown		.797
E-procurement gives hackers a chance to paralyze organization operations		.873
The transaction risks associated with e-procurement are a challenge to e-procurement implementation		.804
Privacy risks arising from inappropriate information on e-procurement is a threat to e-procurement implementation		.743
Eigen value		***4.232***
3.093		
Variance (%)		***35.27***
25.773		
Cumulative variance (%)		***35.27***
61.043		

Extraction Method: Principal Component Analysis; Rotation Method: Promax with Kaiser Normalization: a. Rotation converged in 3 iterations.

Source: Output from data analysis

The factor structure of ICT infrastructure is such that, Technological readiness (Eigen value = 4.232, Variance = 35.27%) was the better measure explaining 35.3% and IT security risk (Eigen value = 3.093, Variance = 25.773%) contributes 25.8%. Noteworthy is the fact that both factors explained approximately 61.0% of ICT infrastructure, which is evidence of considerable level of validity of the items captured in the factor structure. The results further summarize the items that measure each of the components of the ICT infrastructure in their order of significance. The level of importance of each item is illustrated by the factor loadings, where a higher value indicates a higher magnitude. To this effect, items with factor loadings below 0.5 were eliminated and as shown in the table above, all items loaded above 0.7, which signifies considerable validity of measurement.

Table 10: Factor Structure of E-Procurement implementation

	Component		
	Effectiveness	Transparency	Efficiency
E-procurement increases productivity of procurement staff	.939		
E-procurement improves contracts compliance	.801		
E-procurement enhances better service delivery	.809		
Reduction in Time through improved internal workflow/contract completion	.553		
E-procurement improves on operational cost.	.562		
E-procurement improves transparency during procurement process		.764	
E-procurement improves visibility of supply chain		.905	
E-procurement helps with monitoring supplier performance		.833	
E-procurement establishes mutual trust with vendors		.682	
E-procurement reduces transaction costs of inventory			.921

E-procurement reduces transaction process time			.690
E-procurement eliminates paper work			.578
Eigen value	***5.242***	***1.328***	***1.108***
Variance (%)	***43.686***	***11.069***	***9.229***
Cumulative variance (%)	***43.686***	***54.755***	***63.984***

Extraction Method: Principal Component Analysis: Rotation Method: Promax with Kaiser Normalization: a. Rotation converged in 6 iterations.

Source: Output from data analysis

From the table above, the factor structure of e-procurement implementation is such that effectiveness (Eigen value = 5.242, Variance = 43.686%) was the more prominent explaining 43.7%, Transparency (Eigen value = 1.328, variance = 11.069) contributes 11.1% and efficiency (Eigen value = 1.108, Variance = 9.229%) contributes 9.20%. It is important to note that the three factors explained approximately 64% of e-procurement implementation, which is indicates of considerable level of validity of the items captured in the factor structure. The pattern matrix for all the retained factors revealed appropriate factor-loadings with evidence of no-cross loading and with all retained indicators reporting coefficient > 0.5 as shown on the table above.

4.5 Correlation Analysis

Pearson's Correlation analysis was conducted to measure the strength of linear associations between the study variables and is denoted by r. The Pearson correlation coefficient, r, can take a range of values from +1 to -1. A value of 0 indicates that there is no association between the two variables. A value greater than 0 indicates a positive association; that is, as the value of one variable increases, so does the value of the other variable. A value less than 0 indicates a negative association; that is, as the value of one variable increases, the value of the other variable decreases. The study variables were measured on a continuous scale, and thus Pearson

correlation was found to the most appropriate to test the relationships between the variables. The results are presented in table below:

Table 11: Correlation Analysis

	1	2	3
Organizational factors (1)	1		
ICT Infrastructure (2)	.602**	1	
E-Procurement implementation (3)	.383**	.311**	1

Source: Output from data analysis

4.5.1 The relationship between Organizational factors and e-procurement project implementation

The results in table 11 indicates that there was significant positive relationship between organizational factors and e-procurement implementation ($r = .383^{**}$, $p < 0.01$). These results imply that a unit change in organizational factors is associated with change in the level of e-procurement project implementation.

