

Constraints to Effective Implementation of E-Procurement in the Public Sector: A Survey of Selected Government Ministries in Kenya

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Abstract

Purpose: The purpose of this study was to establish the challenges facing the implementation of e-procurement in public organizations in Kenya. The study was guided by the following specific objectives: to examine the drivers of e-procurement in the Government of Kenya ministries; to evaluate the benefits accruing from the adoption of e-procurement in the Government ministries in Kenya; and to assess the constraints to effective implementation of e-procurement in the Government ministries in Kenya. **Methods:** A Cross sectional survey was undertaken due to the fact that we intended to describe the area of research and explain the collected data in order to investigate the differences and similarities with our frame of reference within a given period of time. The focus of the study was all Government ministries totaling to 31 as at December 2011. The study respondents were heads of Procurement Units from the selected ministries, who are also the secretaries of the Ministerial Tender Committees in the respective ministries. A representative sample of 16 ministries, representing about 51.6% of the whole population were selected at random, which is within the limits of the generally accepted statistical condition. A two-stage stratified random sampling technique was employed to select the ministries for the study. Primary data was collected from the various ministries with the aid of a semi-structured undisguised questionnaire with both open ended and closed questions. **Data Analysis:** For purposes of the current study, the data was analyzed by employing descriptive statistics such as percentages, frequencies and tables. Statistical Package for Social Sciences (SPSS) was used as an aid in the analysis. The researcher prefers SPSS because of its ability to cover a wide range of the most common statistical and graphical data analysis. Computation of frequencies in tables, charts and bar graphs were used in data presentation. In addition, the researcher used standard deviations and mean scores to present information pertaining to the study objectives. The information was presented and discussed as per the objectives and research questions of the study. **Findings and Discussions:** The findings of the study do indicate that the following are the drivers of e-procurement in the Government of Kenya ministries:- (i) Technological drivers: - Secure transactions; Integration of web site to all business processes; and Adequate resources and appropriate supporting ICT infrastructure; and (ii) Managerial success factors: - Effective project implementation leadership supported by appropriate human resource capacity; forming alliances – with suppliers, technology providers, customers; Appropriate organizational structure; and Stakeholders support. The key constraints were: - budgetary support; the legal framework governing ICT in Kenya; and Government Policy on ICT. The other challenges are: - Human Resource capacity; required support; and Backing of the top executives of the ministries.

Keywords: e-Procurement; Public Sector; Resource Challenges; Technological challenges; Financial Resources; Human Resource capacity; Stakeholders support; Technology adoption; and Supporting Infrastructure; e-Procurement system; e-Procurement process; e-Procurement application

ABBREVIATIONS AND SYNONYMS

ADB	African Development Bank
B2B	Business-to-business
CMM	Capability Maturity Model
e-commerce	Electronic Commerce
EDI	Electronic Data Interchange
e-procurement	Electronic procurement
ERP	Enterprise Resource Planning
EU	European Union
GoK	Government of Kenya
ICTs	Information and Communications Technologies

IS	Information systems
IT	Information Technology
MRO	Maintenance, Repair and Operations
MSU	Michigan State University
PIM	Purchasing Information Management
PO	Purchase Order
PWC	PriceWaterhouseCoopers
RFI	Request For Information
RFP	Request For Price
SCM	Supply Chain Management
SEI	Software Engineering Institute
TMS	Transactional Management Systems
TQM	Total Quality Management
USA	United States of America
WB	World Bank
WTO	World Trade Organization

1.0 INTRODUCTION

1.1 Background of the Study

Today governments all over the world have received a great deal of attention as providers of essential services, such as health, education, defense and infrastructure. To be able to meet the demand for these services, governments purchase goods and services from the marketplace. In other words, governments are purchasers of works, supplies and services from the open market, placing their demands alongside those of the private sector. The business operations of governments in the marketplace or public procurement have thus both economic and political implications. Yet, until recently, the subject of public procurement did not receive attention by academic researchers and policy makers, because it was considered an administrative function too mundane to worry about¹. The slower-than-anticipated adoption of e-procurement has surprised many observers; in fact, only a relatively small share of parts can be sourced easily through online bidding, and even for these the process is far from smooth².

Whilst the drivers and potential benefits and transformations of e-procurement are well documented, the ongoing impact of these changes on organizations is not well understood. Most organizations seek to improve procurement processes and reduce procurement costs, however there are other motivations. Adoption profiles and reasons for adoption vary, as do the desired benefits³. For example, whilst there are similarities between public and private sector e-procurement contexts in terms of deriving economic value and quality, there are significant differences in terms of social welfare implications⁴. This study sought to explore the drivers of e-procurement adoption, determine the benefits derived from adoption of e-procurement and establish the challenges faced in implementation of e-procurement in the public sector in Kenya.

1.2 Statement of the problem

In 1986, a study was conducted by SGS Consultants to evaluate public procurement systems in Kenya. The major finding of the study was that public procurement was not operating efficiently and that the state was losing a lot of money through shoddy deals. The report strongly indicated the need for reforming the public procurement system in the country. However, the focus of the study had nothing to do with e-procurement and hence failed to address the dependent and independent variables of the current study. In 1997, the Government in collaboration with the World Bank commissioned another study to assess the country's procurement processes and systems (Government of Kenya, 2001a). The World Bank supported the study through the Public Procurement and Capacity Reform Project. This study identified the need for a comprehensive review and an implementation of a reform process in the procurement systems. The study revealed that the public procurement system in Kenya lacked transparency and fair competition. The study further revealed that procurement staff

¹ W.A Wittig, Building Value through Public Procurement: A Focus on Africa, London: Prentice Hall, 2002. 30

² Frank Dietz, Lang, S. Nikolaus and Mauerer Andreas, Beyond Cost Reduction: Reinventing the Automotive OEM-Supplier Interface". The Boston Consulting Group, 2004. 267
http://www.bcg.com/publications/files/Beyond_Cost_Reduction_Mar_04.pdf

³ S.P Williams and F. Morello, eProcurement: Making sense of multiple business designs, IFIP TC WG8.4 Working Conference on e-business. Salzburg, Austria, 2004: 201

⁴ C.A. Hardy and S.P. Williams, Public eProcurement in action: Policies, practices and technologies', Towards electronic democracy (TED) Conference on e-Government -Electronic democracy: The challenge ahead, Bozen-Bolzano, Italy, 2005:286

were not adequately trained and lacked professionalism. Lack of a professional body that would oversee and instill discipline among procurement officers made them vulnerable to corruption. One of the major recommendations from these two studies was that reforms in public procurement systems were paramount if government was to save resources otherwise lost through exorbitant procurement. The World Bank study argued that improvement in procurement systems had a direct and beneficial effect on the overall economic situation in the country. Though the study pointed out the need for reforms, which could have culminated to the shift towards e-procurement, both the dependent and independent variables of this study were not addressed.

There is also insufficient statistics and empirical data on the ability of the government e-procurement system to meet the needs and expectations of user departments. Studies on e-procurement systems in Kenya have focused on such issues as:- Challenges facing e-procurement function in Kenya, manufacturing industries¹; TQM for purchasing management²; Role of Strategic Planning in the efficiency of industrial³; Evaluation of Purchasing Department in a company⁴; and Effectiveness of procurement of small user items⁵. None of the studies paid specific attention to e-procurement system. All the above studies did not pay attention to the linkages between dependent and independent variables of this study. The study therefore, seeks to answer and establish the following: - (i) The drivers of an effective e-procurement process; (ii) the benefits of adoption of e-procurement; and (iii) the challenges of implementation of e-procurement.

1.3 Purpose of the Study

The purpose of the study was to examine the drivers of e-procurement in the Government of Kenya ministries, evaluate the benefits accruing from the adoption of e-procurement in the Government ministries, and to assess the constraints to effective implementation of e-procurement in the Government ministries in Kenya.

1.4 Objectives of the study

1.4.1 Overall objective

The overall objective of the study was to assess the constraints to effective implementation of E-Procurement In the public sector in Kenya.

1.4.2 Specific objectives

The specific objectives of the study were:

1. To examine the drivers of e-procurement in the Government of Kenya ministries
2. To evaluate the benefits accruing from the adoption of e-procurement in the Government ministries in Kenya
3. To assess the constraints to effective implementation of e-procurement in the Government ministries in Kenya.

1.5 Study Hypotheses

Null Hypotheses (H₀)

1. The drivers of an effective e-procurement process are:-
Technological drivers:- Transactions that are not interfered with by unauthorized persons ; Integration of web site to all business processes; Adequate resources and appropriate supporting ICT infrastructure.
Managerial success factors:- Effective project implementation leadership supported by appropriate human resource capacity; Forming alliances – with suppliers, technology providers, customers; Appropriate organizational structure; and Stakeholders support
2. The benefits of adoption of e-procurement are:- Faster and efficient procurement processes; Increased strategic sourcing; Reduced operational costs; Improved integrity of the process; Increased Market transparency; Price reduction; Shortened procurement cycle times; Reduced

¹ I.W. Migwe, Challenges facing procurement systems in Kenya's manufacturing industries, Nairobi: Jomo Kenyatta University of Agriculture and Technology, 2004.23

² J.F. Gali, TQM for Purchasing Management, Nairobi: Jomo Kenyatta University of Agriculture and Technology, 1993.10

³ J.L. Mulwa, Role of Strategic Planning in the efficiency of industrial purchasing - A case of Firestone East Africa, Project paper submitted in partial fulfillment of Postgraduate Diploma in Purchasing and Supplies, Kenya Institute of Purchasing and Supply, Nairobi: KIPS, 2000.31

⁴ L.M. Kimuyu, Evaluation of Purchasing Department of a Company – A case study of James Finlay, Project paper submitted in partial fulfillment of Postgraduate Diploma in Purchasing and Supplies, Kenya Institute of Purchasing and Supply, Nairobi: KIPS, 2004.45

⁵ R.M. Musyoki, Effectiveness of procurement of small user items - A case study of Kenya Ports Authority, Project paper submitted in partial fulfillment of Postgraduate Diploma in Purchasing and Supplies, Kenya Institute of Purchasing and Supply, Nairobi: KIPS, 2003.23

transactional and administration costs; Improved visibility of customer demand and supply chain; and Reduced operational and inventory cost.

3. The challenges of implementation of e-procurement are: -
Technological challenges: -security of information; technological costs; availability of infrastructure to support capacity; ease with which can adapt to the emerging technologies.
Resource Challenges: - Budgetary support; human resource capacity; Government policy ICT; the legal framework governing ICT; and backing of the top executives of the ministries.

