



**INFLUENCE OF TECHNOLOGY ON PERFORMANCE OF ELECTRONIC PROCUREMENT SYSTEMS IN KENYA OWNED PARASTATALS: A CASE STUDY OF KENYA AGRICULTURAL AND LIVESTOCK RESEARCH ORGANIZATION**

Kimani, D. N., & Juma, D.

---

**INFLUENCE OF TECHNOLOGY ON PERFORMANCE OF ELECTRONIC PROCUREMENT SYSTEMS IN KENYA OWNED PARASTATALS: A CASE STUDY OF KENYA AGRICULTURAL AND LIVESTOCK RESEARCH ORGANIZATION**

**Kimani, D. N.,<sup>1\*</sup> & Juma, D.<sup>2</sup>**

<sup>1\*</sup> Msc. Candidate, Jomo Kenyatta University of Agriculture & Technology [JKUAT], Kenya

<sup>2</sup>Ph.D, Lecturer, Jomo Kenyatta University of Agriculture & Technology [JKUAT], Kenya

**Accepted: May 30, 2019**

---

**ABSTRACT**

*The study explored the influence of technology on the performance of Electronic Procurement systems in Kenya Parastatals: A case study of Kenya Agricultural and Livestock Research Organization. The study adopted a descriptive research design and drew its target population from all the 84 employees of the Kenya Agricultural and Livestock Research Organization Africa (Kenya) Limited. Data was collected using well-structured questionnaires from both top and middle-level employees of Kenya Agricultural and Livestock Research Organization. A pilot test was conducted using questionnaires administered to 8 members of staff. This constituted 10% of the respondents of the sample size; purposive sampling was used to select top management and departmental heads while random sampling was used to select other employees. Data collected was analyzed by the use of descriptive statistics and inferential analysis using statistical package for social science (SPSS). Findings from the study established integration of technology as the main key components of Procurement performance. Technology was found to have contributed to the enhanced performance of the Electronic Procurement system through improved efficiency, the creation of better understanding and flexibility in the procurement processes and also aiding at the reduction of errors that might occur along the supply chain cycle and boost user support confidence on the use of Electronic Procurement systems.*

**Key Words:** Technology, Electronic Procurement Systems, KARLO

---

**CITATION:** Kimani, D. N., & Juma, D. (2019). Influence of technology on performance of electronic procurement systems in Kenya owned parastatals: A case study of Kenya Agricultural and Livestock Research Organization. *The Strategic Journal of Business & Change Management*, 6 (2), 2369 – 2378.

---

## INTRODUCTION

For companies competing in highly dynamic markets, the search for new sources of competitive advantage is essential. Rapid changes in technological development are forcing businesses to look continuously for innovative strategies to improve their competitiveness. (Sweeney, 2013) argues that Electronic Procurement technology has transformed productivity in animal health and plant health management essentials supply firms. However, in recent decades, technology has also assumed greater importance in the other services sector facilitating growth by offering service firms important competitive leverage (Lyons, 2006).

When markets become increasingly competitive, firms seek new opportunities to improve their competitiveness. Therefore, firms use advanced information technology, such as Electronic Procurement system, in order to achieve advantages over their competitors. Electronic Procurement Systems have been used on a large scale by firms in the hope to increase, among others, their market agility since the introduction of these systems in the 1990s (Lin, 2009). An Electronic Procurement system has the potential to integrate all the data and the information flowing throughout the entire firm (Lopez, 2013) and these systems have been defined as “enterprise-wide packages that tightly integrate business functions into a single system with a shared database” (Lopez, 2013). According to (Karimi, 2013), the Electronic Procurement system is a system that integrates all departments and functions across a company onto a single computer system that can serve all departmental needs. (Lin, 2009) observed that an Electronic Procurement system is universally accepted in the corporate world as a practical solution for the purpose of facilitating the smooth flow of common functional information and practices across the entire organization. Electronic Procurement system can, therefore, be defined as a collection of applications that cover a wide variety of

an organization’s business functions, such as production, inventory, finance, human resource, among others, and consequently presents them as a monolithic system for purpose of enhancing operational efficiency and effectiveness (Lyons, 2009).

