Influence of Lean Procurement Tools on Performance of Procurement Function in Agriculture and Food Authority, Kenya

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Abstract:
Procurement in Kenya public institutions is characterized by resource wastage, corruption resulting to the lack of value for money. This study sought to determine the influence of lean procurement tools on the performance of procurement function in public institution a case of Agriculture and Food Authority. In specific, the study sought to determine the influence of Just in Time, E-procurement, Supplier Relationship Management and Continuous Improvement on the performance of the Procurement function. Descriptive research design was employed. The target population of the study was 8 directorates of Agriculture and Food Authority with accessible population of 450 and a sample of 82. Data was collected analyzed using SPSS. Demographic, descriptive, and inferential analysis were carried out and the findings presented in form of tables and figures. The study established that Just in Time, E-procurement, Supplier relationship Management and Continuous Improvement have a positive and significant relationship with the performance of procurement function in Agriculture and Food Authority. The study concluded that an improvement on just in time, e-procurement, supplier relationship management and continuous improvement leads to improved performance of procurement function. The study recommended for improvement zero inventories, zero lead time, e-tendering, supplier development, reduced variability among other recommendations.

Keywords: Just in time, continuous improvement, supplier relationship management, and e-procurement

1. Introduction

Globally, the increasing awareness of lean procurement has been triggered in almost every industry to lean manufacturing and supply chain philosophy methods (Liker, 2004). Lean has successfully been applied in industries other than automobile industries such as the service industry, healthcare and government, and continues to evolve and spread (Bowen &Youngdahl, 2006). In Kenya, lean procurement has been used in the manufacturing industry and also in the service sector even though at a low rate(Sifuna, 2008).The failure to establish performance measurement of procurement function among public institutions in Kenya has led to irregular and biased decisions that have costly consequences to every entity(Weele, 2011). There is a need for reliable methods of performance measurement of procurement functions in public entities, especially in Kenya. The issue of basing performance on financial performance and neglecting or ignoring non-financial performance does not help the procurement function since only partial measurement of performance is considered (Lardenoijeet al, 2005).

The government has been facing constraints in funding its institutions; and financing by foreign partnerships and donors have played a crucial role in alleviating these financial shortcomings. Nevertheless, financial limitation still remains public institutions' main challenge, yet they are expected to provide quality services to the publicwhose population has been growing rapidly. The limited finances have brought about challenges not only on maintaining but also on improving on quality of government services to the citizens. It is because of this situation that some public institutions in their attempts to ensure high performance, have considered lean procurement as an option in their efforts to cut costs, improve efficiency, quality, and reduce lead time in the supply chain.

1.1. Statement of the Problem

Public procurement management in Kenya faces challenges of resource wastage, corruption and the lack of value for money in spite the existence of laws and regulations. The Public Procurement and Asset Disposal Act, 2015 enacted to ensure efficiency in public procurement, is still not fruitful since there is still evidence of waste and high cost in the public procurement processes. According to Transparency International Kenya report(2014), there is evidence that an effective procurement system could save the government approximately 25% of its total expenditure. This is a significant amount considering the fact that public procurement accounts for 11% of the GDP. In 2017 alone, Kenya's GDP was estimated at

Kshs. 7,700 billion putting the total expenditure on procurement by the Government at around Kshs. 770 billion annually. It is, therefore, concluded that a 25% savings due to improvements in procurement practices would mean a yearly gain to the exchequer of about Kshs. 154 billion. The gains expected to accrue from a streamlined procurement system will allow the Government to invest more resources in other priority areas and thereby improving service delivery by public entities. In order to eliminate waste, reduce cycle time and flow time, increase capacity, reduce inventories, increase customer satisfaction and generally improve efficiency and effectiveness in functional operations, this study, sought to determine the influence of lean procurement tools on the performance of procurement function in public institutions in Kenya with reference to Agriculture and Food Authority.

1.2. Objectives of the Study
The study objectives are;

1.3. General Objective
The general objective of this study was to determine the influence of lean procurement tools on performance of procurement function in Agriculture and Food Authority.

1.4. Specific Objectives
- To assess the influence of Just in Time on performance of procurement function in Agriculture and Food Authority
- To determine the influence of e-procurement on performance of procurement function in Agriculture and Food Authority.
- To establish the influence of Supplier relationship management on performance of procurement function in Agriculture and Food Authority.
- To examine the influence of continuous improve mention performance of procurement function in Agriculture and Food Authority.

1.5. Research Hypotheses
The study sought to test the following null hypothesis:
- H_{01} - Just in Time has no significant influence on performance of procurement function in Agriculture and Food Authority.
- H_{02} - E-procurement has no significant influence on performance of procurement function in Agriculture and Food Authority.
- H_{03} - Supplier Relationship Management has no significant influence on performance of procurement function in Agriculture and Food Authority.
- H_{04} - Continuous Improvement has no significant influence on performance of procurement function in Agriculture and Food Authority.

1.6. Theoretical Review
The following theories underpinned the study;

1.6.1. Theory of Constraint
The Theory of Constraint (TOC) is a management philosophy developed by Goldratt (1986).This theory is a methodology for identifying the most important limiting factor (i.e. constraint) that limits the attainment of a goal and then systematically improving that constraint until it is no longer the constraint. In the context of manufacturing, the constraint is referred to as a bottleneck. This theory puts emphasis on lean thinking which helps to reduce the wastes (constraints). The focus of lean production is on defining value from the viewpoint of the customer, getting rid of wasteful actions from the value stream for a product family, and making those actions which create value occur in a continuous flow as pulled by the final customer. In the lean environment, wasteful actions are activities that consume resources but create no value for the customer. Therefore, a key objective of lean thinking is the elimination of non-value-adding activities and their associated costs throughout the enterprise. By focusing on constraints, this theory produces positive effects on the time taken for the product or service to flow through the system. When the constraint is improved, variation is reduced, and quality is improved (Lysons& Farrington, 2006). The ideas in this theory provided insight into the need for adoption of Supplier Relationship Management and Continuous Improvement to counter constraints in the organization. This theory was used to test the third and fourth hypothesis

1.6.2. Lean Theory
The eight wastes highlighted in Toyota Production System are overproduction, waiting, conveyance, over processing, excess inventory, movement, defects, and unused employee creativity, and the biggest one being overproduction (Liker, 2004).Womack and Jones (1996) propose a number of principles for achieving a lean enterprise. Organizations need to adopt these principles and incorporate them into their operations. Incorporating these principles into operations requires the use of certain tools and techniques. The first principle is the identification of value from the consumer's perspective. The second principle is the identification of product or services that follow common process paths to the consumer.

