THE CRITICAL SUCCESS FACTORS AND CHALLENGES IN E-PROCUREMENT ADOPTION AMONG LARGE SCALE MANUFACTURING FIRMS IN NAIROBI, KENYA

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Abstract

E-Procurement is more than just a system for making purchases online. Some companies implement e-procurement and succeed while others fail. This study was carried out on the adoption of e-procurement among large scale manufacturers in Nairobi, Kenya. The study had three objectives: To ascertain the extent to which large scale manufacturers in Nairobi have adopted e-procurement; to determine the critical success factors influencing the success of e-procurement in large manufacturing firms in Nairobi and to establish the challenges that face e-procurement adoption in large scale manufacturing firms in Nairobi. The research involved a cross-sectional survey of the large manufacturing companies operating in Kenya. The study adopted a descriptive approach in trying to establish the factors that influence the success of e-procurement projects. A sample size of 46 respondents was selected from a list of 455 large manufacturing companies. Data was collected from the respondents through a questionnaire. The collected data was analyzed using SPSS and presented in tables. The study revealed that majority of the large scale manufacturers in Nairobi, Kenya has adopted e-procurement with the following e-procurement practices: online advertisement of tenders, receiving online submission of proposals for the tenders, and short listing suppliers online among others. The five critical success factors identified were: employees and management commitment to success of adoption; reliability of information technology and supplier performance; monitoring the performance of e-procurement systems;

user acceptance of e-procurement systems and top management support. The challenges established are: resistance to change from employees, lack of e-procurement approval by company board, existence of old IT equipment among the firms that need overhaul and lack of managerial support. The study recommends that large scale manufacturers in Nairobi need to incorporate all the e-procurement activities into the system; they need to find out ways of encouraging employees to make use of e-procurement systems as well as find ways of addressing the factors that are critical to the success of e-procurement. This will enable them to improve adoption of e-procurement.

Introduction

The rise of e-business in the late 1990's led to the development of new opportunities related to procurement: e-procurement, spend management, outsourcing and joint product design (Lancioni, Smith, and Oliva, 2000). The advent of the Internet as a business systems platform has been a catalyst for major changes in the operation and status of organizational procurement. Information Technologies have changed the way organizations and governments operate. As noted by Nelson et.al. (2001), the majority of organizational spending consists of purchasing. In order to decrease the total costs spent on purchasing process, internet technologies are used and e-Procurement has become popular to implement in the latest era by both governments and enterprises. Although the opportunities for improvement seem abound, both private and public sector are still cautious as far as the adoption of electronic technologies is concerned (Zheng, Caldwell, Harland, Powell, Woerndl, and Xu, 2004). Ward and Peppard (2003) indicate that 60% of Information Technology application in procurement initiatives and projects do not deliver the expected benefits.

The use of Information Communication Technologies (ICTs) has dramatically changed services, business models and people's expectations of the quality and efficiency of information sharing and service delivery (Brown, 2005; Maniam, 2005).Development in information and communication technology, especially the Internet helps the application of alliances used by the manufacturers to become more effective through the integration of firm's information technology (IT) infrastructure. One of the information systems that helps revolutionize the supply chain activities is e-procurement.

E-Procurement Adoption

Private and public sector organizations have been utilizing Information Technology (IT) systems to streamline and automate their purchasing and other processes over the past years. It is only in the past decade that e-Procurement systems have attracted attention. While there is debate about how recently e-Procurement has emerged, (Dai & Kauffman, 2001; Koorn, Smith & Mueller, 2001), there is no doubt that the use of the Internet in e-Procurement provides several advantages over earlier inter-organizational tools. For example, Electronic Data Interchange has been providing automated purchasing transactions between buyers and their suppliers since it was launched in the 1960s. Enterprise Resource Planning (ERP) followed in the 1970s, and then came the commercial use of the Internet in 1980s. It was only in the 1990s that the World Wide Web the multimedia capability of the Internet - became widely enabled and provided the essential resource for the automation of procurement (OGC, 2002).

E-Procurement refers to the use of Internet-based (integrated) information and communication technologies (ICTs) to carry out individual or all stages of the procurement process including search, sourcing, negotiation, ordering, receipt, and post-purchase review (Croom& Brandon-Jones, 2004). While there are various forms of e-Procurement that concentrate on one or many stages of the procurement process such as e-Tendering, e-Marketplace, e-Auction/Reverse Auction, and e-Catalogue/Purchasing, e-Procurement can be viewed more broadly as an end-to-end solution that integrates and streamlines many procurement processes throughout the organization. Businesses have realized that time and cost savings can be achieved by having a link with major suppliers through private networks such as electronic data interchange (EDI). The internet has enabled firms to even centralize their procurement and logistics systems that previously conducted in every country they operated.

E-procurement has become one of the most successful applications of electronic commerce (e-commerce), having been implemented by many companies seeking better business processes (Aberdeen Group, 2001). Kalakota and Robinson (2000) have identified benefits in cost saving, improved efficiency, measurement and single data entry; consequently, these are the three catalysts driving growth in the e-procurement area. E-Procurement is the procedure that involves goods procurement automation by use of internet. This process leads to significant reduction in both cost and time. As noted by Quinnox (2012), e-procurement is a very comprehensive phenomenon which includes making strategic initiatives and it can be used in reorganizing the entire purchasing process. A properly

implemented e-Procurement system can connect companies and their business processes directly with suppliers while managing all interactions.

Khanapuri, Nayak, Soni, Sharma and Soni (2011) assert that there are a number of requirements relating to the adoption of e-procurement system. They include technology, objectives, information, staffing and skills. The above mentioned requirements make the adoption process to face a number of challenges such as Compatibility, Integration, Adoption and regular use by employees and lack of capacity by small suppliers.