1.6 Definition of terms

e-Procurement: The term e-procurement results from the electronic support of procurement activities between a purchaser and a supplier through information and communication technologies¹.

e-Procurement system: According to Croom, electronic procurement systems in essence mirror the procurement process through the provision of two distinct, but connected, infrastructures - internal processing (via, for example, corporate intranet) and external communication with the supply base (via, for example, Internet-based platforms)².

e-Procurement process: According to McKie, e-procurement software support the procurement process from requisition to payment. By his definition, a typical e-procurement workflow involves the following steps: Requisitioning; Order Submission; Order Tracking; Receipt Processing; Payment Processing; and ERP update³

e-Procurement application: An additional theory that will be used to answer this question is put forward by Knudsen⁴, which defines e-procurement applications as follows: **(1) E-sourcing:** Finding potential new suppliers using the Internet in general or a B2B marketplace for information gathering; **(2) E-tendering:** Process of sending request for information (RFI), request for price (RFP), etc to suppliers and receiving the responses using internet technology and occurs takes place in the supplier contact step of the procurement process; **(3) E-informing:** Handling information about the supplier regarding quality certification, financial status or other unique capabilities; and **(4) E-reverse auctions:** Buying goods and services that have the lowest price or combination of lowest price and other conditions via Internet technology.

2.0 LITERATURE REVIEW

2.1 Introduction

This chapter presents a description of the relevant literature surrounding the research problem, which form the foundation of the empirical study. The researcher discusses procurement in general and then takes a look at its significance and contribution in organizational and supply chain management. Moreover, as a way of providing a fundamental and necessary framework for the study, different terms and concepts like e-procurement process, models, benefits and barriers are developed and defined in this chapter.

2.2 The concept of procurement

Traditionally, procurement has involved a number of communication mediums to facilitate procurement process between the various parties. These have included the use of mail, phone, and fax, EDI and more recently, email and the Internet. The process as it was undertaken before the emergence of e-procurement was manual, involving a lot of paper work and prone to corrupt tendencies, besides being time consuming. These inefficiencies led to adoption of e-procurement, where electronic communications are used to support all forms of transactions that facilitate the procurement process⁵. E-procurement is a new phenomenon, but what it wants to achieve is not new. As long as companies have been around, they have sought to improve efficiency and effectiveness. E-procurement is an umbrella concept that backs up the same tree, improving efficiency and effectiveness.

Procurement encompasses all activities involved in obtaining goods and services and managing their inflow into an organization⁶. Traditionally the corporate function of procurement is divided into strategic and operational tasks. Whereas the strategic tasks include sourcing activities, supplier management, and design and implementation of buying procedures, operative tasks embrace all transaction-oriented activities such as the

¹ Dave Chaffey, ed., E-business and E-commerce Management, 2nd ed., London: Prentice Hall, 2004, 56

² S.R Croom, The impact of e-business on supply chain management, An empirical study of key developments, International Journal of Operations & Production Management, Vol. 25 No. 1, 2005, 55

³ Stewart McKie, E-business best practices: leveraging technology for business advantage, New York: Wiley, 2001, 87

⁴ Daniel Knudsen, Improving Procurement Performance with E-business mechanisms, Lund:Lund University, Sweden, 2003, 67

⁵ NECCC E-Procurement Work Group, e-Procurement: Failure to Implement, Not an Option! (2002) , 49 (<http://www.ec3.org/Downloads/2002/eProcurement.pdf>).

⁶ J. Gebauer and A. Segev, "Assessing Internet-based Procurement to Support the Virtual Enterprise", Electronic Journal of Organizational Virtualness, Vol. 2, No. 3, (2001):30

expedition of purchase orders.¹ Procurement is the term most commonly employed to refer to the purchasing of goods and services for the day-to-day operation of a business. Procurement is an essential part of any organization's ability to function effectively and efficiently².

Gadde and Håkansson assert that there are a number of reasons why purchasing has become more significant and consists of a larger part of the turnover. The first reason is that purchasing has gradually become more involved in larger parts of the company's total activity and due to this; the purchasing department's capacity and competence have great consequences for the efficiency of the company. Secondly, the reason why purchasing has become more important is that purchases directly influence the result. One cent less spent on purchasing is one cent extra added to the profit. This expression is often confused with the notion that one cent lower price leads to a higher profit. Nothing could be more wrong, due to the indirect cost associated with purchases.

The third reason for the increased importance of purchasing is the insight that benefits can be made by having deeper and more long-term relationships with a supplier. These potential benefits concern flow of material, flow of information and cooperation in technical development³.

2.3 The concept of e-procurement

According to Neef, e-procurement systems continue the trend of reducing transaction costs by automating processes, replacing human labor with information technology. There are some fundamental things the purchasing company wants to achieve when it comes to purchasing. These include reducing the time employees spend looking for a product, service or suitable supplier, reducing the time and cost of administering purchases, reducing cycle times, increasing volume with a few preferred suppliers to get better pricing and other conditions, as well as limiting choices to only a number of pre-qualified suppliers to ensure quality.⁴

2.4 E-procurement Systems and Applications

E-procurement is more than just a system for making purchases online. A properly implemented system can connect companies and their business processes directly with suppliers while managing all interactions between them. This includes management of correspondence, bids, questions and answers, previous pricing, and multiple e-mails sent to multiple participants⁵. Essentially, E-procurement systems must enable their users to specify their purchasing requirements, to conduct purchasing market research, to pre-qualify suppliers and if possible allow for the running of tenders. To realize the savings claimed by the providers of these applications, a high degree of integration is required between the front office and back office on the one hand, and between the back office and the supplier's systems on the other.⁶

Two types of e-procurement systems are extranets and electronic markets. Extranets connect the buyer and its suppliers with a closed network. In contrast, electronic markets create open networks for buyer and supplier interactions. The differences between these two types of e-procurement channels lie in system implementation costs, marketplace benefits, and the extent of supplier competitive advantage that develops due to information sharing⁷. E-procurement applications are designed to facilitate the development of efficient procurement. Internet technology, both the Internet protocol and the public network, plays five key roles in developing e-procurement beyond the capabilities now available in an EDI enabled ERP procurement solution⁸: (i) Reduces the cost of deploying e-procurement solutions in the enterprise; (ii) Reduces the network management costs of the procurement solution; (iii) Enables a user friendly e-procurement application; (iv) Increases the supplier's benefits from cooperation with buyer; and (v) Expands the reach of trading communities.

¹ R.J Kauffman and Y.M Wang, "The Network Externalities Hypothesis and Competitive Network Growth," *work paper, MIS Research Center, Carlson School of Management, Minnesota: University of Minnesota, 2000, 69*

² Leonard Steven R, *Electronic Procurement, European Commission's IST Programme eBusiness and eWork, 2000. (www.lsi.upc.edu/~jmpujol/gsel/e-procurement.pdf)*.

³ L.C. Gadde and H. Hakansson, *Supply Chain Network Strategies*, Chichester: John Wiley & Sons, r, 2001, 218

⁴ Bakowski Marcin, C-commerce. Would mixing ERP, CRM, e-Procurement and SCM be an efficient strategy for the future? (*Business Solution Management, 2002*), 88

⁵ K. *Berryman*, I. Harrington, D. Layton-Rodin and V. Rerolle, "Electronic Commerce: Three Emerging Strategies," *The McKinsey Quarterly*, (33:1), 1998. 152.

⁶ A.J. Weele, *Purchasing and supply Chain Management: Analysis, Planning and Practice* (3rd revised ed.), London, England: Thomson International, 2001. 147

⁷ Q. Dai and R.J Kauffman, "To Be or Not to B2B: Evaluating Managerial Choices for E-Procurement Channel Adoption," *Info. Tech. Mgmt.*, 2005. 155

⁸ L. R. Steven, *Electronic Procurement, European Commission's IST Programme eBusiness and eWork, (2000)*, 17 . (www.lsi.upc.edu/~jmpujol/gsel/e-procurement.pdf).

2.5 E-Procurement Process

According to Shaw and Subramaniam, two types of procurement process were categorized based on two ends of a continuum – structured and unstructured procurement¹ (See table 2.1).

2.5.1 Structured procurement: On the one end, there are procurement processes that are highly automated in terms of the need identification, ordering, and fulfillment. The customized needs, high demand volume and potential uncertainties associated with supply can lead to high transaction costs for the buyer enterprise, if each transaction has to undergo the supplier search, approvals, processing and ordering. If the demand is regular and the product specifications do not change with time, organizations can reduce the transaction costs by negotiating a long-term contract with a supplier and designing an automated procurement process for reordering the items. We call this type of procurement as “structured” procurement. Examples of such procurement include tooling items, welding wires, and custom replacement parts.

2.5.2 Unstructured procurement: On the other end, there are some products that are not suitable for any level of automated procedures. Often organizations allow the end users to take advantage of best deals available at the time of ordering and there is very little benefit of tying such procurement to product-specific purchasing steps with a particular supplier. These procurements tend to have very broad procurement rules giving plenty of freedom to the users to choose suppliers. We call this type of procurement as “unstructured”. Examples of this category of procurement include office equipment and furniture.

Table 2.1: Characteristics of structured and unstructured procurements

	Unstructured Procurement	Structured Procurement
Product characteristics	<ul style="list-style-type: none"> ▪ Sporadic demand with high demand uncertainty ▪ Low demand volume ▪ Involves greater product variety and options ▪ Low risk of supply uncertainty 	<ul style="list-style-type: none"> ▪ Regular demand with low demand uncertainty ▪ High demand volume ▪ Specifications do not change with each order ▪ High business risk of supply uncertainty
Process characteristics	<ul style="list-style-type: none"> ▪ Orders manually initiated by the end-user ▪ Consists mostly of one-time orders ▪ Product selection, supplier selection and order details are decided for each transaction ▪ Approvals are required for most transactions, based on dollar volume and requesting employee’s status in the organizational hierarchy 	<ul style="list-style-type: none"> ▪ High level of automation ▪ Consists mostly of re-orders ▪ Product selection, supplier selection and order details are decided at set-up and coded into the procedures ▪ No approvals needed for individual transactions
Examples	<ul style="list-style-type: none"> ▪ Office furniture ▪ Office equipment 	<ul style="list-style-type: none"> ▪ Tooling items ▪ Welding supplies ▪ Custom replacement parts

Source: Shaw and Subramaniam, 2002

2.6 Impact of e-Procurement on the procurement process

E-procurement impact on procurement process has not fully materialized as expected. There are however important and promising features of e-procurement, such as improved information sharing capabilities, increased connectivity, and efficiency improvements that should not be overlooked. Balchin argues that an e-procurement solution play a fundamental role in transition of procurement to e-procurement as follows:- (i) Reduce paperwork and redundant effort, improving productivity and lowering the cost of the purchasing process; (ii) Enable companies to locate suppliers with the best prices and quality and help streamline negotiations and contracting; (iii) Take full advantage of an enterprise’s buying power by enabling it to qualify for volume discounts and ensuring purchases are made through preferred suppliers; (iv) Streamline and automate purchasing through critical suppliers, enabling more timely and accurate order fulfillment.² Table 2.2 illustrates the impact e-procurement is having on enterprise compliance and spend management initiatives. Performance

¹ M.J. Shaw and C. Subramaniam, “The Effects of Process Characteristics on the Value of B2B E-Procurement”, *Working Paper CITEBM-02-02*. (Center for IT and e-Business Management, University of Illinois at Urbana/Champaign, 2002). <http://citebm.cba.uiuc.edu/ecforum/Process-effects-B2Bvalue.pdf>.