4.5.2 The relationship between ICT infrastructure and e-procurement project implementation

The results in table 11 further reveal that there was significant positive relationship between ICT infrastructure and e-procurement project implementation and usage ($r = .311^{**}$, $p < 0.01$). This indicates that a unit increase in ICT infrastructure, there is up to 0.311 increases in e-procurement implementation. In other words, an improvement in ICT infrastructure by one unit, there is up to 0.311 improvements in e- procurement implementation.

4.6 Regression Analysis

The regression model was used to determine the effect of organizational factors and ICT infrastructure on the e-procurement project implementation. Regression analysis helps us to

determine the extent of the relationship between the variables and thus helps in making predications.

Table 12: Regression Analysis

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	1.981	.761		2.603	.035		
	Organisational Factors	.189	.205	.355	.921	.388	.394	2.541
	ICT Infrastructure	.419	.352	.460	1.193	.272	.394	2.541

a. Dependent Variable: E-Procurement Implementation

Model Summary: R =.769[a]; **R^2** = .591; Adj. **R^2 =** .474**;** Std. Error =.16112;

Source: Output from data analysis

The results from the table above showed that organizational factors in the regression model had insignificant positive effect on e-procurement implementation in West Nile local governments (beta = .355, p value =.388; >.01). This implies that organizational factors (top management support and IT knowledge and skills) impact e-procurement implementation. Therefore, we can conclude that there is statistical evidence that organizational factors impact e-procurement implementation in West Nile local governments. Further, the results indicate that ICT infrastructure had insignificant positive effect on e-procurement implementation and usage in West Nile local governments (beta = .460, p value =.272; >.01). We can conclude that there is insufficient statistical evidence to suggest that ICT infrastructure impacts e-procurement implementation in West Nile local governments. However, from the model summary, the variables under study predicted 47.4 % of the variance in e-procurement implementation in West

Nile local governments. This implies that e-procurement implementation is not only explained by organizational factors and ICT infrastructure, but also by other variables that explain it by 52.6% not included in this study.

In addition, the multi-collinearity test was carried out by running regression model (table 12) in which the variance inflation factor (VIF) and tolerance values were generated. The results of multicollinearity test suggest that there is no problem of collinearity in the model. The statistical standard is that the VIF must be less than 10 and the Tolerance value must be greater than 0.1 and from the table above all the VIF are less than 10 and the tolerance values are all greater than 0.1.

CHAPTER FIVE

DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter provides the discussions, conclusions and recommendations of the findings presented in chapter four in line with research objectives and the literature review. The chapter is divided into three main sections; discussion of the findings, conclusion and recommendations.

5.2 Discussion of Findings

The discussion of the findings is in line with the research objectives in chapter one and are as below;

5.2.1 Organizational Factors and E-Procurement project implementation

According to the study, there was significant positive relationship between Organizational factors and e-procurement project implementation. This implies that organizational factors are associated with e-procurement project implementation. This is so because organizations whose top manager support users and encourage them to use e-procurement facilitate its implementation and usage. This view was reflected by respondents that said top managers constantly encourage the users to utilize the e-procurement system, they are committed in the use of e-procurement and they are always willing to invest the necessary resources for improving e-procurement usage in local governments. In the same way, respondents that strongly agreed and agreed on the questions of "I have basic knowledge about e-procurement, I have already used e-procurement systems before" reported higher e-procurement implementation and vice versa. This is further supported by the results which indicate that the two constructs of organizational factors (top management support and IT knowledge and skills) were prominent explaining e-procurement

implementation and usage. Also appropriate training on skills and knowledge to utilize IT innovations also depends on heavy investment in appropriate ICT infrastructure (Wang *et al.,* 2010). Thus, management support through resource investments in appropriate IT technologies improves and influences organization ability to adopt and implementation of e-procurement. Top management, therefore, have an important role in that circumstance to set goals, strategies and baselines that are necessary for the implementation of the e-procurement. This view was in line with Jeyaraj et al., (2006), who suggested that top management support is one of the three best predictors for IT innovation adoption at the organizational level and can contribute to the adoption of innovations by creating a fertile environment and by providing resources. This study finding further replicates earlier studies by; Teo et al., (2006), Mirchandani & Mowarni, (2001), Oliveira & Martin, (2011), Wang, Wang & Yang, (2010).