Over the whole world, we can see a rapidly increasing number of firms that adopt an Electronic Procurement system (Granlund & Malmi, 2012). An obvious example of the rising importance of Electronic Procurement Systems is the considerable sales increase of the largest vendor, SAP, which has grown from less than \$500 million in 1992 to \$17,6 billion in 2014 (Lopez, 2013: SAP annual report, 2014). This has to do with the fact that firms seem to think that an implementation of an Electronic Procurement system leads automatically to higher efficiency, and hence for better performance relative to non-adopting firms (Bernard, 2008). Further, expectations are that an Electronic Procurement performance has major implications for the organizational structure, the manner of working and also on management control (MC) (Leech, 2007). The potential suggested benefits regarding Electronic Procurement Systems have attracted significant attention from researchers in the area of accounting (Vandael, 2011).

The implementation of an electronic procurement systems in Kenya, like any large project, is fraught with danger. The scan group 2014 survey showed that approximately 2000 firms apply electronic procurement systems and found that only 16% were successful. The significant risks attaching to technology investments discourage many firms from committing resources to enhance their performance into the future (bowen, 2010). Kenya has embarked on a concerted effort in joining the league of industrialized nations in the acquisition, deployment, consumption and utilization of Electronic Procurement system. It has become an indispensable tool for individual and national empowerment,

improvement, development and actualization of service. (debela, 2009) emphasized that automation of physical activities has been affecting the blue-collar workers. He went further to say that automation of information activities in office has changed the nature of office work and has highly affected the activities of knowledge on workers. The use of electronic procurement assists and improves the delivery of services in civil service due to the high qualities of processing, service delivery and maximum efficiency in all areas that involve the knowledge of computer. Electronic procurement is also relevant to both public and private organization as well as to individuals. Electronic procurement is used in assisting in the organizational functions such as administrative planning, coordinating, controlling, directing, budgeting, reporting and staffing.

The objectives of KALRO are to expedite equitable access to research information, resources and technology and promote the application of research findings and technology in the field of agriculture and also promote, streamline, co-ordinate and regulate research in crops, livestock, genetic resources and biotechnology in Kenya. KALRO operates as an interactive and interdependent network of semi-autonomous institutions committed to a common goal, vision and mission. KALRO has an establishment of approximately 613 staff deployed within the research institutes and centers country wide.

The vision of the organization is to be a globally competitive Agricultural and livestock Organization while the mission is to generate and disseminate agricultural and livestock knowledge, innovative technologies and services that respond to clientele demands, for sustainable livelihoods. KALRO'S mandate is to establish suitable legal and institutional framework for coordination of agricultural research in Kenya while the collection in agricultural research libraries aims at supporting the creation of an efficient production and marketing system informed

by contemporary knowledge, technologies and best practices in agriculture.

### **Statement of the problem**

Several scholars have carried out research concerning the electronic procurement Systems in Kenya. Karimi (2013) did an investigation of critical success factors for successful Implementation of Electronic Procurement Systems in Kenya and the study concluded that "Teamwork and composition in the Electronic Procurement implementer-vendor-consultant partnership, good communication between the implementation partners, cross functional Electronic Procurement core team, presents of partnership trust in the team members working well together and change management program and culture are critical successful factors in Electronic Procurement implementation". While there is 89% adoption of Electronic Procurement Systems in Europe and North America, developing countries like Kenya has only adopted it 27% (Palvia, 2001). This can be attributed to among others; lack of top management commitment, poor staff training on the use of Electronic Procurement Systems, high costs of implementing the systems and how well is integrated within the organization. Many studies in literature have shown the importance of Electronic Procurement system in companies' effectiveness, and this is because Electronic Procurement system has become one of the main prerequisites, a price of entry, and a strong and integrated IT infrastructure for many companies enabling them to compete in the local and global market place and ensuring them to gain a competitive advantage in the global economy particularly with the current e-business (Lin, 2009).

Wanyonyi (2015) did a study on the Challenges of implementing enterprise resource planning strategy at public institutions case of Kisumu County. The study established that Wanyonyi (2015) organizational structure was incompatible with Electronic Procurement system, non-supportive

organizational culture, inadequate allocation of resources, resistance to change, ineffective communication, high implementation costs, lack of incentives and reward systems and inadequate user training and education. Kariuki (2010) did an investigation of the business value of enterprise resource planning systems by firms in the public sector in Kenya. Kangogo (2013) carried out research on implementing an Electronic Procurement system at the Kenya Revenue Authority. Most of the above past studies have dwelt much on the business value, effects and challenges of Electronic Procurement Systems performance in public sector organizations no studies had been done on influence of technology on performance of Electronic Procurement performance among private sector firms especially firms dealing with animal and crop health. This study helped bridge the missing knowledge on the influence of technology on performance of Electronic Procurement system in Kenya Agricultural and Livestock Research Organization.

