Assessment of road contractors' e-procurement adoption barriers in Kenya rural roads authority, Kenya

Rose Achieno Mukhongo [1], Fredrick Onyango Aila [2*]

[1] Department of Management Science, Maseno University
[2] Department of Business Administration, Maseno University

Abstract

The study assessed road contractors' e-procurement adoption barriers in KeRRA Busia guided by resource based and legitimacy theories on a descriptive design. A sample size of 323 out of 1667 contractors was drawn using Yamane (1967) formula. Stratified random sampling was used to draw respondents from the target population. Primary data was collected using structured questionnaires. A pilot of 33 respondents was studied. Instrument reliability was determined through test retest approach while expert judgment on content was used to determine the instrument validity. Cronbach's alpha reliability coefficient was α=.830 while content validity index was CVI=0.910. Descriptive statistics like frequencies, means and standard deviations was used to analyze the data. The findings indicate that 79.4% (mean=1.653, SD 0.226) of contractors believe that existing barriers considerably affected adoption of e-procurement. The study concludes that a small portion of contractors have adopted the e-procurement due to many barriers in organizations but with many drivers that can be invoked to raise this low adoption level. The study recommends that workshops be held to expose contractors on the strategic importance of e-procurement in performance of road construction projects. The findings provide practical and useful information for road contractors, Infrastructure Ministry, KeRRA and Government of Kenya for policy formulation, management and regulations.

Keywords: Contractors; E-Procurement; E-Sourcing; E-Tendering; E-Reverse Auctions

* Corresponding author. *E-mail address:* faila@maseno.ac.ke

1. Introduction

Procurement is the term most commonly employed to refer to the purchasing of goods and services for the day-to-day operation of a business (CIPS, 2013). The process undertaken before the emergence of e-procurement was manual, involving a lot of paperwork and prone to corrupt tendencies and time consuming. These inefficiencies led to adoption of e-procurement, where electronic communications are used to support all forms of transactions that facilitate the procurement process. E-Procurement refers to the use of Internet-based (integrated) information and communication technologies to carry out individual or all stages of the procurement process including search, sourcing, negotiation, ordering, receipt, and post-purchase review (Croom and Brandon-Jones, 2004).

Several researchers have investigated barriers to e-procurement, Smart (2010), looked at barriers relating to adjusting to e-procurement platform while PWC (2002) concentrated on infrastructural and legal frameworks for institutionalizing e-procurement in Kenya. Subramaniam and Shaw (2004) pointed out that technical and attitudinal issues or barriers are important. Others like Wyld (2004), Byline (2008), Aberdeen (2009) and Giunipero and Sawchuk (2009) agreed that top management commitment, cost implications and enabling environment are critical barriers to e-procurement. These past studies did not relate to government procurement activities and more so the third party suppliers' barriers to e-procurement as a result of government directive in dealing with her agencies. Therefore, the information on what barriers might hinder third party contractors from adopting e-procurement practices in relation to a government agency is lacking.

According to Wyld (2004), despite the overwhelming evidence which shows the advantages of e-procurement systems, most firms face proprietary systems challenges such as electronic data interchange (EDI) which continue to persist and have to be included in a company's overall e-procurement infrastructure. The information infrastructure in Kenya is slowly picking up and may be giving road construction contractors a challenge too. According to Uyarra and Flanagan (2010), in his study on the problems related to the adoption of e-procurement for indirect purchases, five problem factors related to e-procurement adoption were identified. They are: standardization issues and lack of flexibility; scarcity of resources; low transaction volumes; integration issues (immaturity of suppliers and immaturity of software vendors) and suppliers' own portals.

Giunipero and Sawchuk (2000), in their study on the barriers to adoption of e-procurement, asserted that though much progress has been made, significant barriers to successful e-procurement adoption remain in the context of supplier capacity, user adoption, budget and policy support and information communication technology (ICT) support. Similar factors may or may not be applicable in the road construction industry in Kenya. Khanapuri et al. (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. These requirements make the adoption process to face a number of barriers such as compatibility, integration, adoption and regular use by employees and lack of capacity by small suppliers. The situation in Kenya and especially road construction may be different or not.

