

# Factors Affecting Implementation of E-Procurement Practices in Public Service in Kenya: A Case of Ministry of Finance

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**Abstract:** *This paper presents a study into the key lessons learnt from e-procurement implementation at public sector organisations in Kenya. The literature relating to e-procurement implementation and operation is reviewed, identifying main variables addressed by the current literature: impact on cost; the impact on governance; e-procurement implementation; and broader IT infrastructure issues. The research carried out was intended to explore the perceptions and reflections of both 'early' and 'late' adopters of e-procurement. Key lessons are drawn from the study and presented here. I recommend further research, including the need for research into failed e-procurement projects.*

**Keywords:** Electronic procurement; public sector procurement; e-procurement implementation.

## 1. Introduction

The advent of web-based electronic procurement has been heralded as a revolution for the purchasing process (Neef, 2001), delivering significant transactional economies (Croom, 2000; Essig & Arnold, 2001; de Boer et al, 2002, Wyld 2002) and acting as a catalyst for a shift in the role and influence of the purchasing function within the public organisations (Croom, 2000; Osmonbekov et al, 2002). Much of the existing e-procurement research has examined implementation issues and in this paper I report on the findings from my study of the experiences of public sector e-procurement implementation.

## 2. Background

What is e-Procurement? Confusion exists in defining the term e Procurement (Vaidya, Yu, Soar & Turner, 2003). While the terms "e Procurement" and "e-Purchasing" have been used synonymously in many jurisdictions in an attempt to prove their involvement in the e-Commerce revolution (MacManus, 2002), the term "purchasing" has a narrower scope. 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. Although the term "end-to-end e-Procurement" is popular, industry and

academic analysts indicate that this ideal model is rarely achieved (DOIR, 2001) and e Procurement implementations generally involve a mixture of different models (S&A, 2003).

## 3. Public Sector Procurement Requirements

Public procurement is an important function of government (Thai, 2001). It has to satisfy requirements for goods, works, systems, and services in a timely manner. Furthermore, it has to meet the basic principles of good governance: transparency, accountability, and integrity (Wittig, 2003; Callender & Schapper, 2003). Another main principle of governments is to achieve value for money in procurement (DOF, 2001). However, public procurement has been a neglected area of academic education and research, although governmental entities, policy-makers, and public procurement professionals have paid a great deal of attention to procurement improvements and reforms (Thai, 2001).

Public sector procurement is large and complex, accounting for between twenty and thirty percent of gross domestic product (Thai & Grimm, 2000) and traditionally attempts to meet many social and political objectives (Tether, 1977). Governments procure goods and, in order to preserve accountability and transparency services, use a complex contractual system designed to protect the public interest (Rasheed, 2004). While private sector procurement is practiced under the sponsorship of each individual firm's governance policies, public sector procurement must operate within a range of regulations and policies established to accomplish desirable social (Tether, 1977) as well as economic (OCIO, 2000), financial, and public audit requirements.

Government procurement officials issue requests for bids and/or proposals with product or service specifications that are unique to each contracting event and economies of scale are difficult to achieve (Rasheed, 2004). There are also bargaining and opportunism costs of governance unique to public procurement that result in high transaction costs (Globerman & Vining, 1996).

### 3.1 E-Procurement

Electronic procurement refers to the use of integrated (commonly web-based) communication systems for the conduct of part or all of the purchasing process; a process that may incorporate stages from the initial need identification by users, through search, sourcing, negotiation, ordering, receipt and post-purchase review. A review of the body of literature to date identifies four main variables in e-procurement.

- Cost efficiency benefits;
- The impact of e-procurement on governance;
- E-procurement implementation; and
- IT infrastructure issues.

### 3.2 Cost efficiencies

Existing literature on e-procurement has emphasized the cost improvements that may be achieved as a result of transactional and process efficiencies. These efficiencies are gained in three ways. Greater opportunity for lower prices from suppliers; reduced work content in the total 'requisition to payment' process; and significant reductions in the time taken to complete the procurement process (Min & Galle, 1999; Croom, 2000; Emiliani, 2000; Zsidisin & Ellram, 2001; deBoer et al, 2002; Wyld, 2002). Whilst it is has been widely contended in this body of literature that e-procurement implementation will have considerable implications for the design of the procurement process, it was observed by Lancioni et al., (2000) that the precise nature of these process changes remained unclear. Recently, Yen & Ng (2003) carried out a case study investigation of textile and apparel supply chain electronic commerce implementation in Hong Kong and although primarily interested in the e-commerce system roll-out processes, they provide a useful comparison of pre- and post- e-commerce procurement process performance. Their case evidence gives some useful description of the changes to the procurement process and supports the claims from prior literature that such changes deliver process efficiencies. In addition to the three categories of efficiency improvement mentioned above, they also highlight the reduction in costs arising as a result of 'digitizing' catalogues, reducing errors in order transmission, reductions in inventory, and reductions suppliers' marketing costs. Consequently, improved economies of management information are considered to be a major catalyst for reducing purchase prices.