### Objective of the Study

The objective of this study was to establish the influence of technology on performance of Electronic Procurement systems in Kenya Owned Parastatals: A case study of Kenya Agricultural and Livestock Research Organization.

## LITERATURE REVIEW

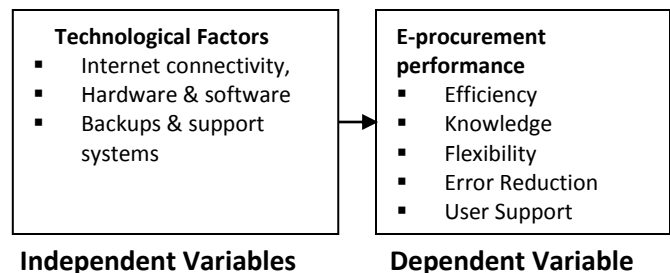
### Theoretical Framework

#### Socio-technical Theory

The Socio-technical theory studies about social aspects of people and technical aspects of organizational structure, and processes, and the effects to technology implementation (Bostrom & Heinen, 1977). Therefore socio-technical theory is about joint optimization which designs the social system and technical system in tandem to enable work efficiency. According to Walker, Stanton, Salmon and Jenkins (2007), the social and technical

factors interact to generate conditions for successful/unsuccessfulness of system performance in the efficiency of functions in an organization. Socio-technical theory aims at addressing the problem of inefficiency by implementing technological solutions in the form of Electronic Procurement Systems which smoothly bring people together and the technical structures of procurement functions. This theory aims to draw a connect between the organizational factors and technology aspect which both is presumed to greatly impact Electronic Procurement Systems performance in most organizations.

### Conceptual Framework



**Figure 1: Conceptual framework**

Source: Author (2019)

#### Technological factors

According to (Sweeney 2013) technology has traditionally been viewed as the key to productivity in manufacturing industries. However, in recent decades, technology has assumed greater importance in the services sector facilitating growth by offering service firms important competitive leverage and Electronic transmission has revolutionized the cost and speed of purchasing processes (Lyons, 2006).

As observed by (Lopez 2013) ICT resources impact on communication improvement, this includes internal and external communication and coordination of activities. ICT enables a faster and more efficient use of information both within the firm and with external agents, such as customers and suppliers. ICT facilitates interaction and better coordination among workers, departments and firms. The process of adoption of ICT (Dyerson and Spinelli, 2011) is



complex and it is stimulated by the occurrence of the following conditions: *business conditions* (sensitivity and commitment of the top strategic management), *organizational conditions* (the presence of an ICT Pivot: entrepreneur, manager, IT department employee or external consultant/vendor), *management conditions* (an appropriate presidium of ICT tools by skilled human resources). The analysis of factors of ICT adoption and the impacts on organizations are very important to understand how to stimulate in SMEs the process of investment in new technologies to acquire competitive advantages and good business performances.

Countries in the world are moving from an industrial economy to a knowledge economy in which economic growth is dependent on a country's ability to create, accumulate and disseminate knowledge. Computers and the internet have catalyzed the growth of the knowledge economy by enabling people to codify knowledge into a digital form easily transmitted to anywhere around the world. People who have access to this new wave of ICT – broadly defined as technology that can be used for transmitting and/or processing information – are part of an information society connected to a virtual network that constantly creates and disseminates new information. According to (Kogilah, N., Santhapparaj, A. & Eze, U, 2008) ICT has sped up the pace of globalization and increased the complexity of business practices because firms not only need to be familiar with their local context but also with global developments. Thus, to compete in the knowledge economy, countries need a strong ICT - literate skills base that can innovate and adapt quickly to change. More value is placed on the knowledgeable worker than ever before. As cited by (Lin, 2009) knowledge, change and globalization are the driving forces of the new economy

Information and communication technologies (ICTs) are being adopted in different organizations to improve efficiency and to provide better services to

their customers. There has been reported increase in the use of ICT in Kenya. The effects of ICT usage have been rated to be positive by many enterprises (Matambalya, 2001). Though ICT has many impacts on any given enterprise, it's been argued that ICTs are creating a new economy-information economy-in which information is the critical resource and basis for competition in all sectors (Aissaoui et al, 2007), however according to (Namusonge, 2013) In the world over 200 million people run non-profit micro and small agro processing enterprises and have often singled out access to technology as the major hindrance to growth and competitiveness.