² J. Balchin, Strategic enlightenment. Logistics Europe, Issue: September, pp 16-19. L ULEA: University of Technology Division of Industrial Marketing & e-Commerce, 2001, 154

improvements recorded map very closely to Aberdeen's previous benchmarks, indicating that e-procurement is consistently delivering on its initial value proposition.

Table 2.2: E-procurement impact (Average performance)

Performance area	Before e-procurement	After e-procurement
% of spending that is off-contract ("maverick")	38%	14.2%
Price savings on maverick purchases brought into compliance	17%	7.3%
Requisition-to-order cycles	20.4 days	3.8 days
Requisition –to-order costs	\$ 56	\$ 23
% of spending under management of the procurement group	56%	69%

Source: Abredeen Group, December 2004

2.7 E-procurement benefits

The potential benefits and characteristics of e-procurement, especially for indirect goods and services, are described and proved in a huge number of articles and studies. According to Muffatto and Payaro, the main results are that e-procurement decentralizes operative tasks and centralizes strategic procurement processes. This eliminates the so-called maverick buying and reduces transaction costs (e.g. decreasing process time and media discontinuities or reducing personnel expenditures) and purchasing costs (e.g. through grouping effects and/or a reduction of the number of their suppliers)¹.

According to Kalakota and Whinston, e-procurement's benefits fall into two major categories:

2.7.1 Efficiency and Effectiveness- E-Procurement's efficiency benefits include lower procurement costs, faster cycle times, reduce maverick or unauthorized buying well organized reporting information, and tighter integration of the procurement functions with key back-office systems. E-Procurement's effectiveness benefits include in the increased control over the supply chain, proactive management of the key data, and higher-quality purchasing decision within organizations².

Chaffey classified benefits of e-business adoption to tangible benefits and intangible benefits as follows: **(i) Tangible benefits: Increased sales** from new sales lead giving rise to increased revenue from: New customers, new markets, Existing customers (repeat-selling), and Existing customers (cross-selling); **Marketing cost reduction** from: Reduced time in customer service, Online sales; and Reduced printing and distribution costs of marketing communications; **Supply-chain cost reductions** from: Reduced levels of inventory, Increased competition from suppliers, and Shorter cycle time in ordering.; and Administrative cost reductions from more efficient routine business processes such as recruitment, invoice payment and holiday authorization; **(ii)**

Intangible benefits: These include Corporate image communication; Enhancement of brand; More rapid, more responsive marketing communications including P; Faster product development lifecycle enabling faster response to market needs; Improved customer service; Learning for the future; Meeting customer expectations to have a web site; Identifying new partners, supporting existing partners better; Better management of marketing information and customer information; and Feedback from customers on products³.

Another set of e-procurement benefits is given by Chaffey as follows: (i) Reduced purchasing cycle time and cost; (ii) Enhanced budgetary control (achieved through rules to limit spending and improved reporting facilities); (iii) Elimination of administrative errors (correcting errors is traditionally a major part of a buyer's workload); (iv) Increasing buyers' productivity (enabling them to concentrate on strategic purchasing issues); (v) Lowering prices through product standardization and consolidation of buys; (vi) Improving information management (better access to prices from alternative suppliers and summaries of spending); (vii) Improving the payment process (this does not often occur currently since payment is not always integrated into e-procurement systems).

Shaw and Subramaniam⁴ studied the value of electronic procurement to an organization. They proposed a formula to measure value of e-procurement:

$$\text{Value of E-Procurement} = \text{Price Benefits} + \text{Transaction Cost Benefits} - \text{Technology Lock-in Costs}$$

Price benefits comes from potential price reduction off average market price while transaction cost benefits result from savings in search, negotiation and contracting, and coordination costs. Technology lock-in costs are costs involved in choosing and using a specific procurement system, including switching costs,

¹ M. Muffatto and A. Payaro, "Integration of Web-based Procurement and Fulfilment: A Comparison of Case Studies," *International Journal of Information Management*, 24, 2004: 295.

² R.Kalakota and A.B Whinston, *Electronic Commerce: A Manager's Guide*. Reading, MA: Addison-Wesley, 2001, 145.

³ Dave Chaffey, *E-business and E-commerce Management*, 2nd ed., London: Prentice Hall, 2004, 79

⁴ M.J Shaw and C. Subramaniam, "The Effects of Process Characteristics on the Value of B2B E-Procurement", *Working Paper CITEBM-02-02*. (Center for IT and e-Business Management, University of Illinois at Urbana/Champaign, 2002), 143 . <http://citebm.cba.uiuc.edu/ecforum/Process-effects-B2Bvalue.pdf> .

opportunistic behavior by contracted suppliers. These costs are offset by the extent of protection from uncertainty.¹ According to Wyld, there is a plethora of literature espousing the benefits of an e-procurement solution. These benefits would be identified as drivers for any implemented solution. They include: (i) Price reduction; (ii) Improved contract compliance; (iii) Shortened Procurement cycle times; (iv) Reduced administration costs; (v) Enhanced inventory management; (vi) Improved visibility of customer demand; (vii) Improved visibility of supply chain; (viii) Reduced operating and inventory costs; (ix) Increased accuracy of production capacity; (x) Enhanced decision making, and; (xi) Improved market intelligence².

Considering the benefits which are defined by David C. Wyld, the following theories provides definition and description for some of benefits regarding his theory: **(i) Price Benefits-** According to Shaw³, price benefits are derived as a result of better demand management capability of e-procurement systems. Web-based systems provide a centralized and more accurate visibility of the enterprise-wide procurement of products and services. This helps to consolidate the demand at the enterprise-level and negotiate lower prices with suppliers. Procurement costs are reduced through economies of supplier search and increased price competition among suppliers⁴.

Shortened Procurement cycle times: According to NECCC, e-procurement has the ability to reduce resources currently involved in paper and manually based procurement processes through improved payment processes and decreased cycle time. Workflow - from producing a purchase request through to payment - can be managed electronically by e-procurement processes, reducing errors and processing time. These efficiencies enable a reduced cycle time from requisition to payment⁵. The Aberdeen Group estimates the time saved at 70 per cent. These timesaving allow reduced inventory levels, resulting in additional cost savings through better cash flow and lessened inventory carrying costs;

Reduced transaction and administration costs: The efforts (time, money and human resource) spent on carrying out any exchange become transaction cost (process or administration costs). The existence of transaction costs indicates a waste of time and efforts of purchasing personnel in non-value added activities, such as performing data entry and correcting errors in paperwork. Reduction in transaction cost is one of the most attractive benefits from e-procurement adoption;

Improved visibility of customer demand and supply chain: Companies that have successfully integrated E-Business into their operations can capture the full range of advantages E-Business provides, including stronger relationships with customers, distributors, retailers, suppliers, and business partners.⁶;

Reduced operating and inventory costs: According to Puschmann and Alt, e-procurement efficiency benefits consist of process, products and inventory savings. By adopting e-business, supply-chain cost reductions come from reduced levels of inventory, increased competition from suppliers and shorter cycle time in ordering⁷

Enhanced decision-making: Business benefits achieved through successful e-procurement initiatives include cost reductions, improved information, increased efficiencies, self-service approach, integrated supplier management and the strategic use of purchasing staff.⁸

2.8 E-procurement adoption

Despite the potentials promised by the vendors of such systems, e-procurement got off to a slow start. A study by Eyholzer and Hunziker, only 18 percent of the Swiss companies analyzed used electronic product catalogs, auctions or requests for quotations in procurement in the year 2000. According to this study, however, many companies were planning to implement e-procurement systems at that time⁹. Other studies show similar proportions for other countries (e.g. Industrial Distribution, 2001 and Administration, 2000 for the USA). A study by Wyld, reports that currently almost half of all American companies use e-procurement systems. Although the adoption of e-procurement has rapidly increased in recent years, companies face different

¹ Ibid

² D.C Wyld, The Weather Report for the Supply Chain: A Longitudinal Analysis of the ISM, 2004, 118 <http://www.ism.ws/ismreport/forrester>, Southeastern Louisiana University, Department of Management, Hammond (CA).

³ M. Shaw and J. Gebauer, Success Factors and Benefits of Mobile Business Applications: Results from a Mobile E-Procurement Study. International Journal on Electronic Commerce, 8, 2004, 3

⁴S.R Croom, The impact of e-business on supply chain management, An empirical study of key developments, International Journal of Operations & Production Management, Vol. 25 No. 1, (2005): 55, 73

⁵ NECCC E-Procurement Work Group, e-Procurement: Failure to Implement, Not an Option!, 2002, 87

⁶ Price Waterhouse Coopers (PWC), Electronic Business Outlook: e-Markets Realism, not Pessimism. Price Waterhouse Coopers, Retrieved May 15th, 2002, from <http://pwcglobal.com/ebusinessinsights>.

⁷ Thomas Puschmann, and Alt Rainer, Successful use of e-procurement in supply chains, Supply Chain Management: An International Journal, 10/2,(2005): 122, 133.

⁸ Ernst & Young, Enabling E-Commerce: E-Procurement - Boosting the Bottom Line, 2001, '15.

⁹ K. Eyholzer, and D. Hunziker, The Use of the Internet in Procurement: An Empirical Analysis. Konferenzbeitrag, Hansen, H-R. (eds.), Proceedings of the 8th European Conference of Information Systems, (3rd-5th July 2000), Vienna, pp. 335. 342.

challenges associated with the advent and use of e-procurement¹. One is that most companies only apply single e-procurement functions.