In the practitioner and general management literature there is a plethora of anecdotal case evidence to support the view that electronic procurement is a far more efficient and reliable method for the requisition to payment process than preceding manual and semi-automated processes. (For example: Electronic Commerce News, 2003; Hayward,

2003; Moore, 2003; Parker, 2003; Trommer, 2003; Wheatley, 2003)

### 3.3 Governance

The influence of improved information transmission and user access to the procurement process through the use of inter-organizational systems (IOS) has a significant impact on the configuration and structure of supply chains. Holland (1995) and Croom (2001) note that the literature posits two opposing schools of thought.

On one side, an IOS may increase the tendency towards market transactions as the barriers to participate in electronic transactions diminish (Malone et al, 1987; 1989). Malone et al (1987) argued that IOS networks would improve co-ordination between firms to reduce the costs of searching for appropriate goods and services (they call these "electronic brokerage effects"). Consequently, they claimed that one of the major effects of IOS would be a shift from hierarchical to market relationships (Malone et al. 1987, p. 492). Barratt and Rosdahl (2002) claimed that ease of search and transparency acts as an advantage to the buyer but may be a disadvantage for the seller, which further reinforces market-based relationships under e-procurement.

On the other side, it has been argued that the proprietary nature of some IOS may in fact serve to tie in customers and suppliers into virtual hierarchies or virtual integration (Johnston & Vitale, 1988; Johnston & Lawrence, 1988; Konsynski & McFarlan, 1990). Brousseau (1990) reviewed 26 IOS networks, finding that most were used to reduce production or distribution costs and served to reinforce already existing hierarchical relationships among firms. Only in two, the petroleum business and textiles, was the use of IOS associated with buyers gaining advantage by having more suppliers from which to choose. Evans and Wurster (2001) claimed that the low infrastructure and transaction costs of Internet-based systems allowed organizations to exploit the increased opportunities for complex information exchange with multiple partners, but also recognized the value to be gained through closer, hierarchical, relationships between regular trading partners ('affiliation'). Amit and Zott (2001) likewise discussed the importance of close relationships ('lock-in') between trading partners as a key source of advantage to both buyer and seller.

### 3.4 E-Procurement Structures

The term 'e-procurement' has to date been employed in a rather generic manner. It is useful, therefore, to develop a means of classification that helps to relate the form of e-procurement to the resulting governance structure. Thus, in the Figure 1 (below) we set out five simple exchange stereotypes that may be employed to transact between buyer and supplier:

Through the public web, buyers have the opportunity to identify potential suppliers via standard search engines or specialist trading search engines. On line search and comparison of list prices are typically used for one of, specialist or low value purchases. Depending on the nature of the supplier's web site facility, orders may be placed on-line, via email or through the more traditional route of

telephone, fax or mail. A marketplace is in essence a multi-supplier/multi-products catalogue often hosted and maintained by a third party and access provided to users via Internet or LAN connection. In this study two examples of marketplaces are included in cases of the Agencies represented.

#### Seller Extranet

An extranet is a secure, often security protected, Internet link between buyer and seller. Such extranets are used primarily for shared and collaborative data – such as delivery scheduling and product design data. Pre-Internet, EDI links represented a type of extranet connection, being dedicated to an individual customer. Although there remain concerns for the security of transmission over the World Wide Web, extranets represents an effective means of communication between close trading partners.

### 4. Company Hub

Often also called a 'buy-side' solution, a company hub is similar to a marketplace since the buyer (rather than a third party) hosts and maintains a multi-supplier/multi-product catalogue.

