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Effect of Lead Time on Procurement Management in the Motor Industry in Kenya

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Abstract: The study sought to investigate the effect of lead time on procurement management in the motor industry in Kenya. The study was hinged on the supply chain management theory, the SCOR framework, the queuing theory and the theory of constraints. Specifically, the study sought to establish the effect of fixed lead time, preprocessing lead time, processing lead time and post processing lead time on procurement management in the motor vehicle assembly firms in Kenya. The study employed a descriptive research design on a target population of 38 registered motor companies in Kenya who were members of Kenya Motor Industry Association (KMIA) by the year 2015.The study conducted a census of the 38 Motor companies instead of adopting a sampling methodology. The respondents for the study were operations managers, IT managers, Procurement officers and logistics managers of the motor companies. The total sample size was 152 respondents. The data used for analysis was quantitative primary data collected through the use of questionnaires administered to operations managers of the companies. Descriptive statistics such as, mean and frequencies and inferential statistics (regression and correlation analysis) were used to perform data analysis. Data was presented in form of Tables, figures and charts. A multiple linear regression analysis model was used to test and link the variables. The study established that Fixed processing lead Time had a positive but insignificant relationship with procurement management this because the p-value was greater than 0.05. On the other hand, Pre Processing lead Time, Processing lead Time, and Post Processing lead Time, were found to have a significant and positive relationship with procurement management this because the p-value was less than 0.05. The study concluded that the company's good lead time management significantly affected procurement management. The recommended that companies need to determine in real time if and when an order can be fulfilled profitably and should also promise a constant lead time to all customers, regardless of the characteristics of the order and the current status of the system.

Keywords: *Fixed lead time, preprocessing lead time, processing lead time, post processing lead time, procurement management*

Introduction

The study sought to establish the effect of lead time on procurement management in the motor industry in Kenya. This chapter presents the back ground of the study globally, regionally and locally. The chapter also presents statement of the problem, objectives of the study and research questions. Justification of the study, scope of the study and limitations are also established. Global competition and market uncertainty has resulted in many companies having international operations and thereby complex logistics networks. In these circumstances there is a continuous need to increase efficiency in order to maintain profitability and customer satisfaction derived from better customer service. Meanwhile there is a need to secure some supply chain flexibility in order to react to the fast changing customer requirements in circumstances regarding changing lead time (Mäe & Ohno, 2012). According to Bowersox (2010), historically the purchase decision has been dependent mainly on the price. Nowadays the choice of supplier not only depends on price but also on "the cost of time" while the customer is waiting for the delivery. Kagiri (2005) states that the competition in modern world has turned to competition between individual supply chains where the turnaround time for delivering services to the customers determines success or failure. Harland *et al.* (2009) defines lead time as the time needed to prepare bids, the time required to make an award and place an order, the time required to receive the delivery, and the time between receipt and payment. Long lead times entails increasing the costs due to larger buffers, increased uncertainty about requirements, larger safety stocks and broken delivery promises, whereas short lead times are beneficial for both the supplier and the customer demand increases with lower delivery times as well as with lower prices. Consequently, lead times are inversely related to market shares (Münster & Vestin, 2012).

On the other hand, Christopher (2008) indicates that one of the key business considerations for companies is reaching a balance between supply and demand and thereby increasing its profitability. Thus, for optimizing the performance of the supply chain, product availability has to be met at the required time. The importance of short lead time and high speed cannot be understated as Ireland and Webb (2007) put it, high speed is not always synonymous with better use of time, but attacking and eliminating delays invariably improves throughput and customer services. Measures for reductions in design times, cycle times, setup times, throughput times and delivery times are appearing with greater regularity on performance reports. That is why it is important for companies to have better lead time management strategies. The companies in motor industry in Kenya face a number of activities that require short lead times and hence this can affect procurement management. For example, fixed lead time which entails quotation processing time, preprocessing lead time which can entail local purchase order handling lead time, processing lead time which involves the time taken to assembly a car and post processing lead time which entails the time taken to handle finished products for instance transport and delivery.

This activities are hereditary urgent and need to be performed with the least lead time. Thus, to manage the procurement process well, these lead times should be taken into consideration and managed well. Agile supply chain requires minimum total lead-times defined as the time taken from a customer raising a request for a product or service until it is delivered (Christopher, 2000). Christopher (2000) further explains that management of lead time can be competitive advantage that can enhance customer satisfaction. Managing time may be the mirror image of managing quality, cost, innovation, and productivity. For reducing lead time it is essential to adopt just in time philosophy and need of continuous improvement focus on issues i.e. flexible manufacturing cells (FMC) or flexible manufacturing systems (FMS), automation tools and efficient information technology tools (Christopher, 2000).