Mambo *et al.,* (2015) in their study, argued that top management can stimulate change by communicating and reinforcing values through an articulated vision for the organization and thus, top management support is critical for creating a supportive climate for the adoption of new technologies like e-procurement. Karungani & Ochiri (2017) noted that leadership and management support is likely reason for successful implementation of e-procurement initiatives.

5.2.2 ICT Infrastructure and E-Procurement project implementation

The study also found significant positive relationship between ICT infrastructure and e-procurement project implementation this implies that a change in ICT infrastructure is associated with a change in e-procurement implementation. This is so because if the local governments technologically prepare and get ready i.e. have enough hardware and software facilities to support e-procurement, e-procurement implementation will be a success. Also the

respondents who strongly agreed and agreed that there are enough hardware and software facilities to support e-procurement in the organization depicted availability of ICT infrastructure that is necessary for successful implementation of e-procurement. Similarly, the respondents that strongly disagreed and disagreed with the question "Supply partners do not trust e-procurement transactions," manifested that all stakeholders adopted the usage of e-procurement in local governments. This finding upholds findings in earlier studies by; Abdul & Lyimo (2019), Mehrtens, Cragg & Mills (2001).

Abdul & Lyimo (2019) found out that ICT infrastructures influence e-procurement implementation and implementation. Similarly, Mehrtens, Cragg & Mills (2001) revealed that adequate computer system infrastructure within the firm to access and browse the Internet without any problems influences implementation of a new system. ICT infrastructure was found to influence the volume of a nation's internet transactions or the number of e-business websites in a country (Laudon & Laudon 2016). Laudon & Laudon (2016) further noted that organizations with ready and appropriate hardware and software have a potential for successful implementation of e-procurement. With adequate number of infrastructure and technological readiness, the adoption and utilization of IT systems like e-procurement can be on the rise.

5.2.3 The extent to which organizational factors and ICT infrastructure impact e-procurement project implementation

The results of the study indicate that organizational factors and ICT infrastructure jointly explain 47.4% of the variance in e-procurement project implementation. The bulk (52.6%) of e-procurement project implementation in West Nile local governments is accounted for by other variables that this study did not establish. Further, e-procurement implementation is such that

effectiveness (Eigen value = 5.242, Variance = 43.686%) was the more prominent explaining 43.7%, Transparency (Eigen value = 1.328, variance = 11.069) contributes 11.1% and efficiency (Eigen value = 1.108, Variance = 9.229%) contributes 9.20%. It is important to note that the three factors explained approximately 64% of e-procurement implementation, which is indicator of considerable level of validity of the items captured in the factor structure.

Additionally, Panayiotou *et al.,* (2004), also agreed that in implementing e-procurement system, the parties involved range from organization factors such as management support, ICT infrastructure and business process alignment. Incorporating all these factors in e-procurement implementation will create positive interest among stakeholders and hence make them develop positive attitude toward the system implementation. Wang *et al.,* (2010) also noted that Although most organization are committed to e-procurement skills development through providing strategic training, it is evident that training may influence to a large extent how e-procurement is adopted and implemented in an organization. This is so because the appropriate training skills and knowledge to utilize IT innovations also depends on heavy investment in appropriate ICT infrastructure.

5.3 Conclusion

The study was carried out to find the relationship between organizational factors and e-procurement project implementation as the first objective of the study. The findings show e-procurement implementation is dependent on the levels of top management support, IT knowledge and skills, local governments need to get top management buy-in and carry out skills enhancement for the procurement teams in their various local Governments. The study also concludes that an increase in any of the constructs mentioned above will increase the level of e-procurement project implementation in West Nile region through top managers by encouraging

the users who are interested, committed, effectively communicate and invest resources in e-procurement project implementation. Also, local government to organize training for its staff with low understanding of e-procurement implementation from time to time

The study was carried out further to find the relationship between ICT infrastructure and e-procurement projects implementation as the second objective of the study. The study reveals that there was significant positive relationship between ICT infrastructure and e-procurement project implementation ($r = .311^{**}$, $p< 0.01$). For successfully implementation, local governments need to prepare themselves through ensuring that they have enough software and hardware facilities to support e-procurement. In addition, local government to ensure that the computers in offices are connected to the internet, there is standby generator or solar system to use in case of power outage, there are modems for use in offices that do not have Local Area Network connection and money allocated for the computer repair and e-procurement implementation is enough.