The analysis by (Wyld, 2004) shows that in the US only 30 per cent of the companies surveyed use e-procurement systems for requests for quotations, online auctions (25 per cent) or eMarkets (33 per cent). A second challenge is that, despite the overwhelming evidence which shows the advantages of e-procurement systems, proprietary systems such as electronic data interchange (EDI) continue to persist, and have to be included in a company's overall e-procurement infrastructure. To do so, companies need to know the critical success factors in implementing e-procurement strategies, processes and systems². From an academic perspective, some initial contributions to success factor research exist.

2.9 E-Procurement adoption Barriers

There are some barriers that hinder the adoption of any of Internet based or e-business applications while, some barriers may just relate to e-procurement adoption and are not applicable to other applications. In a study by the Economist Intelligence Unit (the business-to-business arm of The Economist), the main obstacles to e-business success were found to be internal. The greatest identified barriers were the need to re-engineer business processes (cited by 58 per cent as very significant), a lack of e-business skills (50 per cent) and a lack of integration between front and back-end systems (45 per cent).³ While the Internet may give the impression of making it readily possible to swap between suppliers and use new suppliers, two-thirds of those interviewed said building a trusted relationship with suppliers is necessary before they would trade using the Internet.

Introduction of e-procurement entails major changes, often apparently running counter to the corporate culture, which in most organizations is to empower local business units. Care will be needed to manage the 'soft' aspect including: (i) Need for visible executive sponsorship; (ii) Motivating end-users to adopt the new systems; (iii) Re-engineering internal processes and dealing with cross-company cultural differences; and (iv) Effort will be needed to avoid being seduced by the technology⁴. Naturally there are many barriers to the adoption and implementation of e-procurement, significant amongst these being cost and system integration, which are mentioned in Croom's studies. He identified and ranked impediments to e-procurement implementation by their importance. In presenting the data in table 2.3, he highlighted the level of agreement and disagreement with the five impediments identified. As is depicted in table 2.3, only in the case of the first item – development costs – there was a lack of disagreement with the criteria identified as an impediment.⁵

Table 2.3: Major barriers to adoption of E-Procurement

Impediment to e-procurement adoption	Agree (%)	Disagree (%)
Development costs	49.4	
System integration	35.3	27.1
Culture	34.1	28.2
Development Time	22.4	38.8
Security Issues	16.5	44.7

Source: (Croom, 2001 and 2005)

A PricewaterhouseCoopers survey of 400 senior European business leaders indicates that security concerns and lack of faith in trading partners are the most significant factors holding back e-procurement, which is not approved by Croom (2001 and 2005) studies.

A summary of barriers identified in the literature are as follows: (i) Security of transactions (Gebauer *et al.*, 1998; PWC, 2002; Boston Consulting, 2002); (ii) Lack of Supplier e-procurement (solution PWC, 2002; Gebauer *et al.*, 1998; Boston Consulting, 2002); (iii) High cost of technology (PWC, 2002); (iv) Lack of legal framework (PWC, 2002); (v) Lack of technical expertise (PWC, 2002); (vi) Lack of e-Procurement knowledge (PWC, 2002; Gebauer *et al.*, 1998; Boston Consulting, 2002); (vii) No real business benefit identified (PWC, 2002; Gebauer *et al.*, 1998; Boston Consulting, 2002); (viii) Data exchange standards lacking (PWC, 2002); and (ix) Lack of business relationships with suppliers (PWC, 2002).

As mentioned in the benefits section (Shaw, 2004), derived three components based on the critical factors that drive the costs and benefits and how the Web impacts those factors, in turn affecting the value of e-procurement. Here are the costs (barriers):

¹ D.C. Wyld, , The Weather Report for the Supply Chain: A Longitudinal Analysis of the ISM, <http://www.ism.ws/ismreport/forrester>, Southeastern Louisiana University, Department of Management, Hammond (CA), 2004, 94

² Ibid

³ Ernst & Young, Enabling E-Commerce: E-Procurement - Boosting the Bottom Line, 2001, 14-15.

⁴ BuyIT Best Practice Network Report, Building the Business Case for e- Procurement /ROI, Issued by the BuyIT Best Practice Network (October 2002), 31.

⁵ S.R. Croom, The impact of e-business on supply chain management, An empirical study of key developments. International Journal of Operations & Production Management, Vol. 25 No. 1, (2005): 55, 73

Technology lock-in costs: This is more a cost, rather than a benefit. By implementing a particular type of system, the enterprise essentially “locks” itself into a technology solution and incurs switching costs to move its transaction to a different procurement model. Thus, these costs reduce the extent of the benefits realized from the use of a specific Web-based procurement system. However, lock-in also protects the buyer enterprise from costs due to uncertainty in the supply market. The report, “Procurement management systems: a corporate black hole”, Byline Research, identified six reasons as the failures for computerizing procurement (e-procurement):

The failure of ERP and supply-chain management systems to address non-production related procurement (often because these systems are either too highly specified, too costly, or both for smaller companies); (ii) The difficulty of integrating procurement systems with the existing IT infrastructure; (iii) Unwillingness to incur training and other costs; (iv) Indifference to the problem on the part of the IT department, either because IT faced other priorities but often simply because procurement was considered an unglamorous or otherwise unrewarding problem to address; (v) Negative attitudes to procurement among senior managers, who were more likely to regard it as an overhead than as a strategic function; and (vi) The perception that automating procurement would prove more difficult than automating many other business processes.

Byline research named the following barriers to e-procurement: (i). Operational management culture; (ii) Supply-base culture; (iii) Senior management culture; (iv) Lack of appropriate offerings; and (v) Lack of technical knowledge. Aberdeen¹ has identified the following barriers to e-Procurement adoption and success: **High cost:** Early e-Procurement systems cost about \$1 million, on average, to implement, including license, implementation, and first-year maintenance fees paid to the independent software vendor (ISV). Systems integrator fees range from 100% to 400% of the license fee; **Long implementation cycles:** e-Procurement deployments take between 9 months and 13 months to complete, on average; **Costly delivery model:** Early e-Procurement systems were premise-based applications that required significant resources to implement and maintain; **Poor supplier enablement:** A key hurdle to e-Procurement success has been the inability of organizations to effectively aggregate and manage supplier catalog content; and **Limited fulfillment support:** Most e-Procurement solutions have focused on automating the front-end procure-to-order cycles, providing little, if any, support for critical back-end processes such as supplier management, sourcing, order fulfillment, and financial settlement. A summary of the barriers appears below identified by David C. Wyld²: Inadequate Technological Infrastructure; (ii) Lack of Skilled Personnel; (iii) Inadequate Tech Infrastructure of partners; (iv) Lack of Integration with Business Partners; (v) Implementation Costs; (vi) Company Culture; (vii) Inadequate Business Processes to support e-Procurement; (viii) Regulatory and Legal Controls; (ix) Security; (x) Co-operation of Business Partners; (xi) Inadequate e-procurement Solutions; and (xii) Upper Management Support.

Giunipero and Sawchuk³ asserted that though much progress has been made, significant challenges to successful e-procurement implementation remain. Specifically:

Supplier Capacity - In the early days of e-procurement, buying enterprises and solution providers underestimated the time, effort, and resources required to enable suppliers to transact business electronically. Leading enterprises typically use a combination of supplier- enablement approaches. Though tremendous progress has been made in supplier enablement, all involved parties – end users, suppliers, and solution providers – continue to work to make enablement as simple and cost effective as possible;

User adoption - Individual end users and entire business units will naturally resist any change in business processes that takes away buying power and buying flexibility. Over the past few years, user adoption has increased at essentially the same pace as the increase in suppliers enabled. With more products and suppliers on the e-procurement system, users have less reason to try to circumvent the system. Still, end users report that several factors continue to hold back user adoption, including inadequate representation of spending categories within the system, inconsistent purchase requirements, procedures, and supply bases by site or region, and a lack of executive mandates or policies to drive adoption and system compliance. Best Practice enterprises have worked on user adoption for years, and many supply executives at these enterprises have become leading “sellers” of the e-procurement system to end users;

Budget and policy support – According to the findings of the Aberdeen’s e-procurement benchmark research⁴, more than half of research respondents reported that securing budget/policy support for their e-procurement initiative was a challenge that delayed or muted the benefits of e-procurement. However, even supply executives at Best Practice enterprises would like to see more investment and support of their e-

¹ Aberdeen Group, Best Practices in e-Procurement. Aberdeen Group, (Boston, 2002), 65

² David C. Wyld, The Electric Company: How the Supply Chain is being reinvented Through the Rapid Application of e-Procurement Processes in the Business-to-Business Arena, Management Research News, Volume 25-November 2002: 22, 53.

³ L.C. Giunipero and C. Sawchuk, e-Purchasing Plus: Changing the Way Corporations Buy. Goshen (NY): JGC Enterprises, 2000), 134

⁴ Aberdeen Group, “e-Procurement: Finally Ready for Prime Time”, *Market View Point, Volume 14*, (2001). (http://www.expensewatch.com/IPLS/pdfs/prime_time.pdf) Accessed on 1 September 2002.2, 2002., IFS Central and Eastern Europe, Systems Integration 2002. pp.151, 166

procurement systems;

Information Communication Technology (ICT) support - B2B transactional exchange requires the ability to support many different communication protocols, various security mechanisms, and document standards in use by different suppliers. It also requires the establishment and ongoing management of different connections to each supplier. In order to provide assurance of delivery, the solution must automatically identify when an electronic transaction has not been received and provide comprehensive and reliable retry and notification capability. A complete solution must also address the problem of trading electronically with suppliers with widely varying levels of technology. Some suppliers will have advanced e-business technology and knowledge and some may simply have access to a web browser or email; and **Security** - The final consideration for organization's intending to implement a B2B transactional exchange capability is to ensure the solution delivers robust security for all parties involved in the exchange.

2.10 Best practices of e-procurement in the private sector

Despite the potentials promised by the vendors of such systems, e-procurement got off to a slow start. A study by Archer and Yuan shows that only 18 percent of the Swiss companies analyzed used electronic product catalogs, auctions or requests for quotations in procurement in the year 2000¹. According to this study, however, many companies were planning to implement e-procurement systems at that time. Other studies show similar proportions for other countries (e.g. Industrial Distribution, 2001 and Administration, 2000 for the USA). A study by Wyld reports that currently almost half of all American companies use e-procurement systems². Although the adoption of e-procurement has rapidly increased in recent years, companies face different challenges associated with the advent and use of e-procurement. One is that most companies only apply single e-procurement functions.