In today's competitive business world, companies require short lead times, low costs and high customer service levels to improve operational performance and survive. The result is that companies have been putting in significant effort to reduce their lead times. The main focus of companies in the 20th century was the customers. It has become more and more competitive to satisfy customers according to (Gaither, 2004). For instance, to perform in a global market, short lead times are essential to provide customer satisfaction. Today more than ever, companies are trying to gain a competitive edge and improve profitability through cutting cost, increasing quality and improving delivery. Companies' concentrate on improving delivery through cutting lead time and show how shortened lead times will help to increase export and reduce costs (Olinder and Olhager, 2008). The same is yet to be fully recognized in the Kenyan motor industry, where there are delays in various activities before processing, during processing and after processing. The study would seek to understand the effect of these factors on procurement management in the sector.

Lead time has been a key challenge element in procurement process of supplies of goods in many organizations, companies and institutions (Laizer, 2013). The ability to quickly obtain and deploy this domain-specific supply chain expertise without developing and maintaining an entire unique and complex competency in house is the leading reason why supply chain specialization is gaining popularity. The lead time will in one way or another remain as a main challenging factor in the procurement management (Laizer, 2013). Laizer (2013) further argues that lead time is a vital component in an organizations, companies, and institutions in achieving on-time delivery or completion of procurement management process. Lead time creates awareness on how organizations, companies and institutions can understand when to initiate needs and accomplish that needs accordingly. The relationship between lead time and procurement management is hence key. Therefore, this study seeks to establish the effect of lead time on procurement management in the motor industry in Kenya.

Statement of the Problem

Lead time is one of the most essential elements in procurement management in any organization for its efficiency and effectiveness performance, as Woeppel (2001) noted, lead time is extremely important competitive advantage when stock is not held in advance. Supply chain failures involving long lead times can reduce a company's revenue, cut its market share, inflate its costs, send it over budget, and threaten production and distribution. Such disruptions can also damage the company's credibility with investors and other stakeholders, thereby driving up its cost of capital. An example is Toys R Us and Macyís, US based companies which had to pay a total of $1.5 million to settle a Federal Trade Commission (FTC) action over late deliveries made during the 1999 holiday season. According to the FTC, the e-tailers promised delivery dates when fulfillment was not possible and failed to notify customers when shipments would be late (Enos , 2000).

Bosman (2006) indicates that supply chain failure involving long lead time has been ranked as a major risk, more than any other, having the greatest potential to disrupt their top revenue driver. It has been observed that in some organizations there is a tendency of non-compliance to proper lead time adherence which leads to dissatisfaction of their customers. However, the contribution of the Lead time in procurement management in business performance is not yet well known to many organizations (Laizer, 2013). The motor industry is among many firms where lead time is a critical element in the execution and/ or delivery services to their customers (efficiently and effectively regarding to its objectives) (Laizer, 2013). Hence the necessity to investigate the relationship between lead time and procurement management in this sector.

A number of studies have been conducted on lead time management. The studies have however focused on other sectors other than the motor industry and on performance thus creating contextual and conceptual research gaps. Alp and John (2003) focused on dynamic lead time management in supply chains, Petri (2012) focused on the impact of customer order lead time-based decisions on the firm's ability to make money, Bosire et al. (2011) looked at the impact of outsourcing on lead time and customer services among supermarkets in Nairobi and Mfwaya (2013) investigated lead time management and customer satisfaction in the telecommunication industry in Kenya. None of these studies have focused on the motor industry. This sectoral difference creates a contextual research gap which the current study will seek to fill. This is because the circumstances in those sectors are not similar to service sector. The studies also indicate conceptual research gaps since they have not directly studied the effect of lead time on procurement management. This study will therefore seek to address this gap by answering one major question: What is the effect of lead time on procurement management in the motor industry in Kenya?