The study was also done to find out the combined effect of organizational factors and ICT infrastructure on e-procurement projects implementation as the third objective of the study. The results of the study indicate that organizational factors and ICT infrastructure jointly explain 47.4% of the variance in e-procurement project implementation. Also noticeable in this study is the fact that with standardized Beta coefficient and level of significance of (Beta = .355, $p < .01$, Beta = .460, $p< .01$) for organizational factors and ICT infrastructure respectively, ICT infrastructures are better predictor of e-procurement project implementation than organizational factors. Policy makers and local government leaders alike may use these findings as a way of improving e-procurement implementation in Uganda since the use e-procurement can greatly contribute to better service delivery.

5.4 Recommendations

Based on the findings, the study recommends the following;

Local government leaders should pay attention to ICT infrastructure by ensuring there is enough hardware and software facilities to support e-procurement in the organization as the electronic handling of tasks supports and simplifies the purchasing process, transaction speed will be increased and also the enabled relationships with suppliers, procurement recycle time will speed up. Also, local government to ensure that the computers are connected to the internet, there is standby generator, solar system and computer technicians in place to support e-procurement implementation. For the software, the e-procurement, anti-viruses and operating system software to be in place to solve software break down challenges from time to time.

To successfully implement e-procurement projects, top management support should be sought because procurement performance will be achieved at its highest; they are responsible for formulating and developing policies, goals and vision for the organization and provide direction to the entire organization and there should be deliberate effort to provide users with IT knowledge and skills through organizing training for its staff with low understanding of e-procurement implementation from time to time so that they are well equipped with the e-procurement systems as they carry out their tasks and duties.

Since both ICT infrastructure and Top Management support influence e-procurement implementation based on regression analysis result, Local governments should ensure that both factors are adequately planned for, incorporated, delivered and maintained while implementing

e-procurement system. Once all these factors are incorporated, e-procurement implementation will create an optimistic environment among stakeholders and hence make them develop positive attitudes toward the system implementation. Policy makers may use these findings as a way of improving e-procurement implementation policy framework in Uganda since the use of e-procurement can greatly contribute to better service delivery and above all reduction in the overall operational cost.

5.5 Limitations of the study

The study was quantitative in nature and therefore, it did not capture the respondents' emotions and feelings on e-procurement implementation. In addition the study missed out no advantages of qualitative research which include an increased degree of flexibility in the research design; the ability to avoid reliance on the researcher's predetermined assumptions; the opportunity to provide greater depth and detail in a researcher's findings; the capacity to simulate participants' unique individual experiences; and the ability to focus on the meanings of key issues for participants, especially any contradictions or inconsistencies in their perspectives.

5.6 Areas for further study

Basing on the findings of the study, the researcher suggests the following areas for further research.

There is the need to establish factors other than organizational factors and ICT infrastructure which according to this study accounted for only 10.6% of e-procurement implementation and usage in West Nile local governments.

A comparative study is needed to be carried out on organizational factors, ICT infrastructure and e-procurement project implementation in other regions in Uganda to compare with the results of this study in West Nile.

There is need to also carry out a longitudinal study on organizational factors, ICT infrastructure and e- procurement project implementation in west Nile and results compared with the results of this study.