The third principle is flow. A single product needs continuously flow through processes without interruptions or intervals. The fourth principle is letting value flow at the pull of the customer. Value flowing at the pull of customer implies that nothing is produced upstream unless someone downstream demands for it. The last principle is pursuing perfection continuously which means that firms should always look for waste and find new forms of it and tackle it.

This theory further points out that effective lean transformations yield major improvements not only in productivity, but also in speed, quality, customer loyalty, employee engagement and, most importantly, growth. Achieving these results and ensuring that the underlying changes are maintained is possible only through lean management's comprehensive approach. Instead of focusing only on how the work gets done, lean management addresses all dimensions of a transformation at once, recognizing that each provides crucial support to the others.The ideas in this theory were useful to this research as they facilitated the development of the study and provided an insight into the adoption of Just in time and the linkages between its sub-variables and was used to test the first hypothesis.

1.6.3. Innovation Diffusion Theory

This theory was developed by Rogers (1962). According to this theory, innovation is defined as an idea perceived as new by individuals. According to Andreanna and Swaminathan (2007), innovation can be defined as all the scientific, technological, organizational, financial, and commercial activities necessary to create, implement, and market new or improved products or processes. This theory has four important elements. The first element is innovation which emphasizes on the ability to come up with more efficient and better ways of doing things. Adopters of innovation are categorized into five categories including; innovators who want to be the first to try the innovation, Early Adopters who represent opinion leaders, Early Majority individuals who need to see evidence that the innovation works before they can adopt it, Late Majority who only adopts an innovation after it has been tried by the majority and Laggards who are very skeptical of change and are the hardest group to involve in the innovation process.

According to this theory, the rate of adoption of innovative strategies can be looked at in terms of; relative advantage given to the organization, compatibility, complexity, trial-ability of the new strategies and the ability of the stakeholders to observe within the social system. The second factor is communication that relays information and creates and shares information relating to innovative initiatives in the organization. The third element is time which considers the duration involved in the innovation decision process. The last element is the social context of the new systems. Innovation diffusion strategies require evolution and reinvention of products and individuals so that they are able to perform better (Robinson, 2009). The ideas in this theory were useful to this research as they facilitated the development of the study and provided an insight into the adoption of e-procurement practices and the linkages between the sub-variables such as e-sourcing, EDI and ERP integration. This theory was used to test the second hypothesis.

2. Conceptual Framework

According to Mugenda and Mugenda (2010), a conceptual framework is a diagrammatical representation that shows the relationship between dependent variable and independent variables. This study shows the relationship between influence of lean procurement as independent variable and performance of Procurement Function as dependent variable.
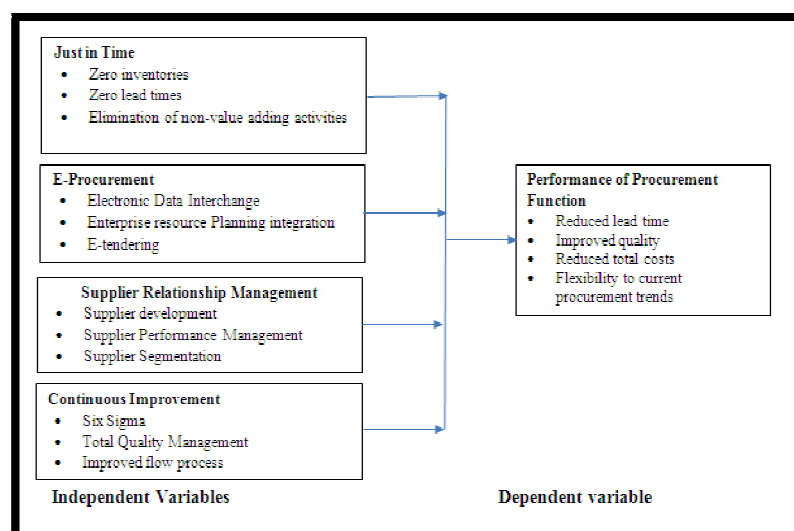

Figure 1: Conceptual Framework

2.1. Research Design

According to Kothari (2004), a research design is the arrangement of conditions for the collection of analysis of data in a manner that aims to combine relevance to the research purpose. This study adopted a descriptive research design since the method allows an in-depth focus on the case of the study and therefore gives room for the researcher to keenly examine the topic of the study. Descriptive research tends to allow researchers to describe a phenomenon the way it is without manipulating the variables. A descriptive research design involves the collection of data to answer research

questions or to offer solutions to an impending problem that is being studied. According to Kombo and Tromp (2006), the main purpose of descriptive research is the description of the state of affairs as it exists without the manipulation of variables.

2.2. Target Population

Target population is defined as a universal set of the study of all members of the real or hypothetical set of people, events or subjects to which an investigator wishes to generate this result (Mugenda & Mugenda, 2003).According to Kothari (2004), a population is a well-defined set of people, elements, and events, group of things or households that are being investigated to generalize the results. According to Agriculture and Food Authority Human Resource Department's Staff registry, as of 2018, the total number of employees in its payroll was 450.The authority is divided into 8directorates with each having various departments. This is the population from which the sample was drawn.

Directorate	Support staff	Middle level Management (Heads of Departments)	Senior Level (Directors)	Total
Tea Directorate	33	6	1	40
Coffee Directorate	33	6	1	40
Fibre Crops Directorate	53	6	1	60
Nuts & Oils Directorate	21	6	1	28
Food Crops Directorate	3	3	1	7
Pyrethrum Directorate	15	6	1	22
Sugar Directorate	81	6	1	88
Horticulture Directorate	158	6	1	165
Total	397	45	8	450

Table 1: Target Population
Source: Agriculture and Food Authority Human Resource Department Staff Registry, 2018

2.3. Sample Size

Sampling is defined as a technique for selecting a set of components used for analysis from a population (Best & Kahn, 2003).According to Kothari (2004), sample size is the number of items to be selected from the universe to constitute a sample. Sampling ensures that conclusions from the study are generalized to the entire population. In order to determine a representative sample from the general population, Yamane's (1967) sampling formula was used as follows;

$$n = \frac{N}{1 + Ne^2}$$

Where;
n is the sample size
N is the population size
e is the level of precision (0.1)

$$n = \frac{450}{1 + 450(0.1)^2}$$

n=82
The distribution of the sample size was as follows;

Cadres	Sample Size
Senior Management	8
Middle Management	45
Support Staff	29
Total	82

Table 2: Sample Size

2.4. Sampling Technique

Purposive stratified sampling was used to apportion a representative sample. According to Guarte and Barrios (2006), purposive sampling is the random selection of sampling units within the segment of the population with the most information on the characteristic of interest. This technique was selected to ensure that the management in the organization were fully involved since most questions were management. At the same time, it ensured that all the cadres of the organization were presented adequately.