Research objectives

i. To establish the effect of fixed processing lead time on procurement management of motor vehicle assembly firms in Kenya
ii. To determine the effect of pre-processing lead time on procurement management of motor vehicle assembly firms in Kenya
iii. To establish the effect of processing lead time on procurement management of motor vehicle assembly firms in Kenya
iv. To find out the effect of post processing lead time on procurement management of motor vehicle assembly firms in Kenya

Literature Review

Theoretical Literature Review

The Supply-Chain Operations Reference (SCOR) Framework

The SCOR framework was developed and endorsed by the Supply Chain Council as the cross-industry, standard diagnostic tool for supply chain management. The SCOR framework is a process reference framework for supply chain management. This reference framework enables users to address, improve, and communicate supply chain management practices within and between all interested parties in the extended enterprise (Poluha, 2007). The model was developed in 1996 by the management consulting firm which is now part of Price water house Coopers (PwC) as the cross-industry de facto standard strategy, performance management, and process improvement diagnostic tool for supply chain management. It is a management tool, spanning from the supplier's supplier to the customer's customer (Douglas, 2008) and Peter and Robert, 2012). The model has been developed by the members of the Council on a volunteer basis to describe the business activities associated with all phases of satisfying a customer's demand. By describing supply chains using process modeling building blocks, the model can be used to describe supply chains that are very simple or very complex using a common set of definitions. As a result, disparate industries can be linked to describe the depth and breadth of virtually any supply chain.

SCOR is based on six distinct management processes: Plan, Source, Make, Deliver, Return, and Enable , Plan involves processes that balance aggregate demand and supply to develop a course of action which best meets sourcing, production, and delivery requirements, Source involves processes that procure goods and services to meet planned or actual demand, Make involves processes that transform product to a finished state to meet planned or actual demand ,deliver involves processes that provide finished goods and services to meet planned or actual demand, typically including order management, transportation management, and distribution management, return which involves processes associated with returning or receiving returned products for any reason. These processes extend into post-delivery customer support and enable which involves new process (James, 2006).

Queuing Theory

Queuing theory is the mathematical study of waiting lines, or queues (Sundarapandian, 2009). In queuing theory a model is constructed so that queue lengths and waiting time can be predicted. Queuing theory is generally considered a branch of operations research because the results are often used when making business decisions about the resources needed to provide a service. The theory has its origins in research by Agner Krarup Erlang when he created models to describe the Copenhagen telephone exchange (Mayhew and Smith, 2006). The theory is also applied in services provisions as it has lied down various scheduling policies which can be used to serve customers. That will explain the different times it takes to finish a process. Some of the policies are : First in first out principle which states that customers are served one at a time and that the customer that has been waiting the longest is served first, Last in first out principle which states that customers with the shortest waiting time will be served first, Processor sharing which states that service capacity is shared equally between customers, Priority principle which states that customers with high priority are served first (Priority queues can be of two types, non-preemptive (where a job in service cannot be interrupted) and preemptive (where a job in service can be interrupted by a higher priority job) while no work is lost in either model ,Shortest job first principle which states that the next job to be served is the one with the smallest size and Shortest remaining processing time principle which states that the next job to serve is the one with the smallest remaining processing requirement (Ramaswami, 1988).