### **Empirical Literature**

Many researches argue that technology adoption brings down the operational costs (Amado et al., 2010), contributes 6 to 81% marginal increase in output (Brynjolfsson and Hitt, 2000; Adewoje et al., 2012), not only improve the efficiency (cost reduction) but also increases the effectiveness (improve performance and make the organization more flexible and better accountability) (Sabbaghi and Vaidyanathan, 2008; Rusli, 2012), reduce environmental impact instead of lowering energy costs (Bressler et al.; 2011).

(Chang, 2010 & Zheng 2000) pointed out that, the main five parts of any supply chain is plan, buy, make, move, and sell. Supply chain contains applications such as, manufacturing planning, demand planning, distribution planning, transportation management, warehousing management, performance management, production scheduling, freight payment, capacity planning, customer clearance, sourcing and procurement, and finally supply chain optimization. (Ngulube & Tafor, 2006) in a study on impact of management of records in the public sector in Africa found that records and information management in developing countries was significant in effective management of the sector. This is because effective record management leads to

accountability. However, the researchers observed that record management in most public sectors in developing countries were poorly management and hence the poor performance of most public institutions.

## METHODOLOGY

This study adopted descriptive research design. According to Cooper and Schindler (2000), a descriptive research design is concerned with finding out the, who, what, where, when and how much. The target population of this study comprised of 186 members of staff of Kenya Agricultural and Livestock Research Organization. The sampling frame was obtained from the human resource department directory of Kenya Agricultural and Livestock Research Organization (2018). Random sampling was used in this study. The sample size of this study was 62 respondents that were selected from the departments in the headquarters. In this study, the main data collection instrument was questionnaires. The study received both quantitative and qualitative

data from the respondents. The questionnaires received were coded and edited for completeness and consistency. Quantitative data were analyzed by employing descriptive statistics and inferential analysis using statistical package for social science (SPSS).

## FINDINGS

### Technological factors

#### Do technological factors determine performance of Electronic Procurement Systems organizations?

The study sought to determine whether technological factors affect electronic procurement system performances, from the findings, majority of the respondents as shown by 97.3 % indicated that financial capabilities affected the electronic procurement system performance of the firm while 2.7 % of the respondents were of the contrary opinion. This implied that technological factors affect electronic procurement system performance.

**Table 1: Technology**

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	57	97.3	97.3	97.3
No	2	2.7	2.7	100.0
Total	59	100.0	100.0	

**Table 2: Descriptive statistics for technological factors**

	N	5	4	3	2	1	Mean	Std. Dev.
High internet connectivity enables better performance of Electronic Procurement Systems	5 9	12.50%	16.67%	20.83%	27.08%	22.92%	1.3973	.66122
Does availability of high speed and modern hardware and software enable better performance of Electronic Procurement Systems	5 9	2.08%	6.25%	10.42%	22.92%	58.33%	1.6438	.63179
Does availability of ICT backups and end user support systems enable better performance of Electronic Procurement Systems	5 9	27.08%	25%	16.67%	18.75%	12.5%	1.4658	.55483

The table above showed that majority of the respondents agreed that High internet connectivity enables better performance of Electronic Procurement Systems. Most systems today run on internet connection in order to transmit information from one point to another, therefore good connectivity means good communication hence better performance. This was indicated with a mean and standard deviation of 1.397 and 0.66 respectively.

Secondly the respondents agreed that availability of high speed and modern hardware and software enabled better performance of Electronic Procurement Systems. Well maintained systems both in hardware and software allowed smooth operation of systems. This was indicated in the study with a mean and standard deviation of 1.64 and 0.63 respectively.

Lastly the respondents agreed to the fact that availability of ICT backups and end user support systems enabled better performance of Electronic Procurement Systems. This implied that feedback from users was a vital aspect in establishing success of any given system. Feedback would clearly indicate whether the system was successful in conducting its duties or not. The study supported this with a mean and standard deviation of 1.47 and 0.55 respectively.