For any e-procurement initiative to be successful, there are a number of factors that an organization must critically consider. They include: user acceptance of new information system; information quality; trust; risk perception; early supplier involvement; staff training; users and buyers; compliance with best practices; top management support; continuous measurement of the key benefits; re-designing affected business processes and actual selection of e-procurement solution.

User acceptance of new information system has a critical and profound impact on the overall usage and success of the system's adoption (Succi & Walter, 1999; Venkatesh et al., 2003). Al-Ghatani and King (1999) suggested that system usage is an obvious defined measure and better indicator of information technology acceptance. According to Davis (1993), user acceptance is often the pivotal factor determining the success or failure of information system. In similar vein, Pikkarainen, Karjaluoto & Pahnila (2004) contended that user acceptance and usage of a system defines the effectiveness or ineffectiveness of the system. Understanding the factors that influence user acceptance of information technology is undoubtedly of interest to both scholars and researchers in a variety of fields as well as procurers of technology for large organizations (Dillon &Morris, 1996).

Another factor is information quality. Information quality is seen to capture the e-commerce (web) content issue. In the context of e-procurement success, web content should be personalized, complete, relevant, easy to understand, and secure if one expect buyers or suppliers to initiate transactions via the Internet and to return to the site on regular basis. There are three constructs that are posited in this service quality dimension which are trust, perceived risk and perceived ease of use (Davis, 1989). The importance of trust is elevated in e-commerce because of the high degree of uncertainty and risk present in most on-line transactions. The most common definition of trust is by Mayers, Davis & Schoorman, (1995) whereby trust is defined as the willingness of a party to be vulnerable to the actions of another party based on the expectations that the other party will perform a particular action

important to the trustor. This trust is conceptualized in terms of trustor's beliefs in the trustee's (suppliers) ability, benevolence, and integrity as proposed by Mayer et al. (1995).

The level of risk perception is also a major determinant of the success of e-procurement technology. According to Ring and Van de Ven's (1994) classification, risks are both technology-driven, and thus derived from the underlying infrastructure (environmental risks), relational, resulting from the trading partner (behavioral risks). It is iterated that behavioral uncertainty arises because web retailers (suppliers) have the chance to behave in an opportunistic manner by taking advantage of the distant and impersonal nature of e-commerce in this context e-procurement and the buyer's inability to monitor adequately all transactions. It is important for organizations to ensure that all the perceived risks are handled properly to ensure success of the e-procurement project (Mayer et al., 1995). E-Procurement success is closely related to early supplier involvement. It is important to demonstrate the proposed solution to the suppliers and discuss any necessary changes, issues, and concerns such as various options in developing and maintaining supplier catalogues (Birks et al., 2001). Suppliers should be educated on the e-Procurement benefits that can be provided to them through a process of consultation as early as possible in the project. The degree to which the success of an e-Procurement initiative can be realized may well be related to the level of e-readiness of suppliers, and appropriate communication with suppliers is therefore important (AOT, 2003).

Training of staff in procurement practices and the use of e-Procurement tools are critical to the success of an e-Procurement initiative (WB, 2003). The staffs of an organization need to acquire the necessary skills that can enable them to operate effectively and efficiently while using the new e-procurement system. If staff is not adequately trained, they may not be able to own the e-procurement system and this may contribute to failure. The success of e-Procurement initiative depends on users and buyers making use of the new process and system. The solution must attract end users to view e-Procurement as the preferred means by which to purchase goods and services (KPMG, 2001). The success of e-procurement also depends on communication to the users (Birks et al, 2001). The organization adopting an e-procurement system must be able to communicate this information to the users. Distorted communication of information may lead to failure of the system. The World Bank (2003) suggests that developing an e-Procurement system in an open environment allows it to link to other systems for interoperability and simplifies upgrading the system.

Compliance with best practices equally leads to successful e-procurement. E-Procurement initiatives only deliver the planned benefits if the users and buyers make changes to the way they work, which requires championing the system and senior management sponsorship. The business case processes for e-Procurement include identifying drivers, understanding the starting point, benefits, approaches, affordability, risks, and benefit realization. To ensure achievement of the e-Procurement objectives, the adoption project should proceed, as far as possible, in alignment with the business case (Birks et al., 2001).

The executive management team is responsible for setting the vision and goals, bringing about collective commitment for change in process and organizational structures, and formulating the policies and strategies necessary to put an e-Procurement initiative in place (WB, 2003). If the e-procurement system does not have the full support of the top management team, there is every reason for that it to fail. It is important to make sure that the top management has given full support for the adoption of e-procurement. Considerable attention and support should be provided by senior management to ensure that the procurement reform has been well understood in the agency (S & A, 2003).

It is significant for the organization to continuously measure the key benefits since it is vital to the successful delivery of a business project. Measurement drives behavior and is a key to making the change a success (Birks et al., 2001). Establishing goals and baselines is very important. These established goals will enable the organization measure how much has already been achieved as far as e-procurement system adoption is concerned. It is important to define key performance indicators (KPIs) early in the process to enable successful benefits tracking and distil the business case into measurable KPIs.

Cost saving, improved efficiency and control, are the three catalysts driving growth in the e-procurement area. It is also believed that there is more benefit to be gained by using e-commerce for sourcing, rather than for transaction management (Kalakota and Robinson, 2000). It is possible to reduce buying and service costs through product standardization. For example, all computers ordered for staff are in pre-defined configurations only, and from one supplier only, so prices could be negotiated once a year. The volume and value of orders is predictable, so other costs, such as service and warranty costs, are listed and added into the buying price to determine the total cost. Required data related to the buying prices and conditions are in the system, so it is possible to compare suppliers from various countries to determine the cheaper supplier who can provide products for the whole region and for more than just one country. Supplier searching costs are reduced (Piotrowicz and Irani, 2009).

