E-Procurement Adoption and Supply Chain Performance in Homa Bay County Government: A Case Study.

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ABSTRACT
In the today’s technological world, it is almost obvious that electronic procurement systems play a vital role in the management of the supply chain. This paper examined how adoption and use of electronic procurement systems in Homa Bay County Government contribute to value creation, reduction of overhead costs incurred during procurement processes as well as its contribution to the performance of their supply chain network. Primary data were gathered using questionnaires from all the 14 procurement personnel in the County Government and a sample of 81 suppliers from their supply base. Regression results indicated that adoption and use of electronic procurement systems greatly improves performance of the supply chain partners ($R^2 = .835, p < .05$) while resulting into procurement cost reduction, increased effectiveness among other benefits. From the findings, the study recommends full adoption and use of electronic procurement systems by the devolved governments to improve on procurement and supply chain performance.

Keywords: Electronic procurement, E-procurement Systems, Supply chain partners, Devolved Government, Information and Communications Technology.

1.0 Introduction

In today’s competitive business environment, technology-based service has become necessary for companies to provide their customers with cost-effective total solution and better customer satisfaction with innovative ideas and methods. With the emergence of Information and Communication Technology (ICT), companies have been forced to shift their traditional operation styles to new philosophies such as e-Business, e-Procurement and e-Supply Chain in order to sustain themselves [1].

The emergency of internet has had a radical impact on the corporate purchasing practices: innovations resulting into Business-to-Business (B2B) marketplaces, electronic supply chains, trading hubs or trading communities situated as web-based procurement networks have been enormous [2]. The diffusion of e-procurement systems in the late 1990s has created the potential for reorganizing the Maintenance, Repair and Operations (MRO) supply chains [3]. E-procurement is gradually replacing the traditional procurement processes of tendering and increasing efficiency and effectiveness the process of sourcing input products and services at low cost, while ensuring that such inputs meet the specific technical and tendering requirements [4].

[5] views e-procurement as the process of purchasing goods, services or works required for an organization’s operation electronically (through the internet). It involves electronic interaction between or among parties in the procurement process rather than physical exchange or contact. On the other hand, [6] defines e-Procurement as conducting on the internet the equivalent of the manual tendering process, with the ostensible objective of enhancing Transparency and Efficiency of Public Procurement.
Whereas e-procurement emerged in the 1990s with the emergence of internet, it has been recognized that e-procurement gained popularity around the year 2000 with the emergence of the two competitors Ariba and Commerce One, companies that both specialized in the support of electronic procurement for MRO products [7]. With the aid of the then so-called ‘buy-side solutions’, large companies started to build up their own electronic multi-vendor and customer self-serviced catalogues [8]. Thus the introduction of Internet-based procurement applications provoked a migration from a centrally organized procurement (central buying) department to a ‘desktop procurement’ environment, which aided the initiation of electronic procurement by any employee who needed a product. These trends aided ‘decentralized purchasing’ and ‘multi-vendor catalogues’, the path towards increased electronic procurement.

Although e-procurement systems offers an array of opportunities and advantages, it adoption of in the devolved government has rather been a slower process. User organizations are faced with a complex decision to make as to whether along to digitalize their purchases and procurement function or remain traditional [9]. Some reasons have been presented by researchers to explain the delayed adoption of e-procurement by many of the organizations. While some organizations have opted to adopt a ‘wait and see’ approach to e-procurement, others are faced with a complexity of decisions resulting from an array of software programs available on market [10]. This study explores e-procurement adoption, use and its contributions to the performance of public procurement in the devolved governments.