2.5. Research Instruments

The primary data were collected through administration of questionnaires to the employees of Agriculture and Food Authority. The main reasons of using questionnaires are that they are relatively cheap, and they also avoid embarrassment onthe part of the respondents as it allows them time to consider responses, especially where there are pre-coded options. Further they also allow possible anonymity of respondent and have no interviewer bias if administered

correctly. According to Cooper and Emory (2008), questionnaires are conveniently used because they are cheaper and quicker to administer, they are above researcher's effect and variability, and are highly convenient for the respondents as they can fill them during free times or when workloads are manageable.

2.6. Data Collection Procedure

The researcher obtained authority to conduct the research from the relevant authorities. On appropriate date, the researcher administered questionnaires to the respondents using drop and pick method where the researcher approached the participants in person, explained the study to them, left the questionnaire, and picked it at an agreed date. There was an introductory note to let the respondent feel free to participate. Questions that were not clear to the respondent were clarified. The respondents were selected on simple random sampling basis. The drop and pick method were used because it increased response rate by adding a personal appeal to the data collection process (Bryman & Bell, 2015).

3. Research Findings and Discussions

3.1. Response Rate

Out of the eighty-two (82) questionnaires administered, sixty-nine (69) were filled up and returned. This translated to a response rate of 84.1%. According to Mugenda and Mugenda (2003), response rate of 50% is good enough for analysis even though researchers should aim as high response rates as possible. Babbie (2014) also asserted that a return rate of 50%is acceptable to analyze and publish, 60% is good and 70% is very good. Based on these as sertions 84.1% which is greater than 50% and 70% and therefore was concluded to be enough to draw conclusion. This is presented on Table 4.1.

Questionnaire	Frequency	Percentage (%)
Issued out	82	100.0
Filled and returned	69	84.1

Table 3: Response Rate

3.2. Demographic Information

3.2.1. Position Held in the Authority

There were three classifications of levels of positions held as shown in table 4.2. 3 out of 8 senior managers responded (37%), 40 out of 45 middle level managers (88%) responded, and 26 out of 29 subordinate staff (89%) responded. This finding shows that all carders were well represented.

Cadre	Frequency	Percent
Senior management	3	37
Middle management	40	88
Support staff	26	89
Total	69	

Table 4: Positions held in the Authority

3.2.2. Years of work at Agriculture and Food Authority

Respondents were required to indicate the category that best suits the number of years they have worked at Agriculture and Food Authority. This result is shown on Table 4.3.

Years of work	Frequency	Percentage
Less than one year	6	8.7
1-3 years	28	40.6
4-6 years	15	21.7
Above 6 years	20	29.0
Total	69	100

Table 5: Years of Work at Agriculture and Food Authority

Table 4.3 shows that most of the respondents (40.6%) had worked at Agriculture and Food Authority for a period between 1-3 years. This is due to the fact that the authority has been hiring employees on contract since 2014.The employees who had worked for a period above 6 years were 29.0% while the rest of the respondents had worked for periods above 4-6 years and less than one year representing 21.7% and 8.7% of the respondents respectively. This shows that 50.7% of the respondents had worked in the organization for more than 4 years. This implied that the respondent had appropriate experience in the organization to give reliable information about the organization.

3.3. Level of Education

The respondents were required to indicate their highest level of education. Table 4.4 shows a summary of the same. The level of education of the respondents determines their ability to understand the survey questions (Murphy & Myors, 2004).

Level of Education	Frequency	Percent
Diploma	29	42.0
Bachelor's Degree	30	43.5
Post graduate degrees	10	14.5
Total	69	100.0

Table 6: Level of Education

Results on Table 4.4 revealed that most of the respondents (43.5%) possessed bachelor's degrees. A further 42.0% were diploma holders. Finally, 14.5% of the respondents possessed post graduate degrees. This implied that the respondents were academically and intellectually able to give information sought through the questionnaires.

3.4. Descriptive Statistics

This section gives a discussion on the descriptive statistics obtained from the analyzed data.

3.5. Just in Time and Performance of Procurement Function

Respondents were requested to show case, the extent to which various just in time features as practiced AFA relates to performance of procurement function. Table 7 shows the results obtained.

Just in Time	N	Min	Max	Mean	Std. Deviation
Zero inventories influence performance of procurement function in AFA	69	1.00	5.00	3.84	0.98
Zero lead times influence performance of procurement function in AFA	69	1.00	5.00	3.64	0.84
Elimination of non-value adding activities influence performance of procurement function in AFA	69	1.00	5.00	3.75	1.02
Strict delivery performance standards influence performance of procurement function in AFA	69	2.00	5.00	4.12	0.76
Valid N (listwise)	69				

Table 7: Just in Time and Performance of Procurement Function

From the findings as in table 7, it was established thin AFA has embraced zero inventories and it influences performance of the procurement function, shown by a mean of 3.84 within a standard deviation of 0.98. According to Gahlan and Aryan (2015), managing optimal inventory in the supply chain is critical for an enterprise. The ability to increase inventory turns and the use of best inventory practices will reduce inventory costs across the supply chain. Moving towards zero inventory will result in effective inventory management in the business process. Obermaier and Donhauser (2013) observed that when interpreting the performance asa function of inventory, organizations with the lowest inventory tend to have the worst performance (and vice versa). When understanding inventory as a function of performance, they indicated that low-performing firms hold the least inventory, whereas high-performing firms have the highest stocks. Besides questions of causality, they did not support a paradigm which suggests that firms should move toward zero inventory. Sheng and Wang (2015) also concluded that the model of Zero Inventory management can help enterprises reduce production cost and speed up the turnover of funds.