The single point of data entry into the system is an important benefit of e-procurement. Under this system, data does not need to be entered into several systems, but is entered once only. As a result of the system adoption, data exchange with suppliers is improved. Document transfer is faster, and electronic documents eliminate the mistakes of data entry and transmission. Efficiency is also increased; because once the system is implemented there is no need to employ new people, even though the department has to process more orders. All the stakeholders get used to the system after using it for a short time. When there is no e-procurement system in place, the company has to employ additional staff. Analysis of historical data in the system allows the creation of approximations of delivery time from suppliers, based on historical statistical analysis of previous delivery times (Piotrowicz and Irani, 2009).

Using the e-procurement system it is possible to measure and monitor orders and their details such as: processing time, time an order was sent, and current status. As part of the adoption, processes are standardized and improved, and non-value-added activities are removed. After process automation, paper documents are eliminated resulting in faster order approval and document processing. The sales department has access to the same data as the purchasing department. Before the system is implemented purchasing staff has to answer questions from sales people, spending a considerable amount of time on it.   With e-procurement the sales people are able to check all information needed on their computers and can answer questions immediately (Subramaniam and Shaw, 2002).

As organizations evolve toward a more strategic view of e-procurement and adoption broaden in reach and deepen in scope there are increasing challenges associated with integrating different systems and applications efficiently throughout the organization (Mendoza et al. 2006). This leads to the following challenges. Despite the various benefits offered by the use of e-procurement, organizations meet a number of challenges when implementing such systems. Problems with integration to backend systems, which may have incompatible platforms, are a stumbling block to many e-Procurement efforts. Some companies use multiple ERPs, which may not be compatible. Suppliers need to be able to handle different e-Procurement systems customers are using. Ariba, i2, Commerce One, for instance, each have specific formats (Bedell, 2002). Most manufacturing plants are still using decades-old equipment and parts whose documentation is paper-based and lacks the digital format necessary for e-Procurement systems (Moore, 2003). The original suppliers of this equipment often prefer to sell manufacturers new equipment rather than to make the necessary upgrades to digital format. Manufacturers who cannot afford to replace their aging

equipment must forego opportunities to implement e-Procurement. Although advances have been made in search technology to address nomenclature issues, inconsistencies in nomenclature for parts, between companies and even within different departments or sites of the same enterprise, often lead to costly delays and errors (Moore, 2003).

As with any new technology introduced into the workplace, an e-Procurement system's effectiveness depends, ultimately, on its being adopted and regularly used by employees. Since e-Procurement systems are a self-service tool, end users sometimes resist using it (Bedell, 2002). Employees are said to comply with the purchase of contracted items only 65% of the time, causing companies to miss out on the 22% in cost reductions possible through compliance with contract terms (Aberdeen, 2006). Maintenance requires a wider supplier base than other business functions, and an e-Procurement system needs to provide access to a broad supplier base. Many suppliers, especially smaller ones, do not have the technological capability to integrate with e-Procurement platforms. They may lack the IT infrastructure and capital necessary to provide e-Procurement and fear that e-Procurement will enable buyers to leverage price concessions (Singer, 2003).

There are several ways of classifying manufacturing firms in Kenya but this study adopts the Parker and Torres (2007) classification which indicates that manufacturing firms in Kenya can be grouped according to the number of employees they have. Large scale manufacturing firms have more than 100 employees, medium manufacturing firms have between 51 to 100 workers while small scale manufacturing firms between 11 to 50 workers, and micro manufacturing firms are those with 10 or fewer workers. Large scale manufacturing companies in Kenya operate various businesses that fall under several sectors.

Problem of Research

In the modern competitive business environment, organizations need to embrace information communications technology in order to remain competitive. E-procurement is among the Supply-side activities that have been identified as a key area where information systems enabled innovations are likely to yield significant benefits for organizations (European Commission 2005b 2006). The success of any e-procurement application will depend on a variety of factors. Some organizations implement e-procurement technologies and they succeed whereas others fail in the same. This diverse nature of the outcomes in adoption of e-procurement systems has attracted a number of researchers who want to understand the reasons for this diversity.

A number of researchers have conducted studies on e-procurement. For instance Vaidya, Sajeev and Callender (2006) conducted a study on the critical factors that influence

e-procurement adoption success in the public sector. The study concluded that if e-Procurement initiatives in the public sector are to assist the development of e-Procurement across the information economy, there should be wider discussion and agreement on what constitutes the relevant CSFs and how the achievement of success can be assessed.

Another study was carried out by Batenburg (2007) on e-procurement adoption by European firms. It was established that there are indeed country differences with respect to e-procurement adoption, and that firms from countries with a low uncertainty avoidance such as Germany and the UK are the early adopters of e-procurement, while countries that are less reluctant to change such as Spain and France have lower adoption rates. Greunen, Herselman, and Niekerk (2010) also carried out a study on the adoption of regulation-based e-procurement in the Eastern Cape provincial administration. The study found that measurable benefits of supply chain management have not yet been realized due to general limited understanding of how supply chain management concept works within government environment.

In Kenya, there are some organizations that have successfully embraced the use of e-procurement technology. For instance Nation Media group through their digital platform commonly known as N-Soko enables their clients to purchase products online (Gitahi, 2011). Awino (2011) conducted an investigation of selected strategy variables on firm's performance. The study focused on supply chain management in large private manufacturing firms in Kenya. It was established that most of the SCM strategies of large manufacturing firms in Kenya are not owned by individual firms but also other organizations within the SC that provide the required linkages towards the overall corporate performance of the manufacturing industry.

The studies above indicate that there are country-specific differences in the adoption of e-procurement. It is on the basis of these differences that the study seeks to examine the adoption of e-procurement among manufacturing firms in Kenya.