The analysis by Wyld shows that in the US only 30% of the companies surveyed use e-procurement systems for requests for quotations, online auctions (25%) or eMarkets (33%). A second challenge is that, despite the overwhelming evidence which shows the advantages of e-procurement systems, proprietary systems such as electronic data interchange (EDI) continue to persist, and have to be included in a company's overall e-procurement infrastructure. To do so, companies need to know the critical success factors in implementing e-procurement strategies, processes and systems. From an academic perspective, some initial contributions to success factor research exist. In the rush to be perceived as industry leaders who have gone 'e', many companies did what is known in the US as 'paving the cow paths'. As noted here, the prevailing 'digital age' wisdom placed implementing new technology at the centre of the initiative. As a result, many companies ended up automating obsolete or inefficient processes, becoming more efficient at doing things right but not doing the right things.

According to a study conducted jointly by McKinsey and Company and Arizona State University (both US firms) and published in February 2002, 'best practices' in purchasing and supply management involve: a focus on the total cost of ownership (TCO), not incremental price reductions; a focus on continuous improvement; a fact-based understanding of suppliers and supply base; a focus on strategic rather than tactical; top-shelf talent who are respected members of cross-functional teams; developing a world-class supplier network, utilizing value-added partnerships as appropriate; and strategically applying the latest technology tools to improve its knowledge base, application of TCO and enhanced supplier integration³.

2.11 Procurement in the public sector

Giunipero and Sawchuk⁴ assert that procurement has an effect on competitive position of the public sector. For example the public sector cannot be competitive unless it can deliver end products or services to its citizens when they are wanted of the quality desired and at a fee the citizens feel is fair. If the procurement function does not do its job, the public sector will not have the required materials when needed and at a price, which keep end product costs under control. Historically, the performance of many procurement managers and their organizations was measured and evaluated on changes in the purchase price of materials, their ability to keep the production line running, and the cost of their departments operation. Today, many world-class organizations expect their purchasing and supplies management to focus on value-adding outputs of pro-active procurement on the following areas:-Quality-the quality of purchased materials and services should be virtually defect-free; cost-the purchasing and supply management function must focus on strategic cost management, the process of reducing the total cost of acquiring, moving, holding, converting and supporting products containing purchased

¹ N. Archer and Y. Yuan Managing business-to-business relationships throughout the e-commerce procurement lifecycle. Internet Research: Electronic Networking Applications and Policy, 10(5), 2000: 385.

² David C. Wyld, The Electric Company: How the Supply Chain is being reinvented Through the Rapid Application of e-Procurement Processes in the Business-to-Business Arena. Management Research News, Volume 25-November 2002: 22, 53.

³ R.G. Allen, Best Practices e-Procurement, London: e-procurement Solutions, EDS, 2002, 4

⁴ L.C. Giunipero and C. Sawchuk, e-Purchasing Plus: Changing the Way Corporations Buy. JGC Enterprises, (Goshen (NY), 2000), 112

materials and services throughout the supply chain; time -purchasing and supply management must play active role in reducing the time required to acquire goods; technology-to ensure that the firms supply base provides appropriate technology in timely manner; continuity of supply-the purchasing and supply chain management must monitor supply trends, develop appropriate supplier alliance and take action so as to reduce the risk of supply disruptions¹.

The World Bank, the African Development Bank (ADB) and ITC, in conjunction with the Government of Kenya, initiated the public procurement reform process in the late 1990s. This reform process was meant to create a system that allowed, among other things, a proper delegation of authority, incentives, procurement thresholds, planning, and the development of supplies manuals². The reform process focused on addressing the issue of procurement laws, establishing appropriate procurement institutions and entities, as well as creating adequate and timely evaluation and monitoring mechanisms. The reforms would also increase transparency in procurement systems and create reputable agencies. The public procurement reforms also aimed at ensuring that the procurement laws were streamlined to conform to international procurement laws and standards.

The purchasing of goods and services in the public sector is central because it supports all functions of government; each governmental unit needs supplies and equipment to accomplish its mission³. As emphasized by Thai and Grimm, one of the most important challenges in government procurement is how to best utilize information technology in an age of communications revolution. Numerous researchers have discussed this challenge under the label "e-procurement." Rajkumar⁴ Pinpoints the managerial challenges by listing critical success factors of e-procurement implementation. These include the definition of an e-procurement strategy, re engineering of procurement processes and management of expectations. Re-engineering of processes in the public sector is in itself a very demanding process⁵ which, at times, tampers with the enthusiasm for implementing e-procurement.

In a public sector context, e-Procurement is a collective term for a range of different technologies that can be used to automate the internal and external processes associated with the sourcing and ordering process of goods and services. Across the European Union e-Procurement is very much at an evolutionary stage. However, despite the variations in the adoption of e-Procurement across member states, the trend towards its acceptance is strong, with the majority of national governments developing strategies to expedite the implementation of e-Procurement projects. This diversity of government implementations reflects the variety of commercially available technologies, business models, and product coding (classification) schemes⁶.

2.12 The future of e-procurement

According to Aberdeen Group⁷, users report they want improvements in future e-Procurement system released in the following six ways: (i) Streamlined catalog management process; (ii) Enhanced interfaces with internal systems; (iii) Provided automation for T&E; (iv) Supported electronic invoicing and payment processing; (v) Improved reporting functionality; and (vi) Improved/streamlined user training.

The enhanced interfaces to internal systems and improved reporting functionality will be critical to fully realize procurement process savings and to measure the effectiveness of procurement as it becomes more strategic. In addition, the improvements in electronic invoicing and payment processing capabilities will be key to help realize the promise of e-Procurement as the first end-to-end e-Business success story. Aberdeen believes organizations will have to do additional business process re-engineering to change procurement habits as e-Procurement automation is adopted. Employees will no longer have free reign at the local office supply store to buy favorite supplies, and procurement personnel will not be just clerical data processors, but strategic players in business processes and relationships.

Some of the key factors dictating the need for organizational change in the procurement area are outlined below: (i) The need for leadership in delivering the e-Procurement Vision; (ii) The introduction of new procurement-related skills at all levels in the public sector; (iii) The introduction and promotion of new procurement practices in line with international best practice; (iv) The exploitation of modern electronic procurement techniques and systems; (v) The introduction of a new framework for the management of procurement, based on the concepts of portfolio and category management; (vi) The provision of leadership and

¹ Government of Kenya, "Economic Surveys", Nairobi: Government Printers, 2001 9-11

² World Bank, "Standard Bidding Documents: Procurement of Works", *World Bank*, (2001), 43

³ K.V. Thai and R. Grimm, "Government Procurement: Past and Current Developments," *Journal of Public Budgeting, Accounting & Financial Management*, 12:2,2000: 234.

⁴ T.M. Rajkumar, "E-procurement: Business and technical issues." *Information Systems Management*, 18:4, 2001: 52-62.

⁵ K. Vaidya, S.M. Sajeew and G. Callender, "Critical Factors that Influence e-Procurement Implementation Success in the Public Sector." *Journal of Public Procurement* 6(1/2), 2006: 70, 78, 99.

⁶ NECCC E-Procurement Work Group, (2002). e-Procurement: Failure to Implement, Not an Option! (<http://www.ec3.org/Downloads/2002/eProcurement.pdf>).

⁷ Aberdeen Group, Best Practices in e-Procurement. Aberdeen Group, Boston, 2002, 11-15

co-ordination in promoting co-operation and combined procurement between agencies within and across sectors; (vii) The development and management of procurement standards; (viii) The promotion of consistency in procurement policies, practices, documentation and systems across agencies and sectors; and (ix) The proactive management and measurement of procurement performance.

Therefore, fundamentally new public sector-wide procurement organizational arrangements are required. Any new arrangements established should be designed to: (i) Have regard for existing structures where procurement competencies and experience are already in place; (ii) Avoid duplication of investment in resources and systems; (iii) Facilitate communication and knowledge sharing across sectors and agencies; (iv) Elevate procurement in the overall list of priorities for public sector management; (v) Facilitate co-operation in procurement at all levels in the public sector to optimize national economic benefit; (vi) Recognize the autonomy of agencies by promoting and facilitating rather than mandating their co-operation; and (vii) The organization change recommendations focus on a number of key areas. These are:

Organizational Structures: defining the organization structures that are required to match skills and resources to the key tasks required to successfully deliver e-Procurement across the public sector;

Integration Mechanisms: setting out the key integrating mechanisms required to ensure that the revised structure operates effectively;

Resource Levels: recommending appropriate resourcing complements for key structures;

Key Capabilities and Skills Development: defining the key capabilities that need to be in place to effectively deliver the procurement practices recommended elsewhere in this report and how to develop them; and

Change Management Activities: setting out the key change management activities that will need to be considered and addressed during the implementation of the new strategy.

The review of literature carried out in the course of this study showed that, fundamental changes are required in the public sector procurement environment if the benefits which e-Procurement can undoubtedly bring are to be achieved. The key changes that are required to achieve the objectives of the study include the following:- The establishment of a new framework for the management of public procurement, based on international best practices; The establishment of appropriate organization structures with the necessary resources and skills to drive the implementation of new initiatives; and the introduction of effective and innovative procurement practices facilitated by electronic procurement techniques.

2.13 Conceptual Framework

The effective implementation of e-procurement in public organizations is dependent of the following factors:

Independent Variables

Dependent Variable

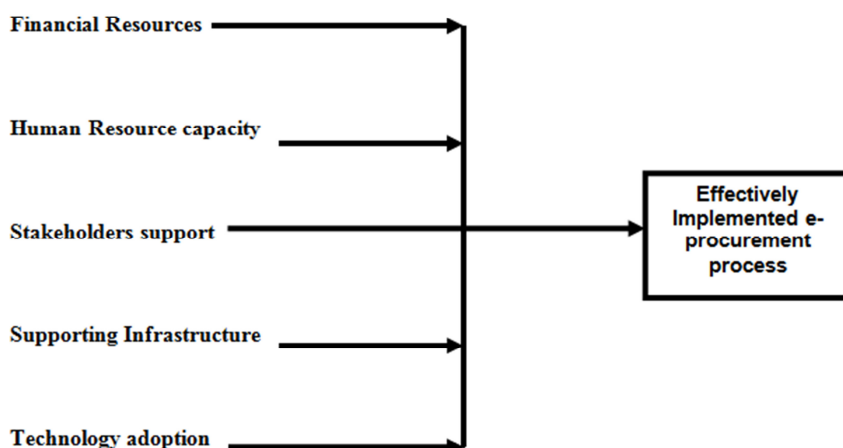


Figure 2.1: Conceptual framework.

Availability of financial resources: According to PriceWaterHouseCoopers, the high cost of technology is indeed a barrier to adoption of e-procurement¹. Effectiveness of the e-procurement system is dependent on availability of financial resources in order to meet such technological costs as software and hardware. Other costs include the payments for the various services offered by suppliers and maintenance of the

¹ Price Waterhouse Coopers (PWC), Electronic Business Outlook: e-Markets Realism, not Pessimism. Price Waterhouse Coopers, Retrieved May 15th, 2002, from <http://pwcglobal.com/ebusinessinsights>.

same.