It was also established that Zero lead times has influence on the performance of the procurement function in AFA. This was shown by a mean of 3.64 withina standard deviation of 0.84. Okyere, Annan and Anning (2015) established that despite the immense importance of lead time on quality service delivery, little attention is given to the concept. It was revealed that, customers were dissatisfied with the commercial bank's services as a result of the unnecessary delays and queuing at the bank premises. The long lead time was found to be attributable to plant/system failure, skill gap on the part of employees, ATM underutilization and frequent breakdowns, among others. This has consequently resulted into long lead time, waiting, queuing and unnecessary delay at the banking hall. These findings were consistent with the study by Ndubi, Iravo and Ochiri (2016) who carried out a study to determine the contributors of lead time variability and its effects on the inbound logistics performance.The study found that lead time variability had a high impact on inbound logistics performance of the organization.

The findings established that the elimination ofnon-value adding activities has influence on the performance of the procurement function in AFA. This was evidenced by a mean of 3.75 within a standard deviation of 1.02.Emuze and Smallwood (2011) carried out a study the on effects and causes of non-value adding activities in the construction industry in general, and South African construction in particular. The research findings indicated that non-value activities are not

only prevalent butare also responsible for performance related issues in terms of cost, time, quality and health and safety in construction. Mayoleff (2006), also established that that non-value adding activities exist because of the current structure of the system in the organization and are considered wasteful. He therefore recommended that they should be eliminated. Nghona, Crowe and Ndihokubwayo (2010) also found out that construction client briefing process failed to identify and minimize the causes which give rise to activities that do not add value to the design process. It was revealed that inadequate design proceedings briefs resulted from the failure on accurate interpretation of building services, inadequate scope of work resulted to changes in drawing specifications, unnecessary redesign drawings came up due to failure in accurate interpretation of the building services and design briefs that did not take complete consideration of client's requirements resulted in changes in design drawings, and therefore the existence of non-value adding activities.

The findings agree that maintaining strict delivery performance standards influenced the performance of procurement function in AFA with a mean of 4.12 within a standard deviation of 0.76.Mauya (2015) established that Standards and performance targets have a very great impact on enhancing performance. Clott and Cannizzaro (2018) also established that Standardizing process performance through supply chain integration and removing inefficiency will be needed to stabilize the international shipping market. Shi, Yan and Tiang (2016) also established that overall supply chain inefficiency is attributable to procurement-stock conversion inefficiency.

Form the findings, strict delivery performance standards the most influential just in time feature on performance of procurement function. This is followed by zero inventory, elimination of non-value adding activities, and zero lead time respectively. Bonavia and Marin (2006) found that JIT procurement provides a cost-effective delivery of only the necessary quantity of parts at the right quality, at the right time and place. This in turn positively affects the performance of procurement functions in organizations. Mazanai (2012) who carried out a study to investigate the impact of Just in Time inventory system on efficiency, flexibility and quality among the manufacturing sector and small and medium enterprise (SMEs) in South Africa, established that there was a statistically significant positive correlations between the application of JIT inventory management principles and cost efficiency, quality and flexibility.

3.6. Influence of E-Procurement on Performance of Procurement Function

Respondents were requested to indicate the extent to which forms of e-procurement influenced performance of the procurement function in AFA. This result is summarized on table 8.

E-procurement	N	Min	Max	Mean	Std. Deviation
EDI influence performance of procurement function in AFA	69	1.00	5.00	3.80	1.01
ERP influence performance of procurement function in AFA	69	1.00	5.00	3.87	1.06
E-tendering influence performance of procurement function in AFA	69	1.00	5.00	3.83	1.00
E-sourcing influence performance of procurement function in AFA	69	1.00	5.00	3.87	1.00
Valid N (listwise)	69				

Table 8: E-Procurement and Performance of Procurement Function

The finding in Table 8 shows that Electronic Data Interchange influences performance of the procurement function in AFA with a mean of 3.80 within a standard deviation of 1.01. Kimani and Noor (2015) established that Electronic Data Interchange will not only reduce the costs associated with filing but also reduce paper work, unnecessary wastage of time during document retrieval and assist in boosting productivity of employees. Banerjee and Sriram (1995) established that as the use of inter-organizational information systems such as electronic data interchange increases, it becomes important to determine the impact their adoption has on different functions of an organization. The results which were based on 122 EDI users, indicated that increasing the percentage of purchasing transactions using EDI permitted more automation but some of these benefits may not be fully realized due to some associated inefficiencies. However, the organizations that have encouraged their vendors to use EDI appear to have significantly improved organizational efficiencies. These organizations also did not perceive any significant organizational changes resulting from EDI adoption.

It was also established that Enterprise Resource Planning has an influence on the performance of procurement function in AFA with a mean of 3.87 within a standard deviation of 1.06. Yamin and Mavondo (2015) established that price benefits resulted from saving in search, negotiation, and contracting and coordination costs which are possible due to ERP systems. Hartand Snaddon (2014) in their findings also established that business benefits are realized by companies that implement ERP systems; and by building benefits into the performance measurement model, a positive impact on organizational performance was observed.

`The findings established that e-tendering influenced performance of procurement function in AFA with a mean of 3.83 within a standard deviation of 1.00.Masheti (2016) established that e-tendering enables firms to track orders and rectify mistakes realized in past orders, enable staff to perform other duties as a result of spending minimal time in procurement. Ibam and Laryea (2016) in their study revealed that the main benefits of e-tendering were reduction in transaction cost, and turnaround time of the tendering process, while the barriers to e-tendering in construction were slow Internet connectivity; resistance to change; expensive internet services and the inability of small, medium and micro-sized enterprises (SMMEs) to afford the technology, training and skills needed to engage in e-tendering.

The findings also showed that that E-sourcing influences the performance of the procurement function in AFA. This was shown with a mean of3.87 within a standard deviation of 1.00. The results are consistent with the findings of Lewis (2004) that e-sourcing can be used as a tool to reduce process time, generate procurement savings and to increase revenues. Kimutai and Ismael (2016) in their study to assess the role of strategic e-sourcing practices on supply chain performance in state corporations established that strategic e-sourcing creates value by lowering cost, streamlining processes and enabling development of new businesses. A study by Rotich, Muma and Micheni (2016) also revealed that there existed a positive relationship between E-sourcing and procurement performance.