#### 4.1 Software Implementation

There are relatively few detailed empirical studies of e-procurement implementation. Mc Manus (2002) examined the rate of e-procurement implementation in US the public sector, remarking that motivation for implementation was based on expectations of lower purchase prices, reduced transaction and process costs, and increased transaction speed. She also noted that the implementation of e-procurement had led to increased debate about some of the fundamental principles behind public sector procurement, including 'lowest bid wins'. A case example of Taiwanese military procurement by Liao et al (2003) documented the challenges for e-procurement implementation in terms of changing established procurement processes and practices, and particularly highlighted the significance of 'human deficiencies and faults (i.e. corruption and inefficiency) in the implementation process.

Heijboer (2003) recognized that governance effects of e-procurement are subject to the dynamics of e-procurement roll-out, and he proposed an analytical model based on both the structural (i.e. internal overhead and process costs) and the ROI and payback resulting from the e-procurement roll out on a commodity-by-commodity basis. He concluded that a strategy predicated on gathering 'low hanging fruit' may dictate the pattern and nature of governance changes.

#### 4.2 IT Infrastructure

Two recent commercial reports have addressed the issue of successful e-procurement implementation: the IDC report (2003) highlighted the slow uptake of e-procurement systems, emphasizing some of the information systems-related issues that were inhibiting implementation such as software integration (including discussion of XML related opportunities). Research by the Aberdeen Group (2001) cited user adoption as an essential factor in successful e-procurement deployment.

Lin & Hsieh (2000) used a single case study to highlight the importance of both web content management and content rationalization as significant issues for e-procurement operation. They noted that constantly changing prices, specifications and account details across the (on-line) supply base caused major problems in the maintenance of supplier catalogues. In addition, the way an item is described (item coding) was been found to be a significant data management issue for e-procurement, and Lin & Hsieh also claim that material code proliferation within ERP systems has posed similar challenges for the management of the IS infrastructure.

The extent to which the e-procurement system is able to integrate effectively with other IS, particularly production planning & control and finance systems, is posited by Subramaniam & Shaw (2002) to be a major causal determinant of the efficiency and effectiveness of an e-procurement system. Rajkumar (2001) also identified systems integration as a critical success factor for e-procurement implementation, both with the customer's information infrastructure and in its links to suppliers.

#### 4.3 Organisational Issues

In a study of the motivation of buyers to use the internet as a resource for various elements of the purchasing process (for example, search, price determination and ordering), Kennedy & Deeter-Schmelz (2001) concluded that 'organizational characteristics and organizational influences' were significant motivators to the use of e-procurement. Croom & Johnston (2003) argue that compliance by internal users is critical to the achievement of cost and efficiency gains from electronic procurement, and therefore internal customer satisfaction should be a key concern in the development, adoption and deployment of such systems. In other words, the level of compliance with e-procurement is strongly influenced by the general disposition of the organization as a whole to either electronic process redesign or the desire to gain perceived benefits from electronic procurement.

In examining the impact of e-procurement on buyer-seller relationships, Carr & Smeltzer (2002) found that increased use of information technology between buyer and supplier did not improve levels of trust between buyer and seller, although Ellram & Zsidisin (2002) found that close buyer-supplier relationships had a strong positive impact on the adoption of e-procurement. E-procurement does not deliver improved levels of trust, but it has been found that e-procurement transactions are more likely to be established first between close trading partners in high trust relationships. Unfortunately neither of these papers accounted for the evolutionary characteristics of buyer-seller relationships (for example, see the IMP evolutionary approach: Ford et al, 2003), although Archer & Yuan (2000) and Croom (2001) both support the view that increased use of e-procurement and inter-organizational systems will enhance opportunities to build closer and more effective customer-supplier relationships over time.

### 5. Research Objective and Methodology

My research study focused on the e-procurement

implementation and its operational consequences in the public sector in the Kenya. The research used both open and semi-structured questions, allowing respondents to discuss at length their experiences, perception and reflections of a range of e-procurement implementation projects. The primary objective was to construct a guide to the main 'lessons learnt' from implementation. The field research incorporated a series of face to face and interviews with individuals across organizations departments. Initial interviews were semi structured and lasted for half an hour. Following my complete interviews, a summary analysis of the findings and pertinent issues was circulated to all participants as the basis for the second round of face to face interviews. All interviews were taped and transcribed. Coding of all interviews was undertaken by both researchers independently and then cross-compared for final coding.