Human resource capacity: Lack of e-procurement knowledge as reported by the Aberdeen Group, is a major barrier to adoption of e-procurement¹. There is thus need to build capacity of the staff in the e-procurement area.

Support from all stakeholders: In order for e-procurement adoption to be effective, the support of all stakeholders is a prerequisite. These include the top executives of the organization, the rest of the employees and the suppliers. According to PriceWaterHouseCoppers, lack of business relationship with suppliers is a barrier to adoption of e-procurement. David Wyld further argued that upper management support was required if an e-procurement system is to succeed².

Availability of supporting infrastructure and facilities: Effectiveness of an e-procurement system is dependent on availability of infrastructure to support the process. These include computers and servers. According to David Wyld, adoption of e-procurement is hampered by inadequate technical infrastructure of partners³.

Technology adoption: Lack of technical expertise, according to PriceWaterHouseCoopers, is a barrier to adoption of e-procurement. Indeed technology keeps on changing and those implementing e-procurement have to continuously undergo relevant training in order to keep up with the pace. In addition, there is need for conformity between the technologies of the user and supplier organizations.

2.13 Summary and conclusions

Public procurement has undoubtedly become increasingly important issue in economic and business circles globally. This is evidenced by the growing interest of donors, governments, civil society, professional organizations, the private sector and the general public on matters of public procurement. After decades of messy public procurement systems in the East African region, the three governments are now reforming the legal, organizational and institutional frameworks of public procurement.

The review of the institutional framework and procedures in public procurement has yielded a number of important conclusions⁴. These are: The country has recognized the need to put in place clear laws and regulations to govern public procurement. Such laws and regulations have already been passed by Parliament; and the procurement activities are fairly decentralized with the procurement entities carrying out most of the procurement. The apex organization, namely the Directorate of Public Procurement in Kenya, is largely the regulatory organ to oversee public procurement activities; To enhance transparency and accountability, the institutional framework in Kenya is such that power is devolved to different procurement organs and seldom to individuals to avoid discretion; and The proposed and existing institutional frameworks in Kenya largely reflect an attempt to put in place a fair and competitive public procurement system. However, there are problems specific to the system.

3.0 METHODOLOGY

3.1 Introduction

This chapter aimed at defining the research design and methodology used in the study. It contains a description of the study design, target population, sample design and size, data collection instruments and procedure.

3.2 Research design

A Cross sectional survey was undertaken due to the fact that we intended to describe the area of research and explain the collected data in order to investigate the differences and similarities with our frame of reference within a given period of time. This method was preferred as it permits gathering of data from the respondents in natural settings resulting in a description of the data, whether in words, pictures, charts, or tables.

3.3 Population of the study

The focus of the study was all Government ministries totaling to 31 as at December 2011. The study respondents were heads of Procurement Units from the selected ministries, who are also the secretaries of the Ministerial Tender Committees in the respective ministries.

¹ Aberdeen Group, Best Practices in e-Procurement. Aberdeen Group, (Boston, 2002), 65

² David C. Wyld, The Electric Company: How the Supply Chain is being reinvented Through the Rapid Application of e-Procurement Processes in the Business-to-Business Arena. Management Research News, Volume 25-November 2002: 22, 53.

³ David C. Wyld, The Electric Company: How the Supply Chain is being reinvented Through the Rapid Application of e-Procurement Processes in the Business-to-Business Arena. Management Research News, Volume 25-November 2002: 22, 53.

⁴ World Bank, Standard Bidding Documents: Procurement of Works: New York, World Bank, 2001, 14-18

3.4 Sampling frame

The sampling frame is the list of ministries presented in table 3.1 below

3.5 Sample design

It would have been desirable to use a census of the whole population of the government ministries, but owing to such limitations as the distances to be covered to each ministry, which are spread in the City Centre and the costs that would be involved in covering them and the given time frame among other reasons, a representative sample of 16 ministries, representing about 51.6% of the whole population were selected at random, which is within the limits of the generally accepted statistical condition. A two-stage stratified random sampling technique was employed to select the ministries for the study. According to Coleman and Briggs¹ stratified sampling is used where there might be a reason to judge that some particular characteristic of the sample members is of such importance that it is necessary to impose further control over how it is distributed or represented in the sample. The following procedure was followed:- A comprehensive list of all the 31 ministries was drawn (See sampling frame). The list was then divided into four strata based on their classification. The ministries are classified as follows:- support, service, infrastructure and production. Out of the various strata, a sample of 50% was picked using the random numbers table, giving each one of them was given a number unique to itself. The researcher then picked the numbers at random and counted up to 16. This procedure was considered effective as each ministry had a non zero chance of being included in the study. Table 3.2 below presents the sample size.

Table 3.2: Sample size

Strata (Category of ministry)	Population (Number of ministries)	Sample size (51.6% of population)
Support	9	5
Service	11	6
Infrastructure	3	1
Production	8	4
Total	31	16

3.6 Data collection

Desk study was undertaken, in which a review of the relevant literature was carried out. Information pertaining to e-procurement was critically reviewed. The sources of information included various websites, books, magazines, Journals and available reports from the various government ministries. The desk study enabled this research to be grounded in the current literature relating to public e-procurement system in Kenya. This development ensured that the research did not duplicate other studies, and instead made a significant contribution towards the subject of study.

Primary data was collected from the various ministries with the aid of a semi-structured undisguised questionnaire with both open ended and closed questions. The closed questions had a five point likert scale, along which the respondents were required to rank given factors. The respondents filled in the questionnaires without guidance from the researcher. A research assistant was hired by the researcher to administer the questionnaires to the respondents. Hand delivery method was used to administer the questionnaires to the sampled procurement officers, all who are conveniently located at the various ministries' Headquarters in Nairobi. A letter of introduction and questionnaire was enclosed in an envelope to be delivered to the respondents. In addition, the researcher made telephone calls to the respective respondents to further explain the purpose of the study and set a time frame for the completion of the questionnaires. The questionnaire was pre-tested on ten randomly selected respondents to enhance effectiveness and hence data validity. Personal interviews were conducted with 10 of the respondents selected at random, aided by an interview schedule. In this case the researcher was able to obtain additional information to corroborate findings from the questionnaire.

3.7 Data analysis and presentation

For purposes of the current study, the data was analyzed by employing descriptive statistics such as percentages, frequencies and tables. Statistical Package for Social Sciences (SPSS) was used as an aid in the analysis. The researcher prefers SPSS because of its ability to cover a wide range of the most common statistical and graphical data analysis. Computation of frequencies in tables, charts and bar graphs were used in data presentation. In addition, the researcher used standard deviations and mean scores to present information pertaining to the study objectives. The information was presented and discussed as per the objectives and research questions of the study.

¹ M. Coleman and R.J. Briggs Anne, Research Methods in Educational Leadership and Management. London: Paul Chapman Publishing, 2002, 100

4.0 FINDINGS AND DISCUSSIONS

4.1 Introduction

This chapter deals with data analysis, presentation and interpretation. The data used was obtained from the questionnaires distributed to Heads of procurement of the 16 sampled Government ministries. The main objective of this study was to establish the challenges facing the implementation of e-procurement in the public sector in Kenya. The main types of statistics used to achieve this objective were mainly descriptive statistics such as measures of central tendencies, frequency distributions, percentages and charts. All the 16 questionnaires sent out were returned completed (100% response rate). The high response rate could be attributed to the researcher's good relationship with the respondents, who made a follow up of every questionnaire sent out. The information is presented and discussed as per the objectives and research questions of the study.

4.2 Implementation of e-Procurement in Government Ministries in Kenya

4.2.1 Drivers for e-procurement adoption in the Government of Kenya ministries

In order to meet the first objective of the study, "to examine the drivers of e-procurement in the Government of Kenya ministries" the respondents were asked to indicate the extent to which a set of listed factors had influenced the success of e-procurement implementation in their respective ministries by ranking the factors on a five point likert scale. The responses are summarized and presented in table 4.1 below.

Table 4.1: Drivers for e-procurement adoption in the Government of Kenya ministries

Drivers for E-Procurement	Response	Not at all	Neutral	Somehow	Much	Very much	Mean score	Standard deviation
Technological drivers								
Secure transactions	Frequency	-	-	-	8	8	2.191	4.382
	Percentage	-	-	-	50	50		
Integration of web site to all business processes	Frequency	-	-	11	-	5	2.434	4.868
	Percentage	-	-	69	-	31		
Adequate resources and appropriate supporting ICT infrastructure	Frequency	-	5	3	5	3	1.025	2.050
	Percentage	-	31	19	31	19		
Managerial drivers								
Effective leadership supported by appropriate human resource capacity	Frequency	-	-	8	8	-	2.191	4.382
	Percentage	-	-	50	50	-		
Forming alliances – with suppliers, technology providers, customers	Frequency	-	3	5	5	3	1.025	2.050
	Percentage	-	19	31	31	19		
Appropriate organizational structure	Frequency	-	3	5	5	3	1.025	2.050
	Percentage	-	19	31	31	19		
Stakeholders' support	Frequency	3	-	5	5	3	1.025	2.050
	Percentage	19	-	31	31	19		
N = 16								

Summary of findings related to technological drivers for E-Procurement

Secure transaction: Security of transactions was considered a key driver for e-procurement in the public sector in Kenya.

Integration of web site to all business processes: The factor was considered a key driving force towards effective implementation of e-procurement process in the public sector in Kenya, since all respondents were in agreement, though to a varying degree.

Adequate resources and appropriate supporting ICT infrastructure: The responses depict that 69% of respondents hold the view that the factor is key to successful implementation of e-procurement in the public sector.

Summary of findings related to managerial drivers for E-Procurement

Effective leadership supported by appropriate human resource capacity: It can be concluded that though to a varying degree, all the respondents were in agreement that the factor was important in as far as effectiveness in implementation of e-procurement is concerned.

Forming alliances – with suppliers, technology providers, customers: The factor was considered favorably by 81% of the respondents. It can therefore, be concluded that this factor is imperative in the implementation of e-procurement.

Appropriate organizational structure: The factor was considered favorably by 81% of the respondents. An appropriate organizational structure is therefore, an important ingredient for effective implementation of e-procurement.