Both studies by Wyld (2004) and Giunipero and Sawchuk (2000), compare well with this study in invoking the use of questionnaires and document guides. The data in both cases were analyzed using inferential

statistics. However, their sample sizes were less than 100 which could have had access to limited respondents. This study employed similar data collection instruments but with a larger sample size of 323 respondents. This is likely to give a wide base of respondents thus would reduce error chances in making conclusions. Uyarra and Flanagan (2010) in a different approach used focus group discussion only which was also limiting and content analysis in stationary supplies. However, the researcher used questionnaires then analyzed then using descriptive statistics as well as content analysis to establish the barriers to adoption of e-procurement practices by road contractors in KeRRA, Busia. Basing on the available records from the cited researchers and writers, there is no research existing to reveal barriers to adoption of e-procurement practices by road contractors in KeRRA, Busia and that is why the researcher had to examine the barriers to adoption of e-procurement by road contractors in KeRRA, Busia.

Byline (2008), Subramaniam and Shaw (2004) and PWC (2002) analyzed the barriers to adoption of e-procurement. However, PWC (2002) concentrated on infrastructural and legal frameworks for institutionalizing e-procurement in Kenya's public sector. Lack of legal framework, lack of technical expertise, lack of e-Procurement knowledge besides security concerns and lack of faith in trading partners were found to be significant factors holding back e-procurement. Subramaniam and Shaw (2004) focused on the IT B2B relationship in adopting e-procurement. The findings barricading e-procurement were that the systems used were not addressing non-production related procurement; difficulty of integrating procurement systems with the existing IT infrastructure; unwillingness to incur training and other costs; indifference to the problem on the part of the IT department; negative attitudes to procurement among senior managers; and the view that automating procurement would prove more difficult than automating many other business processes. Byline (2008) focused on the private construction industry in which operational management culture; supply-base culture; senior management culture; lack of appropriate offerings; and lack of technical knowledge proved to be the barriers to e-procurement adoption.

Byline (2008) and Subramaniam and Shaw (2004) thus focused on the private sector while PWC (2002) focused on the public sector. This study needed guidance of all the findings from Byline (2008), Subramaniam and Shaw (2004) and PWC (2002) since its focus is on both the private sector and the public sector. E-procurement systems are meant to reduce transaction costs by automating processes replacing human labor with information technology and even bring about transparency. The launch of Integrated Financial Management System (IFMIS) was to help facilitate e-governance including e-procurement. During the fact finding mission, contractors and other suppliers of Kenya Rural Roads Authority (KeRRA) Busia do not respond to communications made online. Research has been done on; factors affecting performance of e-procurement systems in KenGen, and also factors affecting implementation of e-procurement practices in Ministry of Finance and Strategy for the implementation and adoption of e-procurement which do not give any information on assessment of adoption of e-procurement by road contractors in Busia. Basing on the available records there is no research existing to reveal barriers to adoption of e-procurement practices by road contractors in KeRRA Busia and this led the researcher to examine the barriers to adoption of e-procurement by road contractors in KeRRA, Busia.

2. Methods

The study was conducted using descriptive survey research design which according to Kothari (2004) is a scientific method that involves collecting data in order to answer questions on current status of subjects of the study. The choice of this design was appropriate for this study since it was restricted to fact finding and is relatively easy to carry out within limited time but also looks at section of the study population whose results can be generalized to the entire population (Kothari, 2008).

The research was carried out in Busia Region as per the attached map for KeRRA (2016) boundaries of road networks. Busia is a county in the former Western Province of Kenya. It borders Kakamega County to the east, Bungoma County to the north, Lake Victoria and Siaya County to the south and Busia District as well as Uganda to the west. Busia is placed at the following coordinates: 00°27′11″N 34°07′30″E/0.45306°N 34.12500°E/0.45306; 34.12500. The region's elevation is 3,900ft (1, 200m). Its total population is 51,981 as per the Kenya National Population Census (2009). Busia has a total area of 1,628.4km^2. The target population comprising of 1667 road construction contractors from Busia Region was used. The target population covers a cross section of contractors from all the constituencies in Busia Region.