Research Focus

Literature in the field of supply management and e-procurement discuss several benefits of e-procurement (Presutti, 2003). Previous literature (e.g., Edmiston, 2003; Panayiotou, Gayialis, and Tatsiopoulos,2004) has identified major advantages with e-procurement, such as; reduction of supply costs, reduction of cost per tender, lead time savings, simpler ordering, reduced paperwork, decreased redundancy, less bureaucracy, standardization of processes and documentation, online reporting, clearer and more transparent processes, ensured compliance with procurement laws and regulations,

minimization of errors, and easier access to information. Previous research also indicates that e-procurement may lead to increased quality and more adequate purchasing (Engström et al., 2008). In addition, e-procurement has been found to facilitate decentralization of procurement and, thereby, enable purchasing professionals to focus more efforts on strategically important issues (Panayiotou et al., 2004).

Angeles and Nath (2005) conducted a study on the adoption of e-procurement. Another study by Succi and Walter (1999) identified Redesigning affected business processes and User acceptance of new information system as some of the success factors of e-procurement adoption. Information quality was also identified by Davis, Bagozzi and Warshaw (1989) as a success factor. Trust is another critical success factor according to (Mayer, Davis, & Schoorman (1995). The other critical success factors include Risk perception, Training of staff in procurement practices, Top management support and continuous measurement of the key benefits, best practices and actual selection of the system (Ring and Van de Ven's, 1994; WB, 2003; ECOM, 2002; Birks *et al*., 2001).

Whenever a new information technology system is being adopted, there are a number of processes that are affected and there is need to redesign them so that they can be in harmony with the new system. Redesigning affected business processes and consequently, influencing end-user/employee behaviors accordingly to conform to the new systems is therefore important (succi and walter,1999). The firm's actual selection of the e-procurement solution itself and the portfolio of catalogs it would need to support also very essential. Using cost-benefit analysis, the firm should be able to identify and justify the different items that constitute the total cost of ownership: functionalities of the software package; technical architecture; installation costs; service and support; and other post-acquisition costs (Angeles and Nath, 2005).

Mitchell (2000), states that the introduction of e-procurement will influence the roles and skills required in the purchasing organization and will alter relationships with vendors and suppliers. In a B2B setting, one study suggests that the buying center may decrease in size, include fewer hierarchical levels, and contain fewer functional areas when e-procurement is applied (Osmonbekov et al 2002). Another study suggests that e-procurement leads to a centralized purchasing function and those employees will be more empowered to manage their own purchasing while adhering to the organization's rules (Kulp et al., 2006).

A gap exists on the factors that influence the success of e-procurement adoption among manufacturing firms especially in developing countries. Most developing countries

lag behind in terms of technology. It will be prudent to address the factors that influence e-procurement among manufacturing firms operating in developing countries such as Kenya.

Implementing e-procurement is a very expensive undertaking and requires heavy investments by organizations. Equipments in the manufacturing sector are also very expensive to automate to make it possible for adoption of e-procurement. The studies have not clearly brought out the implication of e-procurement on the costs of automation for manufacturing plants.

The study sought to answer the following questions: To what extent have large scale manufacturing firms in Nairobi adopted e-procurement? What are the critical success factors in the adoption of e-procurement among large scale manufacturing firms in Nairobi? What challenges face e-procurement adoption in large scale manufacturing firms in Nairobi? Thus the study sought to achieve the following three objectives: to ascertain the extent to which large scale manufacturers in Nairobi have adopted e-procurement; to determine the critical success factors in the adoption of e-procurement in large manufacturing firms in Nairobi, Kenya; and lastly to establish the challenges that face e-procurement adoption in large scale manufacturing firms in Nairobi, Kenya.

Value of the Study

This study will assist researchers in the area of e-procurement technologies. It will serve as a point of reference for the researchers as they conduct studies in this and other related topics. The findings of the study will equally enable policy makers to devise e-procurement policies that are based on empirical evidence.

The findings of this study will also assist the large scale manufacturing firms in Nairobi to understand the factors influencing the success of e-procurement initiatives as well as the various challenges that they face in implementing e-procurement technologies within their organizations.

**Conceptual framework for e- Procurement Adoption**

The conceptual framework explains the relationship between the dependent and the independent variables in the study. In this study, the dependent variable is e-procurement success. It is considered dependent since the success of any e-procurement system depends on the outcomes from very many factors. Several single factors acting individually have a collective impact on the success on an e-procurement system. The independent variables in this case are the factors that lead to success of e-procurement systems.

Several researchers such as Birks et al., (2001); Angeles and Nath (2005) and Mayer et al. (1995) have come up with a number of factors that they consider as determinants of e-

procurement success. Among these factors are: Staff training; top management support; users and buyers; selection of actual e-procurement system; among others. These factors are the independent variables whose collective effect will lead to the success of e-procurement systems.

Figure 1: Conceptual Model

Independent variables
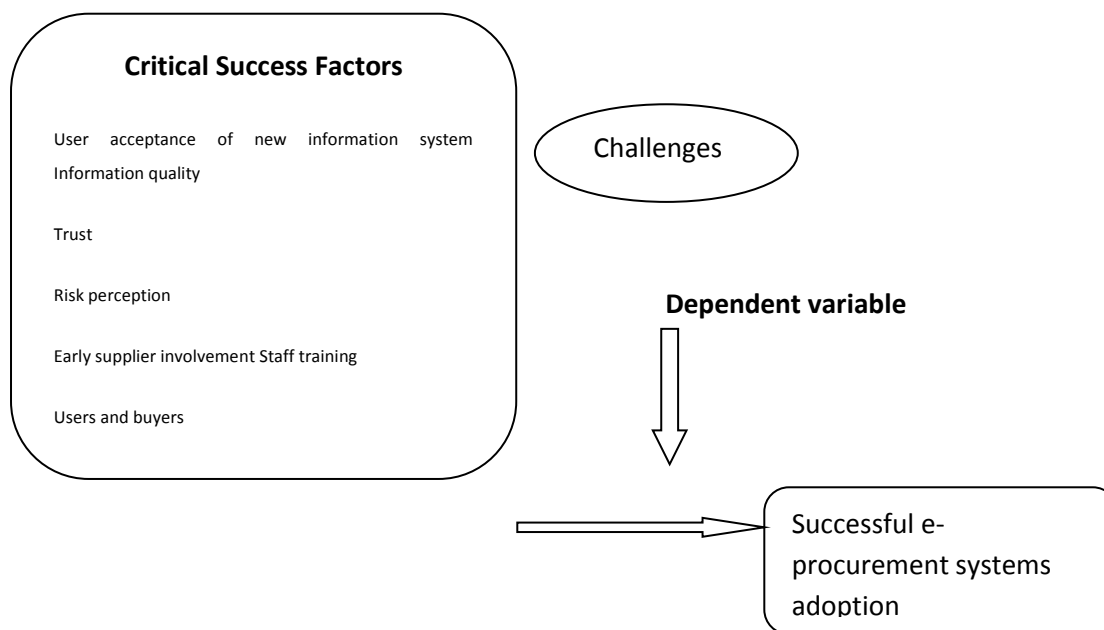
Methodology of Research
General Background of Research