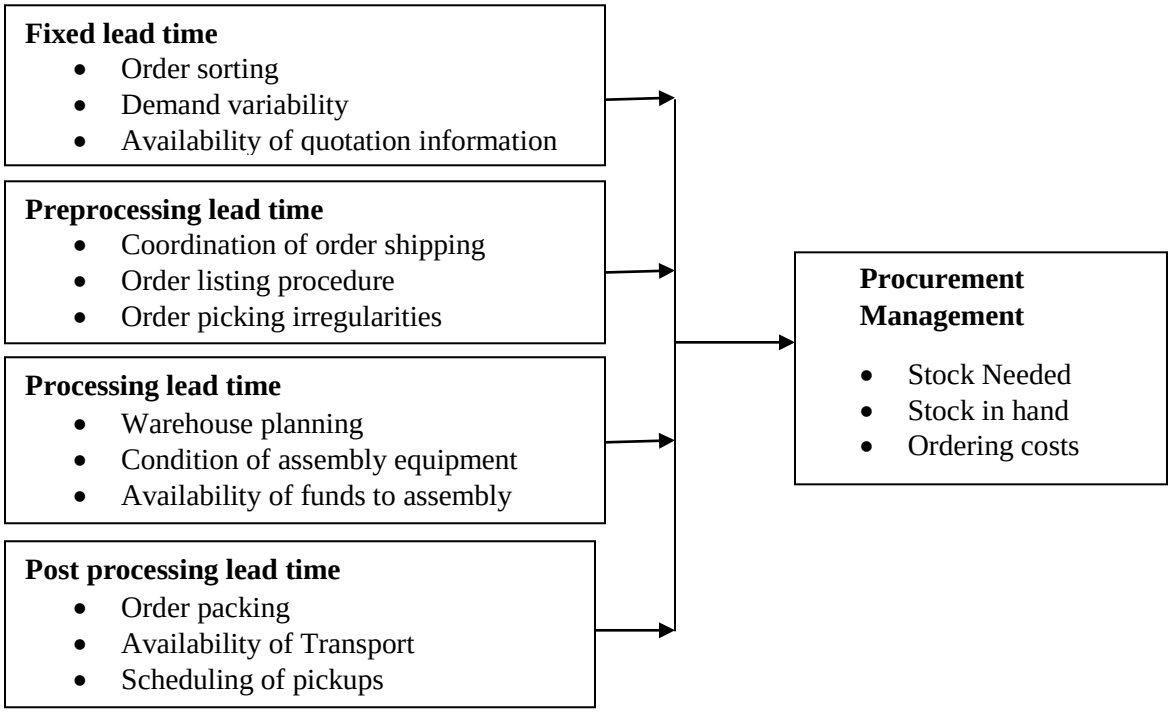
Theory of Constraints

The theory of constraints (TOC) is an overall management philosophy introduced by Eliyahu M. Goldratt in his 1984 book titled The Goal that is geared to help organizations continually achieve their goals (Cox, Jeff; Goldratt & Eliyahu, 1986). Goldratt adapted the concept to project management with his book Critical Chain, published in 1997. The theory of constraints (TOC) views any manageable system as being limited in achieving more of its goals by a very small number of constraints. There is always at least one constraint, and TOC uses a focusing process to identify the constraint and restructure the rest of the organization around it. TOC adopts the common idiom "a chain is no stronger than its weakest link." This means that processes and organizations are vulnerable because the weakest person or part can always damage or break them or at least adversely affect the outcome (Goldratt, 2004). The difficulties in the theory of constraints are: very long lead times, large number of unfulfilled orders, large number of emergency orders and expedition levels, lack of customer's engagement, absence of control related to priority orders which implies on schedule conflicts of the resources (Goldratt, 2004). The theory focuses on managing these constraints (Cooper, 2006).

Supply Chain Management Theory

Lavassani et al. (2009) explain supply chain management as a cross-function approach including: managing the movement of raw materials into an organization, certain aspects of the internal processing of materials into finished goods, and the movement of finished goods out of the organization and towards the end-customers. As organizations strive to focus on core competencies and becoming more flexible, they reduce their ownership of raw materials sources and distribution channels. These functions are increasingly being outsourced to other entities that can perform the activities better or more cost effectively. The effect is to increase the number of organizations involved in satisfying customer demand, while reducing management control of daily logistics operations. Less control and more supply chain partners lead to the creation of supply chain management concept. The purpose of supply chain management is to improve trust and collaboration among supply chain partners, thus improving inventory visibility and the velocity of inventory movement (Lavassani et al. (2009)

Conceptual Framework



Independent Variables **Dependent Variable**

Figure 1 Conceptual Framework

Research Methodology

Descriptive research design was employed. Descriptive research design enhanced clear examination of the research topic and also facilitated data collection process by answering questions concerning the study as per

the current status. Target population of the study consisted of the total numbers of motor companies who are members of KMIA in the study period 2015 are 38. The study purposively focused on the operations managers, IT managers, Procurement officers and logistics managers. The study respondents were 152. The managers from these departments are suitable for the study because they are informed about activities concerning lead time management and logistics and procurement management. Primary data was utilized in this study to enhance originality of the study. Primary data was of essence in this study as it allowed the researcher to address issues that are specific to their study. Descriptive statistics such as, mean and frequencies were used to perform data analysis. The mean scores were used to rate the factors in order of their importance. SPSS was used to produce frequencies, descriptive and inferential statistics which were used to derive conclusions and generalizations regarding the population. Correlation and regression were also used for analysis. A multiple linear regression model was used to link the independent variables to the dependent variable as follows;
$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \mu$, Where; Y = Procurement management, X_1 = Fixed lead time, X_2 = Pre-processing lead time X_3 = Processing lead time, X_4 = Processing lead time
, β_0 = the constant term while the coefficient $\beta_i i = 1 \ldots 4$ was used to measure the sensitivity of the dependent variable (Y) to unit change in the predictor variables X_1, X_2, X_3 and $X_{4,,}$. μ is the error term which captures the unexplained variations in the model.