1.1 Purpose of the Study
With the advancement in technology, the government of Kenya found it necessary to digitize their procurement processes with an aim to be accountable to the use of tax-payers’ resources and also to improve on service delivery to their citizens. In its endeavor to improve on service delivery and remain accountable, the government initiated e-procurement for all its procurement processes. This was rolled down to the devolved governments. However, adoption and use of e-procurement practices during procurement processes in the devolved governments has been sluggish. While studies of a few devolved governments in Kenya indicate positive move towards implementation and use, majority of them have not fully accepted the change to adopt and use e-procurement systems [11]. In the county of Homa Bay, there have been frequent complaints in the media, from the suppliers’ ends of delayed processes and the citizens’ on poor and slow rates of provision of services - an indication of slow procurement processes. This study explored the procurement systems in the county government of Homa Bay to identify the extent of adoption and use of e-procurement as an ICT tool for its processes and the resulting effect on performance.

\[ H_0 – Adoption and use of e-procurement systems has no significant effect on procurement performance of devolved governments. \]

1.2 Conceptualization
The study conceptualized that e-procurement as an independent variable predicts the public procurement performance of devolved governments. The study adopted e-tendering, e-invoicing and e-payment as constructs of e-procurement while procurement performance was viewed in terms of effectiveness and customer satisfaction.

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Dependent Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>E-Procurement Systems</td>
<td></td>
</tr>
<tr>
<td>• E-Sourcing</td>
<td>Supply Chain Performance</td>
</tr>
<tr>
<td>• E-Tendering</td>
<td>• Supply chain effectiveness</td>
</tr>
<tr>
<td>• E-Payments</td>
<td>• Customer satisfaction</td>
</tr>
</tbody>
</table>

2.0 Literature

2.1 Unified Theory of Acceptance and Use of Technology (UTAUT)

Formulated by [12] in 2003, theory explains user intentions to use an information system and subsequent usage behaviour. The acceptance of new technology is believed to be influenced by: an individual’s expectations of the performance of the technology, efforts to be expended and the technology’s social acceptance as well as the availability of facilitating conditions [13]. These are moderated by the gender, age and experience of the individual as well as the voluntariness of the use of technology. If the adoption of the technology is mandatory then it would be implemented regardless of the way individuals perceive it. Performance expectancy, social expectancy and effort expectancy are intervened by gender, age, and experience as moderators. Some individual will accept the adoption of innovation if they believe that it will improve their job performance thus performance expectancy. On the other hand, employees will easily accept the adoption innovation if they believe that the introduction of the system will reduce their effort in performing the required duties. Social acceptance will also influence the degree of acceptance of innovation if an individual believe that by using the system will influence his/her social status and bring pride and self-esteem.

2.2 Technology Acceptance Model (TAM)

The technology acceptance model was developed [14] to explain the factors that influence the acceptance of new information technology. It was used to study the willingness of people to adopt a new technology. According to TAM the two factors that influence acceptance of innovation are perceived usefulness and complexity of the technology. The degree to which employees believe that using a system will improve their performance will significantly impact on the adoption of Electronic Procurement. On other hand, perceived complexity of the system will discourage the acceptance of the innovation. It is therefore important for managers to gauge the attitude of the employees before implementing the system to avoid implementation failures. The attitude then determines an individual’s behaviour towards the new technology. Top management and e-procurement implementation team need to understand the external variables amidst other influencers of e-procurement implementation. The perceived usefulness and ease of use should be well communicated so as to overcome fears towards use and to inculcate positive behaviour of intention to use the e-procurement system so as to increase procurement effectiveness.

2.3 E-Procurement Systems and Supply Chain Performance

E-procurement systems can be considered as solutions that integrate and streamline procurement processes in an organization [15]. The systems involve the use of Information and Communication Technology (ICT) to conduct the whole procurement process: sourcing for suppliers, negotiation, ordering, receipt of goods/services or work and other post procurement practices with an aim to reduce transaction costs incurred as well as time while increasing performance [16]. According to [17], the most commonly used e-procurement practices are e-sourcing, e-tendering, e-ordering, e-invoicing and e-payment. Performance provides the basis for an organisation to assess how well it is progressing towards its predetermined objectives, identifies areas of strengths and weaknesses and decides on future initiatives with the goal of how to initiate performance improvements.

In the technological aspect of e-procurement implementation, studies have identified that accuracy; reliability and accessibility are relevant in ensuring that the success of e-procurement implementation is realized. However, realization of these factors is only achieved if the alignment of the systems is achieved, hence the need for constant assessment of the overall e-procurement systems [18].