This research involved a cross-sectional survey of the large manufacturing companies operating in Kenya. The study adopted a descriptive approach in trying to establish the factors that influence the success of e-procurement projects. There are other designs but the researcher chose descriptive since it would enable him to study the elements in their natural environment without necessarily manipulating them.

Sample of Research

The population of the study in this research was all the large scale manufacturing companies that are based in Nairobi. According to the Kenya Association of Manufacturers, there are a total of 455 large scale manufacturing companies operating in Nairobi as can been seen from the appendix attached at the end of this study. There are various sectors under which these companies operate. The 455 companies represented the study population. Stratified random sampling method as described in Cooper and Schindler (2006) was applied to come up with the sample size, since the population in different large manufacturing firms was considered heterogeneous, implying that a simple random sample would have been

unrepresentative. Stratified random sampling ensured that each manufacturing sector is represented.

According to Cooper and Schindler (2006) every sample must have a non zero probability of selection. Taking a nonzero probability of selection of 0.101 the sample size will be:

$$0.101 = \frac{\text{Sample size}}{455}$$

This gives a sample size of 46 respondents. The study therefore involved 46 large manufacturing companies in Nairobi. The study picked heads of department of Supply Chain Management of each of the manufacturing firms to take part in the study. The researcher calculated the percentage each sector represented among the total number of companies and used the same percentage to calculate the number of respondents. The researcher selected supply chain managers from each of the companies to participate in the study. Table 3.1 shows how the sample size was arrived at.

Table 1: Sample Size

Sector	No. of Firms	Percentage in Sector	Respondents
Building	6	1.3	1
Food, Beverages	100	22	10
Chemical	62	13.6	6
Energy	42	9.2	4
Plastics	54	11.9	5
Textile	38	8.4	4
Wood Products	22	4.8	2
Pharmaceutical	20	4.4	2
Metal and Allied	38	8.4	4
Leather	8	1.8	1
Motor	17	3.7	2
Paper	48	10.5	5
Total	**455**	**100**	**46**

Source: Researchers, 2013

Instrument and Procedures

Primary data was gathered directly from supply chain managers or their equivalents. The data was collected by use of a closed ended questionnaire. The questionnaires had four

sections. The first section contained questions on the bio data of the manufacturing firms, the second part; on the other hand, answered questions on objective one while the third answered questions on objective two. The last section also answered questions on objective three. The questionnaires was administered by drop and pick method.

Data Analysis

The researcher conducted quantitative analysis for the data collected from the study. Two methods of data analysis were therefore adopted to enable the researcher conduct a comprehensive analysis. Objective one was analyzed using mean scores obtained from Statistical Packages for Social Sciences (SPSS); Objective two and three were analyzed by conducting factor analysis. Factor analysis was conducted to establish the critical success factors as well as the main challenges in adoption of e-procurement. The findings from the quantitative data were presented in form of tables.

Results of Research

The study's respondents were drawn from large scale manufacturing firms in Nairobi, Kenya. Out of the 46 supply chain managers who were sampled to participant in this study, only 44 responded giving a response rate of approximately 96%. This is a high response rate indicating that the findings can be used for generalization.

Level of E-Procurement Adoption

Different organizations use different approaches in the adoption of information systems. The e-procurement system of adoption among manufacturing firms can be at different levels depending on the number of years since its adoption, past experience, the success or failure in the implementation of such systems and the automation level of activities within the procurement unit.

E - Procurement Adoption Policy: Firms are expected to develop their e-procurement adoption strategy to guide their implementation. The respondents were asked to indicate whether they have adopted e-procurement systems in their large scale manufacturing firms. From the research data, majority (100%) of the large scale manufacturing firms in Nairobi, Kenya have adopted e-procurement. This is an indication that the organizations that participated in this study have knowledge of what e-procurement systems are.

Years of e-Procurement Usage: The number of years an organization has used the e-procurement system can determine the assessment index of the system's failure or success. Equally it can also determine efficiency and effectiveness within the procurement systems. It will also influence the level of adoption among several other activities within the procurement unit. The respondents were asked to indicate the number of years that have

elapsed since the time their firms had adopted e-procurement systems and the results are as shown in table 2 below.

Table 2: Years in e-procurement usage

Years	Frequency	Percent
1-5 years	32	72.7
6-10 years	12	27.3
Total	44	100.0

Source: Research Data

The findings in table 2 above indicate that majority (72.7%) of the large scale manufacturing firms in Nairobi, Kenya have adopted e-procurement systems for duration of 1-5 years. This is an indication that majority of the firms that participated in the study have not adopted information systems for a long time hence don't have a detailed understanding in the usage of e-procurement systems.

E-Procurement Adoption Level: The level of automation among the key activities in the procurement unit will determine the level of adoption of e-procurement system. The respondents were asked to indicate the extent to which they have adopted e-procurement systems among key activities in the procurement function using a five likert scale (1= Very small extent; 2 = Small extent; 3 = Moderate extent; 4= Great extent 5= Very great extent) and the results are as shown in table 3.