From the findings, ERP and E-sourcing were the most influential E-procurement feature on performance of procurement function. They are followed by e-tendering and Electronic Data interchange respectively. The findings on E-procurement are consistent with the findings of Kamau and Kihara (2017) which revealed that E-procurement positively and significantly affects performance of procurement functions in public institutions. The findings are also consistent with the argument by MacGregor (2011) that online transactions, including e-procurement allow businesses to expand the customer base through the penetration into global markets due to enhanced access to information on an international scale. A study was carried out by Lagat (2013) on the role of e-procurement systems on performance of banking sector in Kenya,A case of Kenya Commercial Bank with study variables including e-tendering, ERP, e-sourcing and e-informing. The study concluded the e-procurement generally enhances the performance of organizations.

3.7. Supplier Relationship Management and Performance of Procurement Function

Respondents were requested to show case, the extent to which various Supplier Relationship Management strategies as practiced AFA relates to performance of procurement function. Table 9 shows the results obtained.

Supplier Relationship Management	N	Min	Max	Mean	Std. Deviation
Supplier development influence performance of procurement function in AFA	69	1.00	5.00	4.04	0.91
Supplier performance management influence performance of procurement function in AFA	69	1.00	5.00	4.16	0.88
Supplier segmentation influence performance of procurement function in AFA	69	1.00	5.00	4.07	0.91
SRM governance influence performance of procurement function in AFA	69	1.00	5.00	3.83	1.03
Valid N (listwise)	69				

Table 9: Supplier Relationship Management and Performance of Procurement Function

From the table 9 it was established thin AFA has embraced supplier development and its influence on the performance of the procurement function. This was shown by a mean of 4.04 within a standard deviation of 0.91. This was consistent with the study by Zimmermann, et al.(2015) who found that segmentation, governance and performance management are cornerstone components of SRM. Once in place they represent a springboard to additional value creation activities that can be undertaken with strategic suppliers. Rodriguez Hemsworth and Lorente (2005) analyzed the effect of supplier development practices with different levels of implementation complexity on the firm's purchasing performance and established that there are important interrelationships that exist among the various supplier development practices, basic, moderate, and advanced. They also established that that the implementation of supplier development practices significantly contributes to the prediction of purchasing performance. Yawar and Seuring (2018) established that supplier development strategies result in developing the capabilities of suppliers to deal with related issues of social sustainability.

The research also established that supplier performance management influenced the performance of the procurement function in AFA. This was shown by a mean of 4.16within a standard deviation of 0.88. Similarly, Tan, Kannan and Hand field (1998) established that measurement of supplier performance is critical in procurement. Focusing on strategic suppliers that form 80% of the organization's expenditure enables them to manage performance issues with fast and highest impact on its operations (Lambert, Emmelhainz & Gardner, 1996). A study by Ndiga and Noor (2016) revealed that suppliers' finances and quality management had a significant positive role on procurement performance in the Geothermal Development Company.

It was established that supplier segmentation influenced performance of the procurement function in AFA. This was shown by a mean of 4.07 within a standard deviation of 0.91. These findings agree with Zimmermann, et al (2015) who noted that Segmentation, governance and performance management are cornerstone components of SRM. Once in place they represent a springboard to additional value creation activities that can be undertaken with strategic suppliers. According to Svensson (2004) vehicle manufacturers have implemented supplier segmentation in order to optimize current business activities and existing resource allocations. Leenders (1995) established that organizations tend to spend time, resources and efforts on a limited number of strategic suppliers because not all suppliers require the same level of focus.

The research found that that SRM governance influenced the performance of the procurement function in AFA. This was shown by a mean of3.83 within a standard deviation of 1.03.Similarly, Anderson, (2002) established that supplier control processes are essential to revealing value in supplier relationships. Benoit and Klose (2006) in their study revealed that in many organizations, activities directed towards suppliers are uncoordinated, possibly carried out by different departments and thus not integrated into an overall supplier management. This stands in contrast to the growing expectations concerning the impact of the purchasing function on overall value creation. Launching operative SRM governance is paramount to unravel SRM value, specifically for strategic suppliers (Lysons & Farrington, 2006).

From the findings, supplier performance management was the most influential Supplier Relationship Management strategy. It is followed by supplier segmentation, supplier development and SRM governance respectively. The findings on supplier relationship management are consistent with those of Park, et al., (2010) who found out that supplier relationship management played a crucial part in the success of supply chain management. According to Corsten and Kumar (2005), retailers in the consumer goods industry can gain benefit from collaborative relationships with their suppliers. This can be extended to the service industry as shown by the results above. These findings are also consistent with those of Teller (2016), who conducted a study on the importance of key supplier relationship management in supply chains. The study established that Key supplier relationship management has a potential for enhancing the level of supply chain management execution within organizations and consequently the level of integration in supply chains which in turn leads to higher customer and shareholder value.

3.8. Continuous Improvement and Performance of Procurement Function

Respondents were requested to show case, the extent to which various continuous improvement strategies as practiced AFA relates to performance of procurement function. Table 10 shows the results obtained.

Continuous Improvement	N	Min	Max	Mean	Std. Deviation
Reduced variability in procurement process influence performance of procurement function in AFA	69	1.00	5.00	3.83	1.07
Satisfaction of internal and external customers influence performance of procurement function in AFA	69	1.00	5.00	4.03	0.89
Improved flow of processes influence performance of procurement function in AFA	69	2.00	5.00	4.10	0.81
Employee personal performance improvement influence performance of procurement function in AFA	69	1.00	5.00	4.00	0.86
Valid N (listwise)	69				

Table 10: Continuous Improvement and Performance of Procurement Function

From the table 10 it was established that reduced variability in the procurement process influenced the performance of the procurement function in AFA. This was shown by a mean of 3.83 within a standard deviation of 1.07. A study by Nicoletti (2013) found that the digitization of a procurement process which is not streamlined can generate problems. A process must be mapped to highlight waste and low quality. Only when the new process is improved, considering that it will be possible to use ICT supports, can it be digitized.

It was also established that satisfaction of internal and external customers influences performance of the procurement function in AFA. This was shown by a mean of 4.03 within a standard deviation of 0.89. Thai (2017) conducted a study to investigate the influences of total quality management and supply chain integration practices on firm performance of container shipping industry in Singapore and established that satisfaction of internal and external customers and supply chain integration practices have positive effects on service quality and firm performance but at different extents, while TQM also contributes positively to supply chain integration.Beamon and Balcik (2008) also established that evaluation of customers in the context of the supply chain responsiveness and customer satisfaction enhances supply chain performance.