Results

Demographic Characteristics of the Respondents

Table 1 Demographic Characteristic of Respondents

Demographic Characteristic	Category	Percentage
Academic Qualification	University	55%
	College	45%
Work Experience	Below 1 year	14.2%
	2 to 5 years	38.1%
	6 to 10 years	28.6%
	Over 10 years	19.1%

Descriptive Statistics of Fixed Processing Lead Time

The study sought to find out the effect of fixed processing lead time on procurement management in motor vehicle assembly firms in Kenya. The results showed that 51.6% and 32.0% strongly agreed and agreed respectively that failure of information in quotation processing due to computer hardware, software or virus attacks affected quotation processing lead time. Those who disagreed were and strongly disagreed were 6.2% and 3.9% respectively. The study assessed whether challenges in order sorting affected quotation processing lead time. The findings showed that 49.2% strongly agreed, 32.8% agreed, 7% were neutral, 7% strongly disagreed and finally 3.9% disagreed.

On whether demand variability affected quotation processing lead time, majority of the respondents agreed as shown by the mean of 4.13. The study was also interested in whether the companies adhered to Logistics

Manual and Logistics Standards in quotation practices in order to reduce lead time. The findings showed that 43.8% of the respondents agreed, 35.9% strongly agreed, 7% strongly disagreed, 6.2% disagreed and finally 7% were neutral. The study finally sought to establish whether regular reviews and audits of quotation processes significantly reduced lead-time. The findings also showed that 45.3% and 42.2% strongly agreed and agreed with the statement respectively. Those who disagreed and strongly disagreed were combined 9.4%. The results further showed that the statements had a mean of above 3.5 which implied that majority of the respondents agreed and strongly agreed with the statement on fixed lead time. The standard deviation showed that the responses varied slightly from the mean. The findings of this study concurred with Rad (2008) who established that identification and elimination of waste makes it easier to focus on value adding activities and to become more cost efficient. Simialarly, Nordas and Geloso (2006) concluded that logistics management is an essential ingredient in the reduction of lead time.

Table 2: Descriptive Results for Fixed Processing Lead Time

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	Std Dev
Failures of information in quotation processing due to computer							
Hardware, software or virus attacks affects quotation processing lead time	3.9%	6.2%	6.2%	32.0%	51.6%	4.21	1.07
Challenges in order sorting affects quotation processing lead time	7.0%	3.9%	7.0%	32.8%	49.2%	4.13	1.16
Demand variability affects quotation processing lead time	3.9%	4.7%	5.5%	46.9%	39.1%	4.13	0.99
The company adheres to Logistics Manual and Logistics Standards in quotation practices in order to reduce lead time	7.0%	6.2%	7.0%	43.8%	35.9%	3.95	1.15
Regular reviews and audits of quotation processes significantly reduces lead-time	4.7%	4.7%	3.1%	42.2%	45.3%	4.19	1.03

Descriptive Results for Pre Processing Lead Time

The study also assessed the preprocessing lead time management on procurement management in motor industry in Kenya. The study sought to establish whether uncoordinated order shipping greatly affected lead time. The study showed that 36.7% and 22.7% of the respondents agreed and strongly agreed with the statement. Those who strongly disagreed and disagreed were 12.5% and 9.4% of the respondents. Whether accountability in LPO process significantly reduced lead time, 41.4% and 27.3% of the respondents strongly agreed and agreed. The respondents who strongly disagreed and disagreed were 12.5% and 9.4%. Majority of the respondents also agreed that Order listing procedure affected LPO handling lead time this can be shown by the mean of 3.63 which was above the threshold of 3.5. The study also established that 39.8% and 22.7% of the respondents strongly agreed and agreed that challenges in order sorting affected LPO handling lead time while 15.6% and 12.5% disagreed and strongly disagreed with the statement. Finally, the results showed that 34.4% and 26.6% of the respondents strongly agreed and agreed that irregularities in order picking affected LPO handling lead time while 12.5% and 10.9% disagreed and strongly disagreed with the statement. The results further showed that the statements had a mean of above 3.5 which implied that majority of the respondent agreed. The results of standard deviation showed that the responses varied slightly from the mean. Tarty (2012) also established that logistics management was influenced by equipment failures; poor warehouse management; poor flow of information; poor order shipping, poor order listing; poor order sorting; ordering costs; bureaucracy in government; order packaging challenges and poor warehouse planning