Table 3 E-Procurement Adoption Level

E-Procurement adoption levels	N	Mean	Std. Deviation
Advertising tenders online	44	3.91	.910
Online submission of proposals	44	3.75	1.222
Short listing of suppliers online	44	3.70	1.212
Company staff make requisitions online	44	3.66	1.098
Call for proposals done through company website	44	3.50	1.191
Existence of functioning website	44	3.48	1.338
Posting item specifications on company website	44	3.00	1.398

Source: Research Data

From the findings in table 3 above, the large scale manufacturing firms in Nairobi were to a great extent (mean ≥3.5, with a significant standard deviation) advertising tenders online, allowing suppliers to submit proposals online, short listing of suppliers online, allowing company staff to make requisition online and call for proposals through company

website. This indicates that the large scale manufacturing firms Nairobi, Kenya have adopted e-procurement to a great extent. The data agrees with the observations by Croom and Brandon-Jones (2004) who assert that e-procurement systems enable organization to carry out individual or all stages of the procurement process such as searching for suppliers, sourcing, negotiation, ordering and posting of purchase review using internet-based (integrated) information and communication technologies.

On the other hand, the existence of functioning website and posting item specifications online among the large scale manufacturing firms in Nairobi have been adopted to moderate extent (mean ≥ 3.0). This may be attributed to challenges like usage of decades-old equipment and parts whose documentation is paper-based and lacks the digital format necessary for e-Procurement systems as noted by Moore (2003).

Critical Success Factors in E-Procurement Adoption

There are number of factors that can determine the successful adoption of e-procurement systems. These are the most important factors that a firm needs to pay attention to in their efforts of implementing electronic procurement systems and practices aimed at improving their competitiveness. The respondents were asked to indicate the extent to which they agreed with various factors that contribute to the success of e-procurement among large scale manufacturing firms in Nairobi, Kenya using a five likert scale of 1= Very great extent; 2 = Great extent; 3= Moderate extent; 4= Small extent and 5= Very small extent. The results are as in table 4 below.

Table 4: E-procurement Critical success factors

Critical Success Factors	N	Mean	Std. Deviation
Senior managers committed to e-procurement	44	2.09	.910
Compliance with rules and regulations	44	2.20	.701
Trust of system by buyers	44	2.27	.758
New processes designed for automation	41	2.29	.750
System selected after competitive bidding	44	2.32	1.196
Employee readiness to make e-procurement succeed	44	2.32	.740
Improving performance using performance reports	44	2.34	.680
Observation of procurement guidelines	44	2.43	.695
Employee willingness to use e-procurement system	44	2.48	1.000
Availability of e-procurent operations instruction	44	2.57	.661
Changing manual procedures in favor of e-procurement	44	2.64	1.036

Efficient risk management	44	2.68	1.095
Regular e-procurement performance measurement	44	2.73	1.020
Involving suppliers in e-procurement adoption	44	2.84	.888
Information up to date procurement information	44	2.84	1.140
E-procurement system competitively acquired	44	2.95	1.346
Employee training on e-procurement usage	44	3.00	1.161
Reliable information available on website	44	3.00	1.431
Training of suppliers on e-procurement	44	3.45	1.170
CEO does not care about e-procurement	44	4.32	1.235

Source: Research Data

From the findings in table 4 above, to a great extent (mean ≤ 2.99, with a significant standard deviation) commitment by senior managers, availability of e-procurement operations, involving suppliers in e-procurement adoption, changing manual procedures in favor of e-procurement, designing new process for automation, acquiring e-procurement system competitively, competitive bidding, employee willingness to use e-procurement system, staff readiness to make e-procurement succeed, regular e-procurement performance measurement, observation of procurement guidelines, compliance with rules and regulations, system buyers trust, up to date procurement information and efficient risk management have been adopted by large scale manufacturing companies in Nairobi, Kenya. This indicates that these factors to a great extent are critical in the success of e-procurement adoption among large scale manufacturing firms in Nairobi, Kenya. The findings are in line with the observations made by several authors. For instance Birks et al., (2001) point out that in order any organization to ensure achievement of the e-Procurement objectives, the adoption process should proceed, as far as possible, in alignment with the all business activities.

The findings also indicate that employee training on e-procurement usage, availability of reliable information on website and training of suppliers on e-procurement to moderate extent (3≥ mean ≤3.5) to the success of e-procurement adoption among large scale manufacturing firms in Nairobi, Kenya. The results also show that CEO to a small extent (mean = 4.32) care about e-procurement adoption. This would be because most of the respondents were CEOs and departmental heads who could not have agreed to the statement since it negatively impacted on them. The factors in table 4.4 above were far too many and therefore factor analysis was further conducted to reduce them to a manageable number.

Critical success factor rotational component matrix was used and the results are in figure 1 and table 5.