It was established that improved flow of processes influences the performance of the procurement function in AFA. This was shown by a mean of 4.10 within a standard deviation of 0.81. Kakwezi and Nyeko (2010) in their study on procurement process and performance established that procurement performance has been attracting great attention from practitioners, academicians and researchers because of the poor performance resulting from non-adherence to proper procedures and processes. Bhamu and Sangwan (2014) established that lean manufacturing has become an integrated system composed of highly integrated elements and a wide variety of management practices. There is lack of standard implementation of flow process/framework.

The research established that employee personal performance improvement influenced the performance of the procurement function in AFA. This could be seen in the response where the mean was 4.00 within a standard deviation of 0.86. Markos and Sridevi (2010) in their study on employee engagement; The key to improving performance established that employee engagement is a strong predictor of positive organizational performance clearly showing the two-way relationship between employer and employee. Engaged employees are emotionally attached to their organization and

highly involved in their job with a great enthusiasm for the success of their employer, going extra mile beyond the employment contractual agreement. Employees are key elements of the organization. The success or failure of the organization depends on employee performance. Therefore, organizations are investing huge amount of money on employee development (Waheed, 2011).

From the findings, improved flow of processes was the most influential continuous improvement strategy. This was followed by satisfaction of internal and external customers, employee personal performance improvement and reduced variability in the procurement process respectively. The findings on continuous improvement were consistent with those of Wilson and Roy (2009) who concluded that nowadays continuous improvement is an extremely important phenomenon that has been considered a vital element in achieving business excellence for years.Wilson and Roy (2009) also found that, application of the six-sigma tool, representing a strategy of continuous improvement and lean procurement improves quality and therefore helps to achieve bottom line results.

3.9. Lean Procurement Performance Indicators

Respondents were requested to show case, the extent to which various procurement performance measurement indicators were influenced by the lean procurement tools practiced in AFA Table 11shows the results obtained.

Performance Indicators	N	Min	Max	Mean	Std. Deviation
Lean procurement tools influence lead times	69	2.00	5.00	3.94	0.87
Lean procurement tools influence cost	69	2.00	5.00	3.80	0.83
Lean procurement tools are influential to increased quality	69	2.00	5.00	3.77	0.88
Lean procurement tools enhance flexibility to current procurement trends	69	2.00	5.00	3.77	0.94
Valid N (listwise)	69				

Table 11: Lean Procurement Performance Indicators

From the table 11 it was established that lead times were influenced by the lean procurement tools. This was shown by a mean of 3.94 within a standard deviation of 0.87. Ndubi, Iravo and Ochiri (2016) found that shipping lead time, production lead time and Receipt and Inspection of goods velocity have a high impact on inbound logistics performance of the organization. According to Yang and Guenes (2007), supply and order lead times can have substantial effects on operations performance and perceived customer service, particularly under uncertain customer demand.

It was also established that operational costs were influenced by lean procurement tools. This was shown by a mean of 3.80 within a standard deviation of 0.83. Musau (2018) established that procurement cost reduction strategy had greater influence on procurement performance in state parastatals in Kenya.Petrucco, Luzzini and Ronchi (2016) established that results show that performance dimensions need to be extended beyond traditional cost measures, with key performance indicators not limited to those imposed by national/regional regulation.Kurien and Qureshi (2011) established that business organizations need to capitalize on supply chain capabilities and resources to bring products and services to the market faster, at the lowest possible cost, with the appropriate product and service features and the best overall value

The research found out that lean procurement tools were influential quality. This was shown by a mean of 3.77 within a standard deviation of 0.88. Siongok and Noor (2016) in their study found that quality control system affects the procurement performance of Kenya National Highways Authority. Equally, quality control planning, quality control policies, quality control procedures and quality control reporting affects the procurement performance of Kenya National Highways Authority.

The research established that lean procurement tools enhanced flexibility to current procurement trends. This could be seen in the response where the mean was 3.77 within a standard deviation of 0.94. Sanchez and Perez (2005) established that aggregate flexibility capabilities are more positively related to firm performance than basic flexibility capabilities. Their findings also indicated that flexibility capabilities are enhanced in supply chains with technological complexity, higher environmental uncertainty, and mutual understanding, but with lower interdependence among the agents involved in the supply chain.

Measuring the performance of the Procurement function yields benefits to organizations such as cost reduction, enhanced profitability, assured supplies, quality improvements and competitive advantage (Batenburg & Versendaal, 2006). Macharia (2014) established that the application of lean procurement tools is becoming a strategy method for gaining competitive advantage and even for survival, not just for manufacturers, but also for service companies since adding value and removing waste is no longer an option for companies.

3.10. Inferential Statistics

3.10.1. Correlations Analysis

The Pearson product-moment correlation coefficient was used to obtain a measure of the strength of association between two variables (Independent and Dependent). The Pearson correlation coefficient, r, can take a range of values from +1 to -1. A value of 0 indicates that there exists no association between the two variables while a value greater than 0 indicates a positive association meaning that an increase in the value of one variable leads to the increase in the other. A value less than 0 indicates a negative association meaning that a decrease in the value of one variable would lead to a decrease in the value of the other.

3.10.2. Correlation Analysis for Just in Time and Performance of Procurement Function

The correlation analysis results in table 12 revealed that there was a positive and a strong significant association between Just in time and performance of procurement function as supported by (r=0.526, p=0.000). This implied that both Just in Time and performance of procurement function change in the same direction. A study was conducted by Liao (2008) on Toyota automobile suppliers in Taiwan. This study found out that that Just in Time purchasing and Just in Time manufacturing in the Toyota production system in Taiwan have direct and significant benefits from suppliers' improved logistics performance as their transport costs, material handling costs, and inventory levels decrease. This is also consistent with the findings by Mazanai (2012), that there is a statistically significant positive correlations between the application of JIT inventory management principles and cost efficiency, quality and flexibility.