Stakeholders' support: The factor was considered favorable by 81% of the respondents and hence critical for

effective implementation of e-procurement. In view of the findings in table 4.1 above, it can be concluded that the drivers for adoption of E-procurement in the Government ministries in Kenya include:

Technological drivers: Secure transactions; Integration of web site to all business processes; adequate resources as well as appropriate supporting ICT infrastructure

Managerial success factors: Effective leadership supported by appropriate human resource capacity; forming alliances – with suppliers, technology providers, customers; appropriate organizational structure; and Stakeholders support.

Drawing from the mean scores, a summary of the ranking of the listed drivers for E-procurement process in terms of extent to which they enhance effectiveness is, the findings indicate that the following drivers were the strongest: - Stakeholders support; Appropriate organizational structure; Forming alliances – with suppliers, technology providers, customers; and Adequate resources and appropriate supporting ICT infrastructure, with a mean score of 1.025.

Next in line in terms of strength were the drivers: - Effective project implementation leadership supported by appropriate human resource capacity; and secure transactions, with a mean score of 2.191. Integration of web site to all business processes as a driver of an effective e-procurement process was ranked last with a mean score of 2.434.

4.2.2 Benefits of adoption of e-procurement in the public sector in Kenya

In order to meet the second objective of the study, “to evaluate the benefits accruing from the adoption of e-procurement in the Government ministries in Kenya” the respondents were provided with a list of possible benefits of e-procurement and asked to indicate the extent to which they agreed that their respective ministries regarded them as benefits. The responses are summarized and presented in table 4.2 below.

Table 4.2: Benefits of adoption of e-procurement in Government ministries in Kenya

Benefits of adoption of E-procurement	Response	Strongly disagree	Disagree	Somehow disagree	Agree	Strongly agree	Mean score	Standard deviation
Faster and efficient procurement processes (Faster transactions)	Frequency	-	13	3	-	-	2.815	5.630
	Percentage	-	-	19	50	31		
Increased strategic sourcing (Procurement department more focused on strategic tasks only)	Frequency	-	-	3	10	3	2.044	4.087
	Percentage	-	-	19	62	19		
Reduced operational and inventory costs	Frequency	-	-	-	-	-	2.815	5.630
	Percentage	-	-	19	50	31		
Improved relationship between buyer and seller	Frequency	-	-	-	-	-	1.711	3.421
	Percentage	-	-	62	19	19		
Improved integrity of the process (Less corruption)	Frequency	-	-	-	-	-	1.711	3.421
	Percentage	-	-	31	50	19		
Increased Market transparency (Integrity)	Frequency	-	-	-	-	-	2.302	4.604
	Percentage	-	-	-	-	-		
Price reduction	Frequency	3	10	3	-	-	2.044	4.087
	Percentage	19	62	19	-	-		
Shortened procurement cycle times	Frequency	5	8	3	-	-	1.711	3.421
	Percentage	31	50	19	-	-		
Reduced transactional and administration costs	Frequency	5	8	3	-	-	1.711	3.421
	Percentage	31	50	19	-	-		
	Percentage	-	-	-	-	-		
N = 16								

Summary of findings related to the benefits of adoption of e-procurement in Government ministries in Kenya
Faster and efficient procurement processes (Faster transactions): In conclusion therefore, it can be concluded that adoption of e-procurement makes the procurement process be achieved faster.

Increased strategic sourcing (Procurement department more focused on strategic tasks only): It can be concluded that e-procurement departments to concentrate on strategic issues.

Improved relationship between buyer and seller: It can be concluded that implementation of e-procurement shall lead to improved relationship between buyer and seller.

Improved integrity of the process (Less corruption): It can be concluded that implementation of e-procurement reduces malpractices in the procurement process.

Increased Market Transparency: It can be concluded from the findings that e-procurement enhances market transparency.

Price Reduction: Implementation of e-procurement, therefore, leads to overall price reduction.

Shortened procurement cycle as a benefit of e-procurement: From the findings of the study, it can be inferred that implementation of e-procurement shall shorten the procurement cycle.

Reduced transactional and administration costs: It can be concluded that 81% of the respondents were in agreement that implementation of e-procurement shall reduce transactional and administration costs.

It can be concluded from the findings of the study that the following are the benefits of adoption of e-procurement, the extent to which the benefits were derived varies:- Faster and efficient procurement processes (Faster transactions) ; Increased strategic sourcing (Procurement department more focused on strategic tasks only); Reduced operational costs; Improved integrity of the process (Less corruption); Increased Market transparency; Overall price reduction; Shortened procurement cycle times; Reduced transactional and administration costs; and Improved relationship between buyer and seller.

The findings also indicate that the following were regarded as being the key benefits derived from e-procurement: Reduced operational costs; improved integrity of the process; Shortened procurement cycle times; and reduced transactional and administration costs, with a mean score of 1.711.

In terms of ranking, the following benefits came second: Reduced operational and inventory costs; Improved visibility of customer demand and supply chain; Price reduction; and Increased strategic sourcing, with a mean score of 2.044. Ranked third was the benefit, Increased Market Transparency, with a mean score of 2.302. The benefit that was ranked the least was faster and efficient procurement processes, with a mean score of 2.815.

4.2.3 Constraints to effective implementation of e-procurement in the selected Government ministries in Kenya

In order to meet the third objective of the study, “to assess the constraints to effective implementation of e-procurement in the Government ministries in Kenya”, the researcher listed possible challenges to implementation of an e-procurement system and asked the respondents to rate them along a five point scale in terms of the extent to which their respective ministries had been negatively affected by each of the factors. The responses are summarized and presented in table 4.3 below.

Table 4.3: Constraints to effective implementation of e-procurement in the selected Government ministries in Kenya

Constraints to effective implementation of e-procurement	Response	Not at all	Neutral	Somehow	Much	Very much
Technological constraints						
Security of information	Frequency					
	Percentage	0	19	0	50	31
Technological costs	Frequency					
	Percentage	0	0	50	0	50
Availability of infrastructure to support the technology	Frequency	-	-	3	10	3
	Percentage	-	-	50	31	19
Supplier’s technological capacity	Frequency	-	-	5	3	8
	Percentage	-	-	31	19	50
Ease with which users adapt to the emerging technologies	Frequency	-	3	3	5	5
	Percentage	-	19	19	31	31
N = 16						

Summary of findings related to technological constraints to effective implementation of e-procurement in the selected Government ministries in Kenya

Security of information: This indicates that 81% of the respondents regarded security of information as being a challenge to effective implementation of e-procurement.

Technological costs: All the respondents indicated that indeed technological costs e.g. software were a challenge to effective implementation of e-procurement in the public sector, 50% indicating “somehow” and 50%

indicating “very much.”

Availability of infrastructure to support the technology: In terms of availability of infrastructure to support the technology, all the respondents indicated that it posed a challenge to effective implementation of e-procurement, with 50% indicating “somehow” 31% indicating “much” and 19% indicating “very much”.

Supplier’s technological capacity: All the respondents indicated that suppliers’ technological capacity posed a challenge to effective implementation of e-procurement in the public sector, with 31% indicating “somehow”, 19% indicating “much” and 50% indicating “very much”.

Ease with which users adapt to the emerging technologies: With respect to ease with which users can adapt to the emerging technologies, the respondents had diverse opinions. While 19% remained neutral, 19% indicated “somehow”, 31% indicated “much” while the other 31% indicated “very much” It can be concluded that adaptability of emerging technology by users is indeed a challenge.

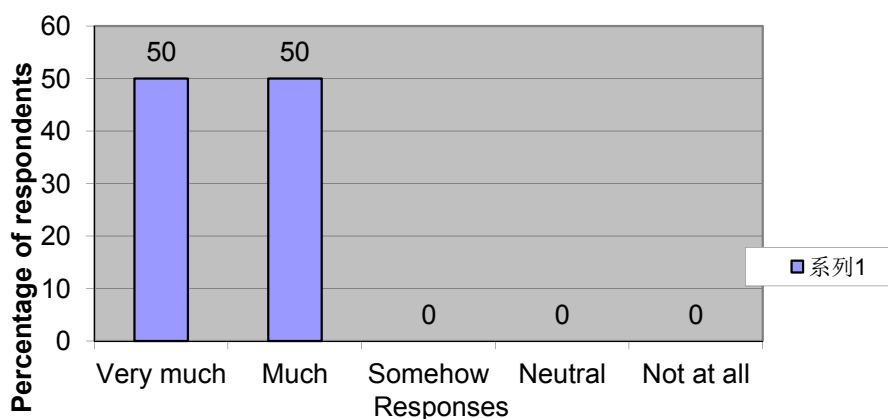
Summary of findings related to resource constraints to effective implementation of e-procurement in the selected Government ministries in Kenya

Resource challenges

In terms of budgetary support, all the respondents indicated that it was a challenge to implementation of e-procurement, with 62% indicating “much” and 38% indicating “very much”. Budgetary allocation is there fore a challenge to e-procurement implementation.

With regards to Human Resource capacity as a challenge to implementation of e-procurement in the public sector, all the respondents agreed, with 19% indicating “somehow”, 62% indicating “much” and 19% indicating “very much”. It is conclusive from the findings that human resource capacity is indeed a challenge.

Chart 4.6: Government policy



All the 16 respondents were of the view that Government Policy on ICT was a challenge to implementation of e-procurement in the Kenyan public sector, with 50% indicating “much” and the other 50% indicating “very much”.

All the respondents indicated that the legal framework governing ICT in Kenya is indeed a challenge to implementation of e-procurement in the public sector, with 81% indicating “much” while 19% indicated “very much”.

With regards to the support of the top executives of the ministries, 19% of the respondents somehow agreed that it was a challenge, 31% indicated “much” while 50% indicated “very much”. The findings show that backing of top executives of the ministries is indeed as indicated by all the respondents.

It can thus be concluded that in as far as the respondents are concerned, the most serious challenges identified are: - budgetary support; the legal framework governing ICT in Kenya; and Government Policy on ICT. The other challenges are: - Human Resource capacity; required support; and Backing of the top executives of the ministries. The findings are summarized and presented in table 4.4 below.

Table 4.23: The challenges of implementing e-procurement

Challenges of implementing e-procurement	Mean score	Standard deviation
<i>Technological challenges</i>		
Security of information	1.711	3.421
Technological costs e.g. software	2.191	4.382
Availability of infrastructure to support the technology	2.161	4.321
Suppliers' technological capacity	2.161	4.321
Ease with which users can adapt to the emerging technologies	1.025	2.049
<i>Resource challenges</i>		
Budgetary support	2.302	4.604
Human Resource capacity	2.044	4.087
Government Policy on ICT	2.191	4.382
The legal framework governing ICT	2.815	5.630
Backing of the top executives of the ministries	2.161	4.321
<i>N=16</i>		

The findings of the study as indicated in table 4.19 above indicate that the strongest challenge facing implementation of e-procurement is “the ease with which users can adapt to the emerging technologies, with a mean score of 1.025. The second most serious challenge is the security of information, with a mean score of 1.711. Ranked third was the human resource capacity with a mean score of 2.044. Ranked in the fourth place were the following challenges:- Backing of the top executives of the ministries; Availability of infrastructure to support the technology; and Suppliers technological capacity, with a mean score 2.161.