### **SUMMARY**

The study indicated that ICT resources impact on communication improvement; this includes internal and external communication and coordination of activities. ICT enables a faster and more efficient use of information both within the firm and with external agents, such as customers and suppliers. ICT facilitates interaction and better coordination among workers, departments and firms. The study observed

that high internet connectivity enabled better performance of electronic procurement systems. Most systems today run on internet connection in order to transmit information from one point to another, therefore good connectivity means good communication hence better performance. Well maintained systems both in hardware and software allow smooth operation of systems.

### **CONCLUSION**

Another variable in the multiple linear regressions was technological factors. The findings revealed that technological factors were found to explain of the variation that occurred in the electronic procurement system performance. The analysis of factors of ICT adoption and the impacts on organizations are very important to understand how to stimulate in SMEs the process of investment in new technologies to acquire competitive advantages and good business performances. Countries in the world are moving from an industrial economy to a knowledge economy in which economic growth is dependent on a country's ability to create, accumulate and disseminate knowledge.

### **RECOMMENDATIONS**

From the findings of the study, technological factors should not be ignored since they significantly affect electronic procurement systems. Finally, the support and influence of the ICT structures by the government is greatly needed to support organizations that are just adopting these new systems.

### **Suggestions For Further Studies**

The study sought to determine technological factors affecting the performance of electronic procurement system performance. The study recommended that other variables should be established and their effects assessed as well.



## REFERENCES

- Adewoje, J.O., Akanbi, T.A. (2012), *Role of Information and Communication Technology Investment on the Profitability of Small Medium Scale Industries – A Case of Sachet Water Companies in Oyo State, Nigeria*, Journal of Emerging Trends in Economics and Management Sciences (JETEMS) 3 (1): 64-71.
- Asghar Sabbaghi and Ganesh Vaidyanathan (2008), *Effectiveness and Efficiency of RFID technology in Supply Chain Management: Strategic values and Challenges*, Journal of Theoretical and Applied Electronic Commerce Research, Vol. 3, issue 2, p.71-81.
- Augier, M. and D.J. Teece (2009), *“Dynamic capabilities and the role of managers in business strategy and economic performance”*
- Benson, W. (2008). *Strategic value of information technology on procurement process among manufacturing firms in Kenya*. International Journal of Science and Research Vol. 2 No.32, pp.44-59
- Deloitte, (1999). *“ERP’s second wave maximizing the value of ERP-enabled processes”* Asian Journal of business and commerce 45 (6) :457-475.
- Gibson, N., Holland, C.P., & Light, B. (2010). *“Enterprise resource planning: a business approach to systems development”*, Proceedings of the 32nd Hawaii International Conference on System Sciences.
- Goodhue, D.L., Wybo, M.D., & Kirsch, L.J. (1992). *“The impact of data integration on the costs and benefits of information systems”*, MIS Quarterly, Vol. 16 No.3, pp.293-308.
- Hitt, L.M., Wu, D.J., & Zhou, X. 2012). *“Investment in enterprise resource planning”*, Journal of Management Information Systems, Vol. 19 No.1, pp.71-98.
- Hsu, L.L. (2005). *“Supply chain system effects on performance for interaction between suppliers and buyers”*, Journal of Industrial Management & Data Systems, Vol. 105 No.7, pp.857-75.
- Hsu, L.L., & Chen, M. (2004). *“Impacts of ELECTRONIC PROCUREMENT system on the integrated-interaction performance of manufacturing and marketing”*, Journal of Industrial Management &
- Y.C. (2011). *“Planning enterprise resources by use of a reengineering approach to build a global logistics”*. Data Systems, Vol. 104 No.1, pp.42-55.
- Huang, S.M., Kwan, I.S.Y., & Hung (2011). *“Management system”*, Journal of Industrial Management and Data Systems, Vol. 101 No.9, pp.483-91.
- Huang, Z., & Palvia, P. (2011). *“ELECTRONIC PROCUREMENT implementation issues in advanced and developing countries”*. Business Process Management Journal 7 (3): 276-284.
- Kallunki, J.-P., Laitinen, E. K., & Silvola, H. (2011). *Impact of enterprise resource planning systems on management control systems and firm performance*. International Journal of Accounting Information Systems, 12(1), 20e39.
- Kemp, M.J., & Low, G.C. (2008). *“ELECTRONIC PROCUREMENT innovation implementation model incorporating change management”*, Business Process Management Journal, Vol. 14 No.2, pp.228-42.