		Performance of Procurement Function	Just in Time
Performance of procurement function	Pearson Correlation	1	
	Sig. (2-tailed)		
	N	69	
Just in Time	Pearson Correlation	.526**	1
	Sig. (2-tailed)	.000	
	N	69	69

Table 12: Correlation Matrix
**. Correlation Is Significant At The 0.01 Level (2-Tailed)

3.10.3. Correlation Analysis for E-Procurement and Performance of Procurement Function

The correlation analysis results in table 13 revealed that there was a positive and a strong significant association between E-procurement and performance of procurement function as supported by (r=0.497, p=0.000). This implied that both E-procurement and performance of procurement function change in the same direction. This was consistent with a study by Muinde and Ismael (2018) who concluded that e-procurement implementation makes the purchasing process faster, facilitates better management of the purchasing activities through improved accountability and transparency; improves relationships with business partners; reduces operational costs and reduces prices of procurement goods in state corporations.

		Performance of Procurement Function	E-procurement
Performance of procurement function	Pearson Correlation	1	
	Sig. (2-tailed)		
	N	69	
E-procurement	Pearson Correlation	.497**	1
	Sig. (2-tailed)	.000	
	N	69	69

Table 13: Correlation Matrix
**. Correlation Is Significant at the 0.01 Level (2-Tailed)

3.10.4. Correlation Analysis for Supplier Relationship and Performance of Procurement Function

The correlation analysis results in table14 revealed that there was a positive and a strong significant association between supplier relationship management and performance of procurement function as supported by (r=0.347, p=0.003). This implied that both supplier relationship management and performance of procurement function change in the same direction. This was consistent with a study by Kigen et al., (2017) to establish the influence of supplier management on procurement performance in devolved governments in Kenya and concluded that procurement performance in selected county governments was affected by supplier selection strategies, supplier contracting, and supplier development and supplier relationship management.

		Performance of Procurement Function	Supplier Relationship Management
Performance of procurement function	Pearson Correlation	1	
	Sig. (2-tailed)		
	N	69	
Supplier Relationship Management	Pearson Correlation	.347**	1
	Sig. (2-tailed)	.003	
	N	69	69

Table 14: Correlation Matrix
**. Correlation is significant at the 0.01 level (2-tailed)

3.10.5. Correlation Analysis for Continuous Improvement and Performance of Procurement Function

The correlation analysis results in table 15 revealed that there was a positive and a strong significant association between continuous improvement and performance of procurement function as supported by (r=0.372, p=0.002). This implied that both continuous improvement and performance of procurement function change in the same direction. Yan and Makinde (2009) in their study concluded that an organization must create a CI culture starting from the management level with the creation of a set of behaviors and incentives to daily work that focus on the CI and allow it to be sustainable.

		Performance of Procurement Function	Continuous Improvement
Performance of procurement function	Pearson Correlation	1	.372**
	Sig. (2-tailed)		.002
	N	69	69
Continuous Improvement	Pearson Correlation	.372**	1
	Sig. (2-tailed)	.002	
	N	69	69

Table 15: Correlation Matrix
**. Correlation Is Significant at the 0.01 Level (2-Tailed)

3.11. Regression Analysis

The multiple linear regressions were undertaken for the purpose of examining the influence of the independent variables on the dependent variable. The model summary on table 16 indicated a multiple linear correlation coefficient R of 0.653 which indicated that the independent variables (Continuous Improvement, E-procurement, Supplier Relationship Management and Just in Time) had a positive correlation with the dependent variable that is performance of procurement function. The coefficient of determination (R Square) of 0.427 indicated that the independent variable constituted 42.7% of the variance in the dependent variable. These results therefore explained only 42.7% while the 57.3% is explained by other factors outside the scope of this study.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.653[a]	0.427	0.391	0.50508

Table 16: Model Summary
a.   Predictors: (Constant), Continuous Improvement, E-procurement,
Supplier Relationship Management, Just in Time

In order to examine on whether the data was good fit for regression model, the ANOVA was undertaken and the data being good fit was tested at 5% level of significance. Since from the table 17the observed p value was 0.000 which was less that 0.05 (5%), it therefore implied that the regression model was good fit for data. This implies that the probability of the regression model giving wrong prediction effect on the dependent variable is 0% which is less than the set level of significance of 5%. Therefore, the regression model was adopted.

	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	12.159	4	3.040	11.916	.000[a]
	Residual	16.327	64	.255		
	Total	28.486	68			

Table 17: ANOVA
a Predictors: (Constant), Continuous Improvement, E-Procurement, Supplier Relationship Management, Just In Time
b. Dependent Variable: Performance of Procurement Function

To examine the influence of the independent variables on the dependent variables, multiple regression analysis was as shown in table 18. The optimal model was;

$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4$

$Y = -0.036 + 0.279 X_1 + 0.255 X_2 + 0.257 X_3 + 0.193 X_4$

Where;

X_1 = Just in Time

X_2 = E-procurement

X_3 = Supplier Relationship Management

X_4 = Continuous Improvement

The regression coefficient of 0.279 for the Just in Time implied that a unit increase in Just in time with the other variables left constant would lead to a 0.279 increase in performance of procurement function. The regression coefficient of 0.255 for E-procurement implies that a unit increase in E-procurement would lead to a 0.255 increase in performance of the procurement function with the other independent variables kept constant. The regression coefficient of 0.257 for the Supplier Relationship Management implied that a unit increase in Supplier Relationship Management with the other variables left constant would lead to a 0.257decrease in contract management. On the other hand, a unit increase in Continuous Improvement would lead to a 0.193 increase in performance of procurement function with the other independent variables kept constant.

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-0.036	0.606		-0.059	0.953
Just in Time	0.279	0.130	0.266	2.153	0.035
E-procurement	0.255	0.110	0.278	2.315	0.024
Supplier Relationship Management	0.257	0.127	0.201	2.026	0.047
Continuous Improvement	0.193	0.093	0.212	2.077	0.042

Table 18: Coefficients[a]

a. Dependent Variable: Performance of procurement function

The study's research hypotheses were tested using the t statistics and p values indicated in table 18. Hypothesis Istated that there is no significant influence of Just in Time on performance of procurement function in Agriculture and Food Authority. The hypothesis was tested by determining the relationship that exists between Just in Time and performance of procurement function using multiple regressions whose results are shown on Table 18. The test was done at a significant level 0.05. The test results show that there exists a statistically significant correlation between just in Time and performance of procurement function ($\beta = 0.279$, $\rho = 0.035 < 0.05$). The result leads to the rejection of the null hypothesis, hence a conclusion that there exists a significant influence of Just in Time on performance of procurement function.