Table 1. Target Population

Constituency	Population	Proportion (%)
Funyula	277	17
Matayos	293	18
Budalangi	231	14
Nambale	260	16
TesoSouth	221	13
TesoNorth	192	12
Butula	193	12
Total	1667	100

Source: KeRRA Busia (2017) Pre-qualification Data

The study employed stratified random sampling. Proportionate sampling was used to determine the sample size from within each stratum. Yamane (1967) formula was employed in determining the sample size.

According to Yamane (1967):   n= $\dfrac{N}{\left[1+\left(N(e^2)\right)\right]}$ ………………………………. 1

     Where   n = is the sample size

                       N = is the population

                       e = is the error limit (0.05 on the basis of 95% confidence level)

     Therefore,   n = 1667 / [1 + 1667 (0.05)^2]

                       n = 1667/5.1675 = 322.6

                       n = 323

There are two types of data collection methods which include monitoring or observation and also communication or interrogation. The second type was applied since there was need to get a feedback from the subject and in this case contractor. The study used structured questionnaires and documentary review as data collection instruments among the 323 respondents. The study opted for this method of data collection because the questionnaires are relatively quick with responses being gathered in a standardized way and are more objective compared to other tools of data collection.

Primary data were collected using the questionnaires from the study respondents who are the road contractors. Secondary data from KeRRA reports were used, in addition, to complement the primary data sources. Additional secondary data were obtained from Public Procurement Oversight Authority (PPOA) reports. The researcher conducted a pilot survey in which 33 out of 323 respondents were used as recommended by Hill (1998) or Isaac and Michael (1995); these suggested a number to be between 10- 30 per cent of the sample size. Data collection was carried out through self-administered survey questionnaires. Respondents were selected from each of the groups for participation in the survey. Telephone contacts and physical address of respondents were obtained. The questionnaire deliveries were carried out, reminders made and personal collection done by the researcher and two research assistants. The respondents were asked to fill the questionnaires in between a period of same day to two weeks before being collected.

Structured questionnaires were used. Structured questionnaires were administered to the respondents because of their advantage of being able to obtain wide responses. A 5-points Likert-scale rating of questionnaire was employed in this study to collect the views of respondents. This enabled the researcher to ask respondents on how strongly they agreed or disagreed with a statement or series of statements. The other advantage of the Likert-style rating questionnaire is that it enables numerical value to be assigned to cases for easy quantitative analysis (Amin, 2005).

This is the level of internal consistency over time (Mugenda and Mugenda, 2003). A reliable instrument constantly produces expected results when used more than once to collect data from two samples drawn from same population (Kothari, 2004). Reliability was determined by the correlation of the scores from the independent raters. The overall alpha for all the items under investigation had a Cronbach's alpha of 0.830 which was above the benchmark Cronbach's alpha of 0.7 (Amin, 2005).

Validity is the degree to which results obtained from the analysis of the data actually represents the phenomena under study (Kothari, 2004). The validity of the questionnaires was tested using expert judgment and computed content validity index (CVI) method. To enhance validity of the study instruments, peer reviews were employed and also the researcher consulted the supervisors to help make the value contents of the study instruments and make modifications where necessary. The computed CVI of the instrument was 0.910 which was above the minimum CVI (CVI≥0.7) recommended in the survey studies (Amin, 2005). This compares well with the CVI found in the study by Abuya, Onditi and Magutu (2016) on material flow, supply chain performance and lead time of road construction projects in Kenya.

The data collected using questionnaires were analyzed in order to ensure logical completeness and consistency of responses. The completed questionnaires were checked thoroughly by editing, coding, entering in SPSS software version 24 to aid the analysis, then presented incomprehensive tables which showed the

responses of each category of variables quantitatively using descriptive statistics such as frequencies, percentages, means and standard deviations to present information pertaining the study objectives.

3. Results

The background information is first presented followed by results for each objective. As objective results are presented, they are interpreted and fully discussed. The response rate of the study is indicated in Table 2.