## 6. Findings

Experiences with e-procurement ranged from the departments, both of whom had developed their own e-procurement systems. The analysis of my study was summarised into some key issues. In this section I present the main concerns expressed by respondents. Purchase price savings. The main routes for achieving clear accountable cost savings on purchases were through three main mechanisms: consolidation of purchase specifications; reducing the number of suppliers; and greater use of existing contracts. The public sector organisation involved in my study reported that compliance with existing contracts had been one of the major difficulties they had encountered prior to e-procurement implementation. E-procurement had significantly improved compliance due to the ease of access for users to contracted supplies. Only one of the respondents had made participation in their e-procurement system a mandatory requirement for suppliers, but all respondents found that greater accessibility and ease of use were significant catalysts in 'encouraging' users to conform to process.

Identifying process savings- Although cost savings were relatively easy to identify through invoice and budget data, respondents reported significant difficulties in clearly identifying process savings. Whilst the e-procurement literature discussed earlier identifies process efficiencies per transaction as a significant benefit of e-procurement adoption, only a few of participants had been able to validate such savings. One of the respondents had commissioned external consultants to conduct a cost analysis of their e-procurement ordering process. Their study estimated the cost per order under e-procurement to be Kshs 1400, approximately one third of the pre-'e' cost. However, this cost estimate was considered to be applicable only to a narrow range of standard, high volume, single source, purchases.

Implementation roll out- The roll out of the e-procurement system across the supply base was found to be typified by one of two distinct strategies. The most popular methodology involved a limited roll out to the organisation's top suppliers. Problem of the distribution of the supply base- Many participants commented on the challenge of incorporating suppliers with whom they had low expenditures. A key determinant in the approach to 'C' category suppliers was

the marginal cost of adding an additional supplier to the e-procurement system.

Finance systems integration was often the main determinant of system selection or system design. This also had a direct impact on the level of process savings and the nature of the system roll out. All of the departments involved in our study stated that their choice of e-procurement provider had been determined by their current or intended choice of finance system provider. Integration between purchasing and finance systems was seen as the most critical constraint for the selection of system.

IT infrastructure- The reliability and capability of the organisation's infrastructure (particularly network connectivity) impacted directly on the operational performance of the e-procurement system. In many cases the links to suppliers were not directly over internet but via existing EDI (electronic data interchange) connections, automated fax or mail print out. Details of the infrastructural characteristics are summarised below.

Project management- All of the participants in our study had established project teams to manage the development and implementation process. The team structures varied, between open structures incorporating finance, IT, HR and other operational representatives, and a closed structure that was driven by the IT function (Clark & Fujimoto, 2001). My initial conclusions are that the open protocol served to overcome pre-existing 'political' barriers', whilst the closed protocol was most often employed in small scale implementation where internal 'political' barriers were not perceived to be significant.

## 7. Conclusions

The literature identifies the possibility of reasonable prices arising through greater use of e-procurement. In my study I found that increased contract compliance was considered to be a major factor in delivering purchase price improvements. Principally this allowed purchasers to provide a more accurate forecast of contract call off, with the concomitant price benefits arising from economies of volume. In terms of process cost reductions, these were far more difficult to identify. Only one of the respondents had validated process cost savings at the time of the study and this supported the claims in the literature of a saving of approximately two-thirds on process costs (Croom, 2000).

The roll out of e-procurement systems has been examined by Heijboer (2003) who recommended a commodity-based strategy. However, my study respondents adopted a mixed commodity/supplier roll out strategy. Such a strategy recognises the importance of establishing the purchaser-supplier connectivity and communications in any roll out programme. This supplier-oriented approach was further emphasised when examination of supply base roll out identified some concerns for integrating low value suppliers in their e-procurement programme.

System selection was dominated by e-procurement/finance system integration issues. The ability to 'push out' procurement order data into financial control systems is regarded as a critical requirement for the success of an e-

procurement system and thus close integration with finance systems was identified as an important criteria.

Finally, the implementation of e-procurement requires that users comply with the requirements of the same system and processes. One of the key characteristics in achieving organisational support was found to be the structure of the implementation project team – I distinguished between the inclusive, ‘open’ project team protocol and a more narrow ‘closed’ protocol, to use Clark and Fujimoto’s (2001) terminology. An inclusive project team structure was found to allow far greater involvement by the system stakeholders and thus had the consequent benefit of directly addressing any user resistance to e-procurement.

## 8. Recommendation

Further research is now being carried out into user compliance and e-procurement performance in order to validate the prognoses of early commentators. I still feel that e-procurement represents an opportunity for ‘revolution’ in procurement, but e-procurement per se does not carry a guarantee of success. In order to get facts right, I feel that one avenue for future research should be to investigate e-procurement failures as a way of furthering our understanding of critical factors for e-procurement performance.

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