Table 5: Critical Success Factors in e-procurement Rotated Component Matrix

Critical Success Factors in e-procurement	Component					Factor Name
Efficient risk management	**.910**	.192	-.050	.160	.106	Factor No. 1: Employees and Management Commitment to Success of Adoption
Changing manual procedures in favor of e-procurement	**.836**	-.215	-.344	.148	-.048	
Information up to date procurement information	**.818**	.526	-.060	.014	-.092	
Senior managers committed to e-procurement	**.815**	-.078	.131	.480	.157	
Employee readiness to make e-procurement succeed	**.810**	.139	.028	.295	.088	
Employee training on e-procurement usage	**.757**	.126	-.058	.114	.580	
Regular e-procurement performance measurement	**.624**	.522	-.086	.283	-.146	
Reliable information available on website	.204	**.955**	-.028	-.057	.006	Factor No. 2: Reliability of Information Technology and Supplier Performance
Training of suppliers on e-procurement	-.093	**.842**	-.133	.110	.407	
E-procurement system competitively acquired	.064	**.833**	-.138	.166	.174	
Involving suppliers in e-procurement adoption	.276	**.592**	-.042	.463	.234	
Trust of system by buyers	.494	**.499**	.382	.109	-.437	
Improving performance using performance reports	-.123	-.081	**.935**	-.012	.136	Factor No. 3: Monitoring the performance of e-procurement systems
Compliance with rules and regulations	.007	-.080	**.874**	-.054	.038	
Observation of procurement guidelines	-.123	-.344	**.533**	.112	-.545	
Employee willingness to use e-procurement system	.187	-.069	.071	**.814**	.118	Factor No. 4: User Acceptance of E-Procurement Systems
System selected after competitive bidding	.374	.409	-.023	**.680**	.132	
New processes designed for automation	.355	.379	-.254	**.658**	-.119	
Availability of e-procurement operations instruction	.290	.132	.164	.139	**.879**	Factor No. 5: Top Management Support
CEO does not care about e-procurement	-.303	.367	.282	.210	**.592**	

Source: Research Data

Figure 1: Scree plot
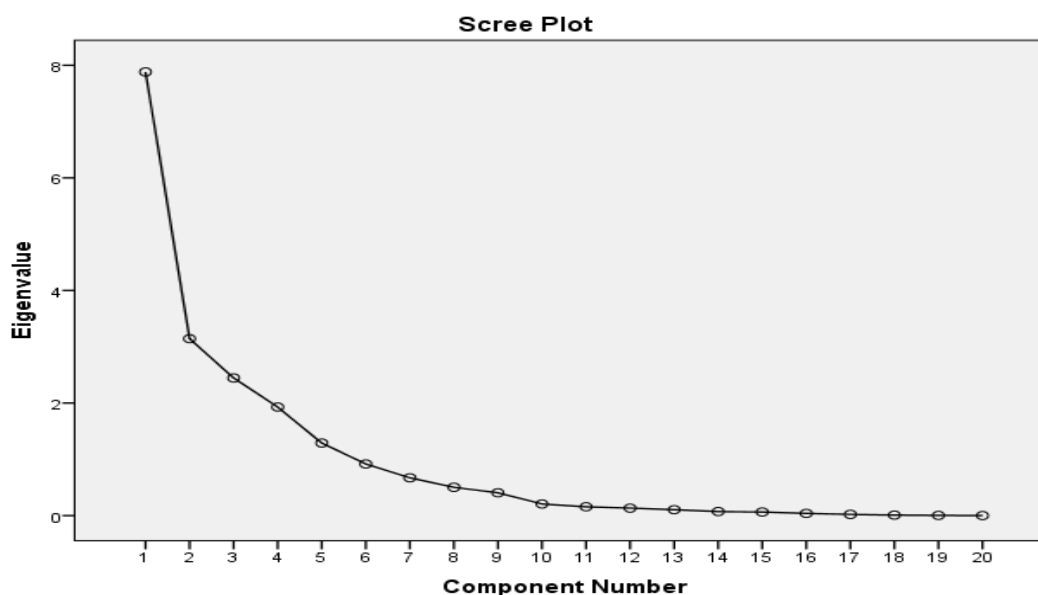
Source: Research Data

Factor No. 1: Employees and Management Commitment to Success of Adoption: Employees and management commitment to the success of e-procurement adoption among large scale manufacturing firms in Nairobi, Kenya is the most critical success factor. For e-Procurement system to be successful, it should allow employees to focus on their day jobs without sacrificing the visibility and management needs to effectively control organizational spending. This can be achieved through staff training and communicating all the guidelines and procurers that can help easy use of the technology. Management should set the vision and the goals that are relevant to the objectives of the organization. Policies should be formulated and strategies set that will enable the adoption of the technology. Equally the management should provide all the financial support that is necessary for the development of e-procurement infrastructure for easy adoption.

Factor No. 2: Reliability of Information Technology and Supplier Performance: Reliability of information technology is very crucial in the adoption of e-procurement. Reliable e-systems enhances security of information, minimizes risks thus leading to higher levels of acceptance by suppliers and buyers. In order to achieve reliability, large scale manufacturing firms in Nairobi, Kenya should ensure that website contents are complete, relevant and easy to understand as well as secure. This will enable suppliers to conduct their transactions with minimal risks. Performance by the supplier is also critical in the success of e-procurement adoption among large scale manufacturing firms in Nairobi, Kenya. This therefore implies that the suppliers should be involved right from the early stages of e-

procurement adoption. Training of the supplier on the usage of the technology will equally enhance performance on e-procurement adoption. The suppliers should also be involved in discussions when the management needs to make any changes on the system. This can lead successful adoption of the e-technology in large scale manufacturing firms in Nairobi, Kenya.

Factor No. 3: Monitoring the performance of e-procurement systems: Every sector has its own unique transformational challenges in the process towards adoption of an effective procurement solution. Embracing performance monitoring in the adoption of e-procurement among large scale manufactures in Nairobi, Kenya is important since this will ensure that the adoption process complies with organizational rules and regulations thus leading to the success of e-procurement. Performance monitoring will also ensure that the e-procurement process is implemented properly in order to realize optimal benefits. It is significant for the large scale manufacturing firms in Nairobi, Kenya to continuously measure the key benefits of e-procurement since it is vital to the successful adoption of the system. This requires the establishment of performance goals and objectives. These established goals will enable the organization measure how much has already been achieved as far as e-procurement system adoption is concerned.