Table 2. Response Rate of the Study

Results	Frequency	Percentage (%)
Respondents	312	97
Non Respondents	11	3
Total	323	100

Source: Survey Data (2017)

The questionnaires were distributed to 323 randomly selected respondents and 312 were completed and returned, giving a response rate of 97 percent. This compares with Ade (2013) in which 30 selected respondents were contacted and the response was 29 which translates to 96.59% response rate. The collection procedures entailed personal administration, follow up after distribution of questionnaires through mobile phone calls for confirmation date when they would be ready for collection and personal collection whenever possible. The response rate was found to be sufficiently adequate for analysis and discussions of the study findings when compared to Abdullah et al. (2013) which was 82 percent. The unreturned questionnaires (3%) could be attributed to delay on the part of the respondents completing and hence being unable to return by collection date. The demographic characteristics of the respondents were analyzed in terms of gender, highest educational level, age and level of experience as shown below. The respondents indicated their gender profile in terms of either male or female in order to determine the nature of gender relations in the construction industry. Table 3 illustrates gender profile of the sample.

Table 3. Gender of Respondents

Gender	Frequency	Percentage (%)
Male	262	84
Female	50	16
Total	312	100

Source: Survey Data (2017)

The study found that 262 (83.97 %) respondents were males and 50 (16%) were females. The results indicate the construction industry is dominated by the male gender who account for the overwhelming majority of the respondents. The study results compare well and are consistent with the study of Zaherawati

et al. (2010) in which all the respondents were of the male gender i.e. 100% confirming that the construction industry is male dominated.

The respondents stated their age brackets as requested in the questionnaire and the results were as shown in Table 4.

Table 4. Age of respondents

Ages	Frequency	Percentage (%)
21-30 yrs	0	0
31-40 yrs	57	18
41-50 yrs	162	52
51 & Above yrs	93	30
Total	312	100

Source: Survey Data (2017)

Majority of the respondents 57 (52%) fall within 40 to 49 years of age. This was followed by 93 (30%) in the age group of 51 and above years. There were 57 (18%) respondents in the age of 31 to 40 years. A cumulative 80% of the respondents were within 31 – 50 years. Ameh and Odusami (2010) study made nearly similar observations whereby 91% of the respondents were within 30 - 49 years of age.

The respondents were requested to state the highest level of achievement for academic qualifications. Table 5 illustrates the levels of qualification for the entire sample.

Table 5. Highest Education Level

Education level	Frequency	Percentage (%)
Diploma	163	52
Undergraduate	119	38
Post-Graduate	30	10
Total	312	100

Source: Survey Data (2017)

The respondents were largely diploma holders as well as undergraduate degree holders. More than half 163 (52%) of the respondents had diploma qualification, 119 (38%) respondents had undergraduate degree and 30 (10%) respondents had a postgraduate degree qualification. This is inconsistent to a study by Ameh and Odusami (2010) who observed that 67 % of the respondents had a first degree or its equivalent. A study by Ade (2013), however, observed that all the respondents in the construction industry had obtained a minimum of diploma qualification and above i.e. 100%. This shows that the respondents were qualified, capable and reliable to explore the underpinning issues related to the study. The respondents stated their work experience levels as requested in the questionnaire and the results were as shown in Table 6.

Table 6. Experience Levels

Ages	Frequency	Percentage (%)
1-3 yrs	47	15
3-5 yrs	66	21
6-9 yrs	147	47
10 & Above yrs	52	17
Total	312	100

Source: Survey Data (2017)

Table 6 summarizes the distribution of respondents by experience. The majority (47%) of the respondents had between 6-9 years' experience compared to 21% who had between 3-5 years' experience and 15% of the respondents were having 1-3 years' experience while those with more than 10 years' experience being 31percent. This preliminary indication suggests that the many contractors' staffs have 6-9 years' experience, followed by those with 3-5 years' experience but there were few staff with 1-3 years' experience as well as those with over 10 years in the study area. This showed that all the respondents were experienced enough to make informed choices regarding e-procurement adoption in the road construction industry. However, majority of the respondents being between 6-9 years experience, the low level of e-procurement adoption could be attributed to slow thinking or sticking to old manual procurement practices as opposed to adopting new e-procurement practices. Besides, it is evident that most of the respondents had adequate experience with the operations, procedures and policies of the KeRRA contractors and public procurement and thus the issues of e-procurement that had been introduced in public procurement at various government agencies were not new to them. This facilitated flow of information regarding the study between them and the researcher.