Table 3 : Descriptive Results for Pre Processing Lead Time

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	Std Dev
Uncoordinated order shipping greatly affects lead time	10.9%	14.1%	15.6%	36.7%	22.7%	3.46	1.29
Accountability in LPO process significantly reduces lead time	12.5%	9.4%	9.4%	27.3%	41.4%	3.76	1.40
Order listing procedure affects LPO handling lead time	7.8%	15.6%	12.5%	34.4%	29.7%	3.63	1.27
Challenges in order sorting affects LPO handling lead time	12.5%	15.6%	9.4%	22.7%	39.8%	3.62	1.45
Irregularities in order picking affects LPO handling lead time	10.9%	12.5%	15.6%	26.6%	34.4%	3.61	1.36

Descriptive Statistics for Processing Lead Time

The study sought to establish the effects of processing lead time on the procurement management in motor industry in Kenya. The findings revealed that a combined 62.4% agreed and strongly agreed that lack of demand due to economic down turn or lack of funds affected assembling lead time. Majority (59.3%) also strongly agreed and agreed that demand variability affects assembling lead time. The study further sought to establish whether poor ware house planning affected assembling lead time. The findings showed that 34.4% and 29.7% agreed and strongly agreed with the statement while 15.6% and 10.9% strongly disagreed and disagreed. The result further showed that a combined 59.3% agreed that the time taken to wait for spare parts affected assembling lead time. Finally the results showed that 65.7% agreed that failure of equipment used for assembling affected assembling lead time while 17.2% and 10.9% strongly disagreed and disagreed with the statement. Majority of the statement also had a mean of above 3.5 which implied that respondents agreed and strongly agreed with the statements. Mäe and Ohno (2012) study indicated the most influential factors related to the lead time changes. For production these are costs of ownership and flexibility. These factors are positively affected by the rule and further reduction of the lead time requirement. For purchasing it is most beneficial when goods are picked up from the suppliers' site. This due to the product cost will be separated from the logistics costs.

Table 4: Descriptive Results for Processing Lead Time

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	Std Dev
Lack of demand due to economic down turn or lack of funds affects assembling lead time	14.1%	14.1%	9.4%	31.2%	31.2%	3.52	1.42
Demand variability affects assembling lead time	15.6%	20.3%	4.7%	28.1%	31.2%	3.39	1.49
Poor ware house planning affects assembling lead time	15.6%	10.9%	9.4%	34.4%	29.7%	3.52	1.42
The time taken to wait for spare parts affects assembling lead time	9.4%	17.2%	14.1%	31.2%	28.1%	3.52	1.32
Failure of Equipments used for assembling affects assembling lead time	17.2%	10.9%	6.2%	30.5%	35.2%	3.55	1.49

Descriptive Statistics for Post Processing Lead Time

The fourth objective of this study was to establish the effects of post processing lead time on the procurement management in motor industry in Kenya. The findings showed that 33.6% and 32.0% strongly agreed and agreed that poor logistics activities affected transport and delivery lead time while 12.5% and 10.9% strongly disagreed and disagreed with the statements. Whether inefficient scheduling of pickups affected transport and delivery lead time, 34.4% and 32.8% of the respondents agreed and strongly agreed while 14.1% and 7.8% strongly disagreed and disagreed with the statement. Whether delay or unavailability of either inbound or out bound transport to move supplies due to breakdown or weather problem greatly affected transport and delivery lead time, 37.5% and 35.9% agreed and strongly agreed with the statement while 9.4% and 7.8% strongly disagreed and disagreed with the statements. The results also revealed that majority (67.2%) of the respondents agreed that order packing challenges affected transport and delivery lead time. Finally the results showed that majority (61.0%) of the respondents agreed that regular reviews and audits of loading, transport and delivery process significantly reduced transport and delivery lead-time. The findings of mean and standard deviation of the statement showed that majority of the respondents agreed and that the responses varied slightly from the mean.