The legal framework governing ICT was ranked fifth in its strength as a challenge, with a mean score of 2.815. Ranked in the sixth place were the challenges, “Technological costs” and Government policy on ICT. Budgetary support was ranked last.

When asked to indicate the coping mechanisms used by their respective ministries in coping with the challenges affecting e-procurement implementation, they all indicated that the ministry of Finance, through the department of Government Information Technology (GIT), has rolled out the process of e-procurement through provision of both software and hardware and also training of personnel. A programme called IFMIS (Integrated Financial Management Information Systems) has been implemented in a number of ministries. In addition, a state corporation, the Kenya Information and Technology Board has been formed to facilitate the implementation of infrastructural development of the ICT industry as well as e-procurement.

4.3 Discussions of findings

The findings of the study do indicate that the following are the drivers of e-procurement in the Government of Kenya ministries:

The effective implementation of e-procurement in public organizations is dependent on the following factors (1) Availability of financial resources; (2) human resource capacity; (3) Support from all stakeholders; (4) Availability of supporting infrastructure and facilities such as computers, connectivity and servers; and (5) Technology adoption. This is in conformity with the null hypothesis.

The findings of the study further indicate that the following are the benefits of adoption of e-procurement, the extent to which the benefits were derived varies:- Faster and efficient procurement processes (Faster transactions); Increased strategic sourcing (Procurement department more focused on strategic tasks only); Reduced operational costs; Improved integrity of the process (Less corruption); Increased Market transparency (Integrity); Price reduction; Shortened procurement cycle times; Reduced transactional and administration costs; Improved visibility of customer demand and supply chain; and Reduced operational and inventory cost enhanced decision making. The findings above are corroborated by findings from the literature, where Wyld listed the same as being the benefits derived from implementing e-procurement¹.

In as the respondents are concerned, the most serious challenges identified are: - budgetary support; the legal framework governing ICT in Kenya; and Government Policy on ICT. The other challenges are: - Human Resource capacity; required support; and Backing of the top executives of the ministries. A review of literature focusing on major barriers to implementation of e-procurement reveal that Croom listed the challenges above as being some of the challenges to implementation of e-procurement². The findings from the study are

¹ D.C. Wyld, The Weather Report for the Supply Chain: A Longitudinal Analysis of the ISM, 2004. <http://www.ism.ws/ismreport/forrester>, South eastern Louisiana University, Department of Management, Hammond (CA), 2004. 124.

² S.R Croom, The impact of e-business on supply chain management, An empirical study of key developments: International Journal of Operations & Production Management, Vol. 25 No. 1, (2005): 73

organized as four inter-related themes which present implications for the positioning of future research into Information systems - enabled innovations in procurement.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

5.1.1 *Drivers of an effective e-procurement process*

Stakeholders support, Human resource capacity and supporting infrastructure: The findings indicate that the following were among the strongest drivers to an effective e-procurement system: - (i) Stakeholders support; (ii) Forming alliances – with suppliers, technology providers, customers; and Adequate; and (iii) resources and appropriate supporting ICT infrastructure, with a mean score of 1.025. Following closely in terms of strength was the drivers: - Effective project implementation leadership supported by appropriate human resource capacity, with a mean score of 2.191.

Lack of e-procurement knowledge as reported by the Aberdeen Group, is a major barrier to adoption of e-procurement¹. There is thus need to build capacity of the staff in the e-procurement area. Wyld, C.D Identified the following as being the barriers to effective adoption of e-procurement: - (i) Adequate skilled personnel; (ii) Inadequate technological infrastructure; and (iii) upper management support². This corroborates the findings of the study resulting from field data. It therefore confirms that the following null hypotheses hold:-

Null Hypothesis 2: The effective implementation of e-procurement in public organizations is dependent on the human resource capacity

Null Hypothesis 3:- The effective implementation of e-procurement in public organizations is dependent on the support from all stakeholders

Null Hypothesis 4:- The effective implementation of e-procurement in public organizations is dependent on the availability of infrastructure and facilities such as computers, connectivity and servers

Financial resources and technology adoption: According to Giunipero and Sawchuk, though much progress has been made, significant challenges to successful e-procurement implementation remain³. Among the factors the authors listed as being critical to implementation of an effective e-procurement process were user adoption of the technology and budget and policy support. This is supported by Aberdeen research which indicated that more than half of research respondents reported that securing budget/support policy support for their e-procurement initiative was a challenge that delayed or muted the benefits of e-procurement⁴. According to PriceWaterHouseCooper, the high cost of technology is indeed a barrier to adoption of e-procurement⁵. Effectiveness of the e-procurement system is dependent on availability of financial resources in order to meet such technological costs as software and hardware. Other costs include the payments for the various services offered by suppliers and maintenance of the same. Lack of technical expertise, according to PriceWaterHouseCoopers, is a barrier to adoption of e-procurement. Indeed technology keeps on changing and those implementing e-procurement have to continuously undergo relevant training in order to keep up with the pace. In addition, there is need for conformity between the technologies of the user and supplier organizations.

The findings of the study as indicate that the strongest challenge facing implementation of e-procurement is “the ease with which users can adapt to the emerging technologies, with a mean score of 1.025. Though ranked last, the respondents were in agreement that budgetary support was critical for effective implementation of an e-procurement system.

The above findings from field data and arguments from the literature review are in conformity with the following null hypotheses:

Null Hypothesis 1: The effective implementation of e-procurement in public organizations is dependent on the availability of financial resources

Null Hypothesis 5: The effective implementation of e-procurement in public organizations is dependent on technology adoption. The hypotheses are thus positive.

¹ Aberdeen Group, Best Practices in e-Procurement. Aberdeen Group, (Boston, 2002), 65

² David C. Wyld, The Electric Company: How the Supply Chain is being reinvented Through the Rapid Application of e-Procurement Processes in the Business-to-Business Arena, Management Research News, Volume 25-November 2002: 22, 53.

³ L.C. Giunipero and C. Sawchuk, e-Purchasing Plus: Changing the Way Corporations Buy, Goshen (NY): JGC Enterprises, 2000). 134

⁴ Aberdeen Group, “e-Procurement: Finally Ready for Prime Time”, *Market View Point, Volume 14*, (2001). (http://www.expenswatch.com/IPLS/pdfs/prime_time.pdf) Accessed on 1 September 2002.2, 2002., IFS Central and Eastern Europe, Systems Integration 2002. pp.151, 166

⁵ Price Waterhouse Coopers (PWC), Electronic Business Outlook: e-Markets Realism, not Pessimism. Price Waterhouse Coopers, Retrieved May 15th, 2002, from <http://pwcglobal.com/ebusinessinsights>.

5.2 Recommendations of the study

5.2.1 Recommendations for policy and practice

Based on findings of the study, it is expected that the stakeholders, who include government procurement officers will gain a better understanding of the challenges emanating from implementation of the e-procurement system and their effects to service delivery.

Not only e-procurement acts as a new channel of interacting and communicating among the construction players but also changes the way an organization works and practices. Most of the potential legal issues namely liability risks, contract enforceability, security and global trading, arising from e-procurement are not new, rather these challenges are magnified when compared to performing these tasks via the traditional modes. However with proper training and strategic use of the technology, e-procedures can maintain higher security than conventional ones. It requires the users to overcome their human psychological barriers of staying in their comfort zone, and change their existing work practices.

To embrace the technology, the construction players should be aware of and understand the legal issues arising from implementing e-procurement. To tackle these legal issues more effectively, the various strategies – legislation, self-regulation, and technology and information security management should be combined. Each strategy has its pros and cons; therefore organization has to analyze and work out the most suitable and effective instruments to resolve these legal issues. E-procurement users should plan and strategize such that e-procurement can integrate smoothly in their work practices, culture, as well as that of their working partners. The construction domain must change its environment to suit and strive in the new era without encountering these legal pitfalls.

E-procurement involves efforts to change how procurement functions, such as spending and budgets, employing staff, buying goods and services, and managing technological and organizational activity are carried out. It also has the potential to transform the relations between suppliers and customers. However, while e-procurement is a label used globally, inscribed within its design may be a number of different assumptions and requirements relating to for example, technology, objectives, information, staffing and skills and institutional contexts. Therefore, its implementation may not be as simple as taking a design from one context into another one. Further insights are required into how IS enabled procurement innovation strategies are constructed and enacted in context.

5.2.2 Recommended areas of further research

The findings of this study, it is hoped, will contribute to the existing body of knowledge and form basis for future research. The following areas of further research are thus suggested: - (1) Whereas the current study focused on responses from the management of the government procurement system, future studies should focus on responses from the suppliers and user departments; and (2) Future studies should seek to establish the nature, extent and adoption profile of e-procurement within the Government of Kenya ministries.

In addition, future research should adopt a broader definition and investigate inter-organizational aspects of e-procurement. This should also address policy issues (such as the design of enterprise wide policies for e-procurement) and risk management implications. For example, understanding the management of enterprise level risks associated with inter-organizational systems, such as the reliance on third parties to maintain service levels, minimize system disruptions and assure business continuity. Further there are risks associated with the security and availability of procurement information and matters of data protection and privacy. This is especially significant in situations where third party application service providers, who may be located in a different country or jurisdiction with differing applicable laws, are managing the organization's e-procurement data and services.

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APPENDIX I: SAMPLING FRAME

No.	Strata (Ministry)
1	Agriculture
2	Communication & Information
3	Cooperatives and Marketing
4	Defense
5	Education
6	Energy
7	Environment and Natural Resources
8	Finance
9	Foreign Affairs
10	Health
11	Housing and Settlement
12	Justice & Constitutional Affairs
13	Labor
14	Lands
15	Livestock and Fisheries
16	Local Authorities
17	National Planning and Development
18	Office of the President - Internal Security & Provincial Administration
19	Office of the President – Special Programmes
20	Office of the Vice President - Home Affairs
21	Office of the Vice President – National Heritage
22	Office of the Vice President - Youth Affairs
23	Public Service
24	Regional Cooperation
25	Roads and Public Works
26	Science and Technology
27	Sports & Gender, Culture and Social Services
28	Tourism & Wildlife
29	Trade & Industry
30	Transport
31	Water & Irrigation
Total	

Source: GoK, 2011

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