- Khaled, A., Zahran, A., & Eldabi, T. (2011). *'Critical Success Factors in ELECTRONIC PROCUREMENT Implementation* European and Mediterranean conference journal 3 (7) 12.
- Kremzar, M.H., & Wallace, T.F. (2001). *ERP: Making it Happen: The Implementers' Guide to Success with Enterprise Resource Planning*, John Wiley & Sons Inc, New York, NY.
- Lambert, D.M., & Cooper, M.C. (2010). *"Issues in supply chain management"*, Industrial Marketing Management, Vol. 29 pp.65-83.
- Li, S., Rao, S.S., Nathan, T.S.R., & Nathan, B.R. (2005). *"Development and validation of a measurement instrument for studying supply chain management practices"*, Journal of Operations Management, Vol. 23 pp.618-41.
- Liang, H., Xue, Y., Boulton, W.R., & Byrd, T.A. (2004). *"Why Western vendors don't dominate China's ELECTRONIC PROCUREMENT market"*, Communications of the ACM, Vol. 47 No.7, pp.69-72.
- Liu Z., & Wei, P. (2016). *ELECTRONIC PROCUREMENT Implementation Case of China's Hauling Company Finance & Accounting* 7 Asian journal of commerce and business 123 (4) 13.
- Mabert, V.A., Soni A., & Venkataramanan, M.A. (2013). *Enterprise resource planning Managing implementation process*, European journal of operational Research 146 (2): 304 ,314
- Maditinos, D., Chatzoudes, D., & Tsairidis, C. (2012). *"Factors affecting ELECTRONIC PROCUREMENT system implementation effectiveness"*, Journal of Enterprise Information Management, Vol. 25 No.1, pp.60-78.
- Molla, A., & Bhalla, A. (2006). *"Business transformation through ERP: a case study of an Asian company"*, Journal of Information Technology Case and Application Research, Vol. 8 No.1, pp.34.
- Neely, A., Gregory, M., & Platts, K. (1995). *"Performance measurement system design: a literature review and research agenda"*, International Journal of Operations and Production Management, Vol. 15 No.4, pp.80-116.
- Njuguna, D. (2011). *Influence of Electronic Procurement Systems on revenue collections at Kenya Revenue Authority*, Asian journal of commerce and business 90 (12):345-376.
- Nyaga, W. (2012). *Role of ICT support tools in procurement in manufacturing sector firms*, International journal of science and research 42 (5); 12-24.
- Olson, D.L., Chae, B., & Sheu, C. (2005). *"Issues in multinational ELECTRONIC PROCUREMENT implementation"*, Int. J. Services and Operations Management, Vol. 1 No.1, pp.7-21.
- Otieno, J. (2015). *Role of Electronic Procurement Systems on procurement among service sector organizations case of tourism hotels in Kenya*. African journal of business 12 (6): 21-32.
- Park, K., Kusiak, A. (2005). *"Enterprise resource planning (ERP) operations support system for maintaining process integration"*, International Journal of Production Research, Vol. 43 No.19, pp.3959-82.
- Parr, A., Shanks, G. (2000). *"A taxonomy of ELECTRONIC PROCUREMENT implementation approaches"*, 33rd Hawaii International Conference on System Sciences (HICSS), Maui,

- Rashid, M.A., Hossain, L., Patrick, J.D. (2002). *The Evolution of Electronic Procurement Systems : A Historical Perspective*, Idea Group Publishing, Hershey, PA.
- Rom, A., Rohde, C. (2006). "Enterprise resource planning systems, strategic enterprise management systems and management accounting: a Danish study", *Journal of Enterprise Information Management*, Vol. 19 No.1, pp.50-66.
- Shepherd, C., Gunter, H. (2006). "Measuring supply chain performance: current research and future directions", *International Journal of Productivity and Performance Management*, Vol. 55 No.3/4, pp.242-58.
- Sila, M. (2010). *Electronic Procurement Systems and their role in modern procurement practices* *International journal of business and commerce* 34 (2) :234-245.