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Appendix: Questionnaire

MAKERERE UNIVESITY BUSINESS SCHOOL

QUESTIONNAIRE ON THE ORGANIZATIONAL FACTORS, ICT INFRASTRUCTURE AND ELECTRONIC PROCUREMENT IMPLEMENTATION IN LOCAL GOVERNMENTS IN WEST NILE DISTRICTS

Dear Respondent,

I am **Alwayo Flavia Bella,** an MBA student of Makerere University Business School. You have been identified as a key informant in this study for my dissertation: ***Organizational Factors, ICT infrastructure and Electronic Procurement Implementation in Local Governments in West Nile Districts.*** Any information provided will be treated with utmost confidentiality and shall be used purely for academic purposes. Your honest and sincere responses are highly appreciated. Kindly spare a few minutes of your busy schedule to answer the following research questions and provide information according to the instructions provided in the questionnaire.

SECTION A*: *Social Demographic Characteristics of Respondents

1. Gender (Tick against the right gender)

Appendix (A) – Survey instrument of the main study

Male	**Female**

2. Age Bracket

	18-24 years	**25-31 years**	**32-38 years**	**39-45 years**	**46-52 years**	**Above 52 years**
Tick						

3. Education Level

Level	**Certificate**	**Diploma**	**Degree**	**Master degree**	**Postgraduate**	**Ph.D.**

Tick						

4. State your job title in the organization…….....

5. State your department…….

6. Length of service in the organization.

<1 year	**1 – 5 years**	**6 - 10 years**	**11 - 15 years**	**16 – 20years**	**Over 20 years**
Tick					

Please tick the scale below closest to your view/opinion to what extent you agree/disagree with the statements in section B below as applicable to your organization.

Strongly Agree	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**
5	**4**	**3**	**2**	**1**

	Organizational Factors					
TMS	**Top Management Support**	**5**	**4**	**3**	**2**	**1**
TMS1	Top managers encourage the users to utilize the e-procurement system					
TMS2	Top managers are committed in the use of e-procurement					
TMS3	Top managers are interested in the use of e-procurement					
TMS4	Top managers effectively communicate its support to the e-procurement usage.					
TMS5	Top managers are willing to invest the necessary resources for improving e-procurement usage in the government.					
TMS6	Top managers are willing to take risks involved with e-procurement usage					
TMS7	Top managements freely delegates to lower management level on issues of e-procurement					

TMS8	Top management rewards employees who excel in e-procurement; practices					
TMS9	Top management considers e procurement adoption important					
ICT	**ICT Knowledge and Skills**	**5**	**4**	**3**	**2**	**1**
ICT1	I have basic knowledge about e-procurement.					
ICT2	I have already used e-procurement systems before.					
ICT3	There is at least one employee who has formal training in the use of e-procurement in my department.					
ICT4	In comparison to other departments, my understanding level of e-procurement systems is high.					
ICT5	The organization organizes training on e-procurement					
ICT6	There is technical expert to resolve e-procurement issues					
ICT7	Our employee has little knowledge on how e-procurement can help improve our business					
	Ict Infrastructure					
TR	**Technological Readiness**	**5**	**4**	**3**	**2**	**1**
TR1	I can change to use e-procurement					
TR2	There are enough hardware and software facilities to support e-procurement in the organization					
TR3	The computers in offices are connected to the internet					
TR4	There is standby generator or solar system to use in case of power outage.					
TR5	There are modems for use in offices that do not have Local Area Network connection					
TR6	The money allocated for the e-procurement implementation enough					
TR7	The money set aside for Computer hardware repair is enough in case of breakdown					
TR8	The money set aside for e-procurement software repair is enough in case of breakdown.					

TR9	The current hardware and software facilities are very difficult to use to support e-procurement.					
ISR	**IT Security Risk**	**5**	**4**	**3**	**2**	**1**
ISR1	I fear that organization data on e-procurement will leak to other organizations					
ISR2	Supply partners do not trust e-procurement transactions					
ISR3	There is fear of dealing with unknown					
ISR4	There is efficient risk management in e-procurement					
ISR5	E-procurement gives hackers a chance to paralyze organization operations					
ISR6	The transaction risks associated with e-procurement are a challenge to e-procurement adoption					
ISR7	Privacy risks arising from inappropriate information on e-procurement is a threat to e-procurement adoption					
ISR8	I have guidelines of how to log safely in and out of the e-procurement system					
	E-procurement Adoption and Usage					
EF	**Effectiveness**	**5**	**4**	**3**	**2**	**1**
EF1	E-procurement increases productivity of procurement staff					
EF2	E-procurement improves contracts compliance					
EF3	E-procurement enhances better service delivery					
EF4	Reduction in Time through improved internal workflow/contract completion					
EF5	E-procurement improves on operational cost.					
EF6	E-procurement enables improved quality through Improved Communication					
TPR	**Transparency**	**5**	**4**	**3**	**2**	**1**
TPR1	E-procurement improves transparency during procurement process					