Hypothesis II stated that there is no significant influence of E-procurement on performance of procurement function at Agriculture and Food Authority. The hypothesis was tested by determining the relationship that exists between E-procurement and performance of procurement function using multiple regressions whose results are shown on Table 18. The test was done at a significant level 0.05. The test results show that there exists a statistically significant correlation between E-procurement and performance of procurement function ($\beta = 0.255$, $\rho = 0.024 < 0.05$). We therefore reject the null hypothesis, and conclude that there exists a significant influence of E-procurement on performance of procurement function in AFA.

Hypothesis III stated that there is no significant influence of SRM on performance of procurement function at Agriculture and Food Authority. The hypothesis was tested by determining the relationship that exists between SRM and performance of procurement function using multiple regressions whose results are shown on Table 18. The test was done at a significant level 0.05. The test results show that there exists a statistically significant correlation between SRM and performance of procurement function ($\beta = 0.257$, $\rho = 0.047 < 0.05$). The result leads to the rejection of the null hypothesis, hence a conclusion that there exists a significant influence of SRM on performance of procurement function in AFA.

Hypothesis IV stated that there is no significant influence of Continuous Improvement on performance of procurement function at Agriculture and Food Authority. The hypothesis was tested by determining the relationship that exists between Continuous Improvement and performance of procurement function using multiple regressions whose results are shown on Table 18. The test was done at a significant level 0.05. The test results show that there exists a statistically significant correlation between Continuous Improvement and performance of procurement function ($\beta = 0.193$, $\rho = 0.042 < 0.05$). The result leads to the rejection of the null hypothesis, hence a conclusion that there exists a significant influence of Continuous Improvement on performance of procurement function in AFA.

4. Summary, Conclusions and Recommendations

4.1. Introduction

This chapter makes summary, conclusions and recommendations in line with the findings of the study.

4.1.1. Summary of the Study Findings

The first objective of the study was to assess the influence of Just in time on the performance of the procurement function in Agriculture and Food Authority. The descriptive results revealed that zero inventories influence the performance of the procurement function in AFA. Similarly, the results revealed that Zero lead times influenced performance of the procurement function in AFA. Further, the results established that elimination of non-value activities influenced performance of the procurement function. The descriptive results also revealed that enforcement of strict delivery performance standards helped improve performance of the procurement function. Correlation analysis showed that Just in Time and performance of the procurement function are positively and significantly associated. Regression analysis indicated that Just in Time has a positive and significant influence on performance of the procurement function in AFA.

The second objective of the study was to determine the influence of E-procurement on the performance of the procurement function in Agriculture and Food Authority. Descriptive results revealed that EDI influenced the performance of the procurement function. The results also revealed that ERP influenced performance of the procurement function. Further, the respondents tended to agree that E-tendering improved performance of the organization. The descriptive results also revealed that E-sourcing helped improve performance of the procurement function. Correlation analysis showed that E-procurement and performance of the procurement function are positively and significantly associated. Regression analysis indicated that E-procurement has a positive and significant influence on performance of the procurement function in AFA.

The third objective of the study was to establish the influence of Supplier Relationship Management on the performance of the procurement function in Agriculture and Food Authority. Descriptive results revealed that supplier development influence the performance of the procurement function. The results also revealed that supplier performance management influenced performance of the procurement function. Further, the respondents tended to agree that supplier segmentation improved performance of the organization. The descriptive results also revealed that SRM governance helped improve performance of the procurement function. Correlation analysis showed that Supplier Relationship Management and performance of the procurement function are positively and significantly associated. Regression analysis indicated that Supplier Relationship Management has a positive and significant influence on performance of the procurement function in AFA.

The fourth objective of the study was to examine the influence of Continuous Improvement on the performance of the procurement function in Agriculture and Food Authority. Descriptive results revealed that reduced variability in the procurement process influence the performance of the procurement function. The results also revealed that satisfaction of internal and external customers influenced performance of the procurement function. Further, the respondents tended to agree that improved flow of processes improved performance of the organization. The descriptive results also revealed that employee personal performance improvement helped improve performance of the procurement function. Correlation analysis showed that Continuous Improvement and performance of the procurement function are positively and significantly associated. Regression analysis indicated that Continuous Improvement has a positive and significant influence on performance of the procurement function in AFA.

4.1.2. Conclusions of the study

From the findings, the study concluded that Just in Time, E-procurement, Supplier Relationship Management and Continuous Improvement influences performance of the procurement function. This was shown by the correlation and regression analysis which portrayed a positive correlation between all the independent variable and the performance of the procurement function. It was therefore concluded that zero inventories, zero lead times, elimination of non-value adding activities, strict delivery performance standards, improved Electronic Data Interchange, Electronic Resource Planning, E-tendering, and E-sourcing, supplier development, supplier performance management, supplier segmentation, supplier relationship management governance, reduced variability, satisfaction of internal and external customers, improved flow of process and employee personal performance improvement are fundamental tools towards ensuring improved performance of procurement functions in public institutions in Kenya.

4.2. Recommendations of the Study

From the conclusions, the study recommended that procuring entities should ensure optimal inventory in the supply chain by increasing inventory returns and use of best inventory practices. The procurement functions should ensure minimal system failure and skill gaps on part of employees to ensure zero lead times. They should adopt efficient structures of systems towards elimination of non-value adding activities. They should standardize process performance through supply chain integration and removal of inefficiencies in order to ensure strict delivery performance standards.

The study further recommended the improvement on EDI to enhance automated purchasing transactions, ERP integration, E-tendering to facilitate the complete tendering process from the point of advertisement of the tender through to the placing of the contract, and E-sourcing as a decision support tool to detect, evaluate, negotiate and build up supplier and customer relationship.

The study also recommended that public institutions should improve on development of supplier capacity by involving entities in jointly planning and outlining long term initiatives. The procurement functions should classify suppliers centered on a distinct and established benchmark. Their internal governance processes must be aligned with the organization structure,

The study recommends that the organizations should work much more closely with suppliers and employees in developing supplier relationships to reduce the procurement cycle time and lead time to ensure that the user department and end user needs are met in the right time. The study recommended that that the procurement functions in public institutions need to improve and manage better their relationships with suppliers.

The study recommended that procuring entities should embrace the idea of Continuous Improvement (Kaizen) to be capable of encountering a growing variety of dynamic customer requirements while concurrently keeping delays, organizational disruptions and performance losses at or near zero. This will eventually increase the performance of procurement function by reducing lead times, improved quality, reduced total costs and increased flexibility to current procurement trends.

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