Table 5: Descriptive Results for Post Processing Lead Time

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	Std Dev
Poor logistics activities affects transport and delivery lead time	12.5%	10.9%	10.9%	32.0%	33.6%	3.63	1.37
Inefficient scheduling of pickups affects transport and delivery lead time	14.1%	7.8%	10.9%	34.4%	32.8%	3.64	1.38
Delay or unavailability of either inbound or out bound transport to move supplies due to breakdown or weather problem greatly affects transport and delivery lead time	9.4%	7.8%	9.4%	37.5%	35.9%	3.83	1.26
Order packing challenges affects transport and delivery lead time	7.8%	9.4%	15.6%	34.4%	32.8%	3.75	1.23
Regular reviews and audits of loading ,transport and delivery process significantly reduces transport and delivery lead-time	12.5%	15.6%	10.9%	25.8%	35.2%	3.55	1.42

Descriptive Statistics of Procurement Management

The study sought to find out the effectiveness of procurement management in the motor industry in Kenya. Procurement management was measured using the ordering costs, purchasing costs and carrying costs. The

study sought to establish the trend in procurement management as measured by the increase of reduction in the costs mentioned above. The results revealed that 43.0% of the respondents indicated that their ordering costs had increased by over 50% while 39.8% indicated that their ordering costs had increased by less than 50%. Those who indicated that ordering costs had decreased by less than 50% were 9.4% while 7.8% revealed that ordering costs had decreased by over 50%. The results also revealed that 49.2% of the respondents indicated that their purchasing costs had increased by less than 50% while 32.0% indicated that their purchasing costs had increased by over 50%. On the other hand, 9.4% indicated that their purchasing costs had decreased by less than 9.4% similar to those who indicated that their purchasing costs decreased by over 50%.

The study was further interested in the trend of carrying costs in motor industry in Kenya. The findings showed that 43.8% of the respondents indicated that carrying cots had increased by over 50% while 41.4% indicated that their carrying cost had increased by less than 50%. Those who indicated that carrying costs had decreased, 10.2% indicated it had decreased by over 50% while 4.7% indicated that carrying costs had decreased by less than 50%. The study findings concurred with Mfwaya (2013) who conducted a study to analyze the good lead time management of telecommunications companies in Kenya. The study findings indicated that the companies good lead time management that is having multiple suppliers of various products and services, trying as much as possible to reduce variability, always having a smooth workflow in the organization, having proper queue control to avoid delays, expediting some processes to avoid delays, using multi modal transportation to avoid delays and offering warranty of the products/services for at least 12 months significantly affects customer satisfaction positively.

Table 6: Procurement Management Performance

	Increased by over 50%	Increased by less than 50%	Decreased by less than 50%	Decreased by over 50%	Total
Ordering costs	43.0%	39.8%	9.4%	7.8%	100.0%
Purchasing costs	32.0%	49.2%	9.4%	9.4%	100.0%
Carrying costs	43.8%	41.4%	4.7%	10.2%	100.0%

The results in table 4.7 further revealed that respondents agreed and strongly agreed with the statement regarding the performance of procurement in motor industry in Kenya. Whether there has been an increase in ordering costs, 27.3% and 25.8% of the respondents agreed and strongly agreed. Similarly, 28.9% and 24.2% of the respondents agreed and strongly agreed respectively that there has been an increase in purchasing costs. Whether there has been an increase in carrying costs, 33.6% and 30.5% of the respondents strongly agreed and agreed. The respondents further agreed that there is good management of suppliers and that stock in hand is always enough. The findings implied that procurement management has not been effective in the motor industry in Kenya.

Table 7: Results for Procurement Management

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	Std Dev

There has been an increase in ordering costs	12.5%	17.2%	17.2%	27.3%	25.8%	3.37	1.36
There has been an increase in purchasing costs	12.5%	20.3%	14.1%	28.9%	24.2%	3.32	1.37
There has been an increase in carrying costs	17.2%	7.8%	10.9%	30.5%	33.6%	3.55	1.46
There is good management of suppliers	17.2%	10.9%	14.1%	25.0%	32.8%	3.45	1.47
The stock in hand is always enough	9.4%	14.1%	12.5%	22.7%	41.4%	3.73	1.37

Correlation Analysis Results

Kothari (2014) stated that the importance of correlation is to determine the extent to which changes in the value of an attribute is associated with changes in another attribute. According to Kothari (2014), the correlation coefficient can range from -1 to +1, with -1indicating a perfect negative correlation,+1 indicating a perfect positive correlation, and 0 indicating no correlation at all. A linearity test was conducted as evidenced by the Pearson correlation coefficient. Correlation analysis was established per objective.