Table 7. Descriptive Statistics for Barriers to E-Procurement Adoption

No	Statement	Frequency	Percentage	Mean	Std. Dev
1	There is high cost of e-procurement technology	309	99	1.132	0.053
2	There are inadequate Business Processes to support e-Procurement	214	69	1.628	0.308
3	There is inadequate e-procurement Solutions in the market	64	21	4.137	0.127
4	There is inadequate Technological Infrastructure to our partners	236	76	1.214	0.358
5	There is lack of e-Procurement knowledge	281	90	1.132	0.286
6	There is lack of integration between front and back-end systems	302	97	1.628	0.138
7	There is lack of Integration with our Business Partners	305	98	2.137	0.234
8	There is lack of Motivation for end-users like contractors to adopt the new systems	224	72	1.214	0.327
9	There are no real business benefits identified	248	80	1.132	0.301

10	Our operational management culture is not in favour of e-procurement	275	88	1.628	0.252
11	We feel there is high insecurity of our transactions being open to our competitors	294	94	2.137	0.121
12	Our senior management culture does not support e-procurement	214	69	1.214	0.236
13	Our supply-base does not use e-procurement so we feel it will be an unnecessary investment	179	57	1.132	0.056
14	It is difficult integrating procurement systems with the existing IT infrastructure	298	96	1.628	0.286
15	There are negative attitudes to procurement among senior managers, who often regard it as an overhead Centre than as a strategic function	201	64	2.137	0.230
16	The perception that automating procurement would prove more difficult than automating many other business processes	273	88	1.214	0.351
	Mean Score	245	79	1.653	0.229

Source: Survey Data (2017)

The barriers to automation among the key activities in the procurement unit will hinder the adoption of e-procurement system. The respondents were thus asked to indicate the extent to which they agreed with various barriers that hinder the adoption of e-procurement among the road construction contractors in Busia, Kenya using a five point Likert scale of 1= Strongly Agree; 2 = Agree; 3= Undecided; 4= Disagree and 5= Strongly Disagree.

Table 7 indicates that of the 312 respondents, the mean response was 1.132 and that 99% of the respondents agreed that there is high cost of e-procurement technology with a standard deviation of 0.053 indicates that not all the respondents agreed with this fact, some disagreed with it. A total of 69% agreed that there were inadequate Business Processes to support e-Procurement with a mean response of 1.628 and a standard deviation of 0.308 indicates that not all the respondents agreed with this fact, some disagreed with it. About 21% however felt that there were inadequate e-procurement solutions in the market with a mean response of 4.137 and a standard deviation of 0.127 indicates that not all the respondents agreed with this fact, some disagreed with it.

A total 76% agreed there is inadequate Technological Infrastructure to our partners with a mean response of 1.214 and a standard deviation of 0.358 indicates that not all the respondents agreed with this fact, some disagreed with it. The findings indicate that 90% agreed there is lack of e-Procurement knowledge with a mean response of 1.132 and a standard deviation of 0.286 indicates that not all the respondents agreed with this fact, some disagreed with it. About 97% concurred that there was lack of integration between front and back-end systems with a mean response of 1.628 and a standard deviation of 0.138 indicates that not all the respondents agreed with this fact, some disagreed with it.

Further, 99% agreed that there was lack of integration with their Business Partners with a mean response of 2.137 and a standard deviation of 0.234 indicates that not all the respondents agreed with this fact, some disagreed with it. About 72% support the fact that there was lack of motivation for end-users like contractors to adopt the new systems like e-procurement with a mean response of 1.214 and a standard deviation of 0.327 indicates that not all the respondents agreed with this fact, some disagreed with it. A total of 80% do believe that there were no real business benefits identified on using e-procurement with a mean response of 1.132 and a standard deviation of 0.301 indicates that not all the respondents agreed with this fact, some disagreed with it.