Studies have been conducted on the assessment of the impact of employee ICT knowledge on e-procurement implementation ([9], [19], [20]). In these studies, knowledge was found to be directly linked to the success or failure of e-procurement implementation. Employees’ skills and knowledge on ICT was found to have significant challenge to e-procurement implementation. Moreover, the employees’ lack of
readiness to learn new technological skills and their resistance to change also hindered the implementation process.

In a study in the USA on the impact of e-procurement: experiences from implementation in the UK public sector, [21] found out that 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. According to the study, early e-procurement literature forecast significant improvements in procurement costs, an improving status of the purchasing function, and changes to the structure of supply markets.

According to [22], an automation of procurement processes is one of the vital factors for increasing process efficiency. He concludes that information sharing is mainly influenced by e-sourcing; partner relationships are mainly influenced by e-negotiation; supply chain integration is mainly influenced by e-evaluation. This has an implication that e-procurement dimensions complement each other in terms of the benefits for the supply chain management [22]. Information sharing among partners in the supply chain is a fundamental agent in achieving higher levels of coordination.

In a study to investigate resources and capabilities affecting e-sourcing value in Malaysian construction firms, [23] used resource based view (RBV) theory to explain the technological, organization resource and capabilities with competitive advantages. The study findings indicated that two factors: Information Technology competencies and the trading partner relationship are very important in e-procurement value.

In a descriptive study of Rwanda Revenue Authority, [24] conducted a study on e-tendering and performance of public corporations. The study in which a multivariate regression model applied to determine the relative importance of e-tendering with respect to performance, established that e-tendering allows selection of a suitable contractor or supplier at a time appropriate to the circumstances and hence enhances the performance of organizations.

[25] in a similar study in Kenya to examined the role of e-sourcing and procurement performance among the state corporations in Kenya. A sample of 42 state corporations was used and data collected through questionnaires. Findings indicated that a strong positive relationship between e-sourcing and performance. In the findings of a study on critical factors central to the realization of optimal use of e-payment utilization success in the Public Sector, [26] noted that despite the efforts put by the governments through reforms towards the use of e-procurement, utilization of e-payment still remains a major challenge for many procurement functions. The findings further revealed that successful e-procurement practices established systems and feedback mechanism.

3.0 Methodology
The study was a case of Homa Bay County Government. Primary data were obtained using questionnaires administered to all the 14 procurement personnel in the county government headquarter. On the supply chain partners, a sample of 81 suppliers from the county’s supply base was used for the study. This was obtained the formula suggested by [27] as below:

\[
n = \frac{N}{1 + N(e)^2}
\]

Where  
\(N\) – Population size  
\(n\) – Sample size  
\(e\) – Precision

Source: [27]
Thus from the county’s supply base of 102 suppliers at 90% confidence level, the sample used was:

\[ n = \frac{102}{1 + 102(0.05)^2} \]

\[ = 81 \]

Secondary data were obtained through review of the procurement documents in the procurement office.

Both descriptive and inferential statistics were used to analyze the data. The variables were regressed in a model as below:

\[ Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + e \]

Where:

- \( Y \) - Supply Chain Performance
- \( X_1 \) - e-Sourcing
- \( X_2 \) - e-Tendering
- \( X_3 \) - e-Payment
- \( \beta_0, \beta_1, \beta_2, \beta_3 \) are constants
- \( e \) – Error term (\( N, \delta \)).

### 4.0 Results and Discussion

Results of regression analysis (Table 1) indicated that \( R = .914, R^2 = .835, \ p < .05 \). This shows that, if adopted and used for procurement processes, e-procurement systems in the county government of Homa Bay significantly explains 83.5% of the variance in supply chain performance. Durbin-Watson value was 1.899, an indication of almost absence of autocorrelation amongst the independent variables.