Factor No. 4: User Acceptance of E-Procurement Systems: Another important that factor that was found to be critical the success of e-procurement adoption was users' acceptance of e-procurement systems. The acceptance of e-procurement systems among the users will lead to the success of the system since those involved will have a positive attitude in learning on how to use the system thus making it easy to incorporate most of the operations into the system. The ease with which users could use the e-procurement system involves the recognition by the senior management of the importance of the ease of using the e-procurement system for its staff and then chose an application that is easy to navigate. Automatic routing of purchase orders to appropriate managers for approval, access to e-catalogues, sending purchase orders to suppliers, producing expense report capabilities, encourages employees to accept and use the system without much hesitation. This can lead to successful adoption of e-procurement systems among large scale manufactures in Nairobi, Kenya.

Factor No. 5: Top Management Support: Top management support was also identified as a critical factor that leads to the success of e-procurement adoption from the sorted component matrix. If an organization wants to adopt e-procurement successfully then top management has to support the adoption of the system into their business and integrate it into its overall goal. The executive team is responsible for setting the vision and goals, bringing

about collective commitment for change in process and organizational structures, and formulating the policies and strategies necessary to put an e-procurement initiative in place. If top executive levels among the large scale manufacturing firms in Nairobi, Kenya support the adoption of e-procurement, the companies can successfully adopt e-procurement systems. On the other hand, if the e-procurement systems do not have the full support of the top management team, there is every reason for that system to fail. To management among the large scale manufacturing firms in Nairobi, Kenya should therefore set goals, strategies and baselines that are necessary for the adoption of the e-technology. The strategies should be in line with the firms' objectives. The goals will enable the organizations measure how much they will achieve as far as e-procurement system adoption process is concerned.

Challenges of Adopting E-Procurement

The challenges of automation among the key activities in the procurement unit will hinder the adoption of e-procurement system. The respondents were asked to indicate the extent to which they agreed with the following statements concerning the challenges of adopting e-procurement using a five likert scale (1= very great extent; 2 = great extent; 3 = medium extent; 4= small extent and 5= very small extent) and the results are as shown in table 6 below.

Table 6: Challenges of adopting e-procurement

E-Procurement Adoption Challenges	N	Mean	Std. Deviation
Making equipment compatible is expensive	44	2.27	1.149
Lack of regular use by employees	44	2.27	1.065
High costs of e-procurement adoption	44	2.52	1.023
Lack of finances	44	2.52	1.023
Old IT equipment that needs overhaul	44	2.55	.901
Resistance to change	44	2.55	1.247
Lack of e-procurement implementation capacity by small suppliers	44	2.68	1.116
Lack of internet access by small suppliers	44	3.09	1.254
Lack of company board approval	44	3.55	1.247
Lack of managerial support	44	4.09	.802

Source: Research Data

From the findings in table 6 above, the large scale manufacturing firms in Nairobi were to a great extent (mean ≤2.99, with a significant standard deviation) faced with the following challenges in adopting e-procurement sytems: usage of old IT equipment that need

overhaul, high costs required to make the equipments compatible, lack of regular use by employees, resistance to change by users, lack of e-procurement implementation capacity by small suppliers, higher adoption costs and lack of finances. The findings are in agreement with Moore (2003) who asserts that most manufacturing plants are still using decades-old equipment and parts whose documentation is paper-based and lacks the digital format necessary for e-Procurement system. The findings on employee resistance are in line with the observation made by Bedell (2002) that e-Procurement systems are a self-service tool thus, end users sometimes resist using them.

The results also indicate that to moderate extent (3.0 ≥mean≤3.9) the firms face the challenge of lack of internet access by small suppliers and lack of board approval in adopting e-procurement. It is also clear that to a small extent (mean = 4.09), there is lack of managerial support in the adoption of e-procurement systems among the large scale manufacturing firms in Nairobi, Kenya. This therefore implies that large scale manufacturing firms in Nairobi, Kenya need to evolve towards a more strategic view of e-procurement adoption in order to integrate different systems and applications efficiently throughout the organization.

Conclusion

The study established that most of the large scale manufacturing firms in Nairobi have adopted e-procurement. However, it is clear that advertising tenders online, allowing suppliers to submit proposals online, short listing of suppliers online, allowing company staff to make requisition online and call for proposals through company website stand out as the e-procurement practices that have been adopted most among large scale manufacturers in Nairobi, Kenya. From the factor analysis conducted, the study identified the following five main factors that lead to e-procurement success among large scale manufacturers in Nairobi, Kenya: employees and management commitment to success of adoption; reliability of information technology and supplier performance; monitoring the performance of e-procurement systems; user acceptance of e-procurement systems and top management support. Concerning the challenges of adopting e-procurement faced by large scale manufacturers in Nairobi, Kenya, the study established that a number of large scale manufacturers experience resistance to change from employees. It was also established from the study that the firms experience lack of e-procurement approval by company board. Equally existence of old it equipment among the firms that need overhaul hinder the process of adopting e-procurement among the organizations as well as lack of managerial support.

The following conclusions were made based on the objectives of the study.

From the findings of the study, it can be concluded that to a larger extent, majority of the large scale manufacturers in Nairobi, Kenya have adopted e-procurement with the following e-procurement practices: online advertisement of tenders, receiving online submission of proposals for the tenders, and short listing suppliers online among others.

The five main factors identified from the study that lead to e-procurement success among large scale manufacturers in Nairobi, Kenya are: employees and management commitment to success of adoption; reliability of information technology and supplier performance; monitoring the performance of e-procurement systems; user acceptance of e-procurement systems and top management support.

The challenges of adopting of e-procurement among large scale manufacturers in Nairobi, Kenya that were established from the study are: resistance to change from employees, lack of e-procurement approval by company board, existence of old it equipment among the firms that need overhaul and lack of managerial support.

Recommendations

The findings indicate the there are a number of manufacturing firms that have not fully adopted e-procurement systems. It will be important to conduct a study to find out the reasons why some of these companies have not incorporated all the procurement activities in e-procurement. A comparative study will be critical in order to establish whether there are any similarities or differences in the factors leading to success of e-procurement across different industries. The manufacturing industry results can be compared to another industry.

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