Of the respondents, 88% thought that their operational management culture is not in favour of e-procurement with a mean response of 1.628 and a standard deviation of 0.252 indicates that not all the respondents agreed with this fact, some disagreed with it. A whopping 94% felt that there is high insecurity of their transactions being open to our competitors with a mean response of 2.137 and a standard deviation of 0.121 indicates that not all the respondents agreed with this fact, some disagreed with it. About 69% agreed that their senior management culture does not support e-procurement with a mean response of 1.214 and a standard deviation of 0.236 indicates that not all the respondents agreed with this fact, some disagreed with it. The findings further indicate that 57% of the 312 respondents purpose that their supply-base does not use e-procurement and felt it would be an unnecessary investment. The mean response was 1.214 with a standard deviation of 0.056 indicates that not all the respondents agreed with this fact, some disagreed with it.

The results further indicate that 96% do agree that it is very difficult to integrate procurement systems with their existing IT infrastructure. The mean response was 1.132 with a standard deviation of 0.236 indicates that not all the respondents agreed with this fact, some disagreed with it. Meanwhile, 64% agreed that there are negative attitudes to procurement among senior managers, who often regard it as an overhead Centre than as a strategic function. The mean response was 2.137 with a standard deviation of 0.230 indicates that not all the respondents agreed with this fact, some disagreed with it. Lastly, 88% the respondents agreed that automating procurement would prove more difficult than automating many other business processes with a standard deviation of 1.215 indicating that not all the respondents agreed with this fact, some disagreed with it.

In view of these results, the following factors were found to be important barriers to the adoption of e-procurement in Kenya for KERRA contractors: usage of old IT equipment that need overhaul, high costs required to make the equipment 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 road construction contractors are still using decades-old equipment and parts whose documentation is paper-based and lacks the digital format necessary for e-Procurement system. The finding on employee resistance to adoption of e-procurement was 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. However, the findings by Byline (2008), Subramaniam and Shaw (2004) and PWC (2002) widen this scope of the e-procurement barriers to include: lack of legal framework, lack of technical expertise, lack of e-procurement knowledge besides security concerns and lack of faith in trading partners to be significant factors holding back e-procurement.

The results further indicate that contractors face the challenge of lack of internet access by small suppliers and lack of board approval in adopting e-procurement, thus, another barrier to e-procurement adoption. This supports the position by Moore (2003). It is also clear that there is lack of managerial support in the adoption of e-procurement systems among the road construction contractors in Busia, Kenya. This therefore implies that road construction contractors in Busia, 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. Giunipero and Sawchuk (2000) also gave a wider view of the significant barriers to successful e-procurement adoption in the context of supplier capacity, user adoption, budget and policy support and information communication technology (ICT) support.

4. Discussion

This objective sought to establish the barriers to adoption of e-procurement by KeRRA contractors in Busia, Kenya. The study established that majority of the contractors believe that the existing barriers have considerably affected their adoption of e-procurement that include usage of old IT equipment that need overhaul, high costs required to make the equipment 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, inadequate business processes to support e-procurement; inadequate technological infrastructure to our partners; lack of e-procurement knowledge; lack of integration between front and back-end systems; lack of integration with business partners; lack of motivation for end-users like contractors to adopt the new systems; operational management culture not in favour of e-procurement; the feeling of high insecurity of transactions being open to our competitors; senior management culture of not supporting e-procurement; the feeling that e-procurement is an unnecessary investment since active supplier-bases are not using e-procurement, difficulty in integrating procurement systems with the existing IT infrastructure; negative attitudes to procurement among senior managers, who often regard it as an overhead centre than as a strategic function and lastly, the perception that automating procurement would prove more difficult than automating many other business processes. The results further indicate that contractors face the challenge of lack of Internet access by small suppliers and lack of board approval in adopting e-procurement, therefore, another barrier to e-procurement adoption. It is also clear that there is lack of managerial support in the adoption of e-procurement systems among the road construction contractors in Busia, Kenya.

5. Conclusion

The study sought to determine the barriers to road contractors' adoption of e-procurement practices in KeRRA Busia. The study concluded that there are a number of barriers to the adoption of e-procurement in KeRRA Busia contractors hence the low adoption level. However, if the drivers that exist are well addressed then they can alter the level of e-procurement adoption.

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