TPR2	E-procurement improves visibility of supply chain					
TPR3	E-procurement helps with monitoring supplier performance					
TPR4	E-procurement establishes mutual trust with vendors					
TPR6	E-procurement leads to centralized control of contracts, product data, catalogues and price updates					
EFF	**Efficiency**	**5**	**4**	**3**	**2**	**1**
EFF1	E-procurement reduces transaction costs of inventory					
EFF2	E-procurement reduces transaction process time					
EFF3	It takes shorter time to learn to use e-procurement					
EFF4	E-procurement reduces administration costs (procurement personnel, office space, etc)					
EFF5	E-procurement eliminates paper work					
EFF6	E-procurement saves time in production of quality reports					
EFF7	I find execution of e-procurement tasks simpler with minimal effort using e-procurement					

--Once again, thank you for your valuable time and cooperation

Appendix 2: Study Population

Districts in West Nile	***No of Respondents***	***Departments***
Arua	18	User deparments-13 members, PDU -1-member, Contracts committee- 5 members, Council-10, Accounting Officer-1
Nebbi	18	User deparments-13 members, PDU -1-member, Contracts committee- 5 members, Council-10, Accounting Officer-1
Koboko	18	User deparments-13 members, PDU -1-member, Contracts committee- 5 members, Council-10, Accounting Officer-1
Maracha	18	User deparments-13 members, PDU -1-member, Contracts committee- 5 members, Council-10, Accounting Officer-1
Moyo	18	User deparments-13 members, PDU -1-member, Contracts committee- 5 members, Council-10, Accounting Officer-1
Pakwach	18	User deparments-13 members, PDU -1-member, Contracts committee- 5 members, Council-10, Accounting Officer-1
Madi-Okollo	18	User deparments-13 members, PDU -1-member, Contracts committee- 5 members, Council-10, Accounting Officer-1
Adjumani	18	User deparments-13 members, PDU -1-member, Contracts committee- 5 members, Council-10, Accounting Officer-1
Yumbe	18	User deparments-13 members, PDU -1-member, Contracts committee- 5 members, Council-10, Accounting Officer-1
Zombo	18	User deparments-13 members, PDU -1-member, Contracts committee- 5 members, Council-10, Accounting Officer-1
TOTAL SAMPLE SIZE (according to Morgan)	180 respondents 123(sample size)	

Appendix 3: Table for Determining Sample Size for a Finite Population

N	*S*	*N*	*S*	*N*	*S*
10	10	220	140	1200	291
15	14	230	144	1300	297
20	19	240	148	1400	302
25	24	250	152	1500	306
30	28	260	155	1600	310
35	32	270	159	1700	313
40	36	280	162	1800	317
45	40	290	165	1900	320
50	44	300	169	2000	322
55	48	320	175	2200	327
60	52	340	181	2400	331
65	56	360	186	2600	335
70	59	380	191	2800	338
75	63	400	196	3000	341
80	66	420	201	3500	346
85	70	440	205	4000	351
90	73	460	210	4500	354
95	76	480	214	5000	357
100	80	500	217	6000	361
110	86	550	226	7000	364
120	92	600	234	8000	367
130	97	650	242	9000	368
140	103	700	248	10000	370
150	108	750	254	15000	375
160	113	800	260	20000	377
170	118	850	265	30000	379
180	123	900	269	40000	380
190	127	950	274	50000	381
200	132	1000	278	75000	382
210	136	1100	285	1000000	384

Note.—*N* is population size. *S* is sample size.

Source: Krejcie & Morgan, 1970