Fixed Processing Lead Time and Procurement Management

The correlation was conducted to test the strength of the association between Fixed Processing Lead Time and Procurement Management. The findings indicate there existed a strong and significant association between Fixed Processing Lead Time and Procurement Management (r=0.388, p=0.000). The findings of this study concurred with Rad (2008) who established that identification and elimination of waste makes it easier to focus on value adding activities and to become more cost efficient. Similarly, Nordas and Geloso (2006) concluded that logistics management is an essential ingredient in the reduction of lead time.

Table 8: Correlation Results for Fixed Processing Lead Time

		Fixed Processing lead Time	Procurement Management
Fixed Processing	Pearson Correlation	1	.388**

lead Time	Sig. (2-tailed)		.000
	N	128	128
	Pearson Correlation	.388**	1
Procurement Management	Sig. (2-tailed)	.000	
	N	128	128

**. Correlation is significant at the 0.01 level (2-tailed).

Pre Processing Lead Time and Procurement Management

The correlation was conducted to test the strength of the association between Pre Processing Lead Time and Procurement Management. The findings indicate there existed a strong and significant association between Pre Processing Lead Time and Procurement Management (r=0.57, p=0.000). Tarty (2012) also established that logistics management was influenced by equipment failures; poor warehouse management; poor flow of information; poor order shipping, poor order listing; poor order sorting; ordering costs; bureaucracy in government; order packaging challenges and poor warehouse planning

Table 9: Correlation results for Pre Processing Lead Time

		Pre Processing lead Time	Procurement Management
Pre Processing lead Time	Pearson Correlation	1	. 578**
	Sig. (2-tailed)		.000
	N	128	128
Procurement Management	Pearson Correlation	. 578**	1
	Sig. (2-tailed)	.000	
	N	128	128

**. Correlation is significant at the 0.01 level (2-tailed).

Processing Lead Time and Procurement Management

The correlation was conducted to test the strength of the association between Processing Lead Time and Procurement Management. The findings indicate there existed a strong and significant association between Processing Lead Time and Procurement Management (r=0.479, p=0.000). Mäe & Ohno (2012) study indicated the most influential factors related to the lead time changes. For production these are costs of ownership and flexibility. These factors are positively affected by the rule and further reduction of the lead time requirement. For purchasing it is most beneficial when goods are picked up from the suppliers' site. This due to the product cost will be separated from the logistics costs.

Table 10: Correlation results for Processing Lead Time

		Processing lead Time	Procurement Management
Processing lead Time	Pearson Correlation	1	. 479**

	Sig. (2-tailed)		.000
	N	128	128
	Pearson Correlation	. 479**	1
Procurement Management	Sig. (2-tailed)	.000	
	N	128	128

**. Correlation is significant at the 0.01 level (2-tailed).

Post Processing Lead Time and Procurement Management

The correlation was conducted to test the strength of the association between Post Processing Lead Time and Procurement Management. The findings indicate there existed a strong and significant association between Post Processing Lead Time and Procurement Management (r=0.479, p=0.000). The study findings concurred with Mfwaya (2013) who conducted a study to analyze the good lead time management of telecommunications companies in Kenya. The study findings indicated that the companies good lead time management that is having multiple suppliers of various products and services, trying as much as possible to reduce variability, always having a smooth workflow in the organization, having proper queue control to avoid delays, expediting some processes to avoid delays, using multi modal transportation to avoid delays and offering warranty of the products/services for at least 12 months significantly affects customer satisfaction positively

Table 11: Correlation results for Post Processing Lead Time

		Post Processing lead Time	**Procurement Management**
	Pearson Correlation	1	.728**
Post Processing lead Time	Sig. (2-tailed)		.000
	N	128	128
	Pearson Correlation	.728**	1
Procurement Management	Sig. (2-tailed)	.000	
	N	128	128

**. Correlation is significant at the 0.01 level (2-tailed).

Regression Analysis Results

According to Kothari (2014), regression is the determination of a statistical relationship between two or more variables. In simple regression, there are two variables, one variable (defined as independent) is the cause of the behavior of another one (defined as dependent variable). When there are two or more than two independent variables, the analysis concerning relationship is known as multiple regression and the equation describing such relationship as the multiple regression equation. A multivariate regression model was conducted to test the joint

relationship of all the independent variable and dependent variable. The result showed that jointly Post Processing lead Time, Fixed processing lead Time, Pre Processing lead Time and Processing lead Time had a significant association with procurement management (R=0.842). The results further revealed that Post Processing lead Time, Fixed processing lead Time, Pre Processing lead Time and Processing lead Time jointly accounted for 70.9% of the variation in procurement management in motor industry