Table 1. e-Procurement and Supply Chain Performance

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
<th>Change Statistics</th>
<th>Durbin-Watson</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>.914*</td>
<td>.835</td>
<td>.830</td>
<td>.27229</td>
<td>.835</td>
<td>153.482</td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), e-Payment, e-Sourcing, e-Tendering

b. Dependent Variable: Supply Chain Performance

On the contributions of each of the constructs used in the study, the regression output gave the results in Table 2. From Table 2, e-sourcing, e-tendering and e-payment all had significant positive contribution (\( \beta_1 = .553, \beta_2 = .504 \) and \( \beta_3 = .431 \) respectively) to supply chain performance of the devolved governments. These have implications that standard adoption and use of e-procurement systems during procurement processes would result into significant increases in the supply chain performance.
Table 2. Collinearity Statistics: e-Procurement Systems and Supply Chain Performance

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>Sig.</th>
<th>95.0% Confidence Interval for B</th>
<th>Collinearity Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td>Lower Bound</td>
<td>Upper Bound</td>
</tr>
<tr>
<td>(Constant)</td>
<td>.123</td>
<td>.154</td>
<td>.804</td>
<td>.424</td>
<td>-.182</td>
</tr>
<tr>
<td>eSourcing</td>
<td>.321</td>
<td>.025</td>
<td>.553</td>
<td>12.96</td>
<td>.000</td>
</tr>
<tr>
<td>eTendering</td>
<td>.299</td>
<td>.026</td>
<td>.504</td>
<td>11.39</td>
<td>.000</td>
</tr>
<tr>
<td>ePayment</td>
<td>.341</td>
<td>.035</td>
<td>.431</td>
<td>9.763</td>
<td>.000</td>
</tr>
</tbody>
</table>

a. Dependent Variable: Supply Chain Performance

The ANOVA results in Table 3 shows that $F (3, 90) = 153.482, p < .05$. This indicates a significant relationship between e-procurement and supply chain performance in the county governments. The null hypothesis that adoption and use of e-procurement systems has no significant effect on procurement performance of devolved governments is therefore rejected.

Table 3. ANOVA: e-Procurement and Supply Chain Performance

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>34.137</td>
<td>3</td>
<td>11.379</td>
<td>153.482</td>
<td>.000b</td>
</tr>
<tr>
<td>Residual</td>
<td>6.747</td>
<td>91</td>
<td>074</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>40.884</td>
<td>94</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Dependent Variable: Supply Chain Performance

This research sought to establish the effect of adoption and use of e-procurement systems on the supply chain performance in the devolved governments. Earlier literature findings pointed out that e-procurement systems provide solutions that integrate and streamline procurement processes in an organization [15]. Findings of the study indicated e-procurement systems have a significant effect on supply chain performance in the county government of Homa Bay.

E-procurement systems were found to have vertical and horizontal effects on supply chain networks. Vertically, e-procurement contributes to the demand management of both inbound and outbound materials. Horizontally, it influences transactions, purchasing management, and marketing. The speed with which procurement processes are undertaken under e-procurement is enhanced, thereby improving on productivity, real time monitoring, transparency, costs, ease of use among other benefits. The findings of this study support those of other researches ([11], [28], [29]; [30]) which also indicated that organizations that adopt and use e-procurement systems in their procurement processes reap a number of benefits such as cost savings, improved service delivery, reduced lead time among others. These collectively resulted into increased effectiveness and customers became more satisfied with service delivery by such organizations.
While the findings indicate immense benefits of adopting and using e-procurement systems in procurement processes, the respondents admitted that the pace with which its adoption and use in Homa Bay county is rather slow. The slow adoption and use of e-procurement systems was attributed to a number of organizational factors. For example, lack of proper training of the supply chain partners on the use of e-procurement, resistance to change due to the fear of unknown, high initial implementation costs on the supply side of the chain among other factors were cited to contribute to the slow process.

5.0 Conclusion and Recommendation

From the findings, the study concludes that adoption and use of e-procurement systems, despite high initial costs, has numerous benefits both to the purchasing organization as well as their supply chain network organizations. Devolved governments in Kenya should fully adopt and use e-procurement systems. This would improve their effectiveness and efficiency, which in turn, lead to improved service delivery and customer satisfaction. However, there is need for proper education and training of the personnel involved in the procurement process as well as the supply chain partners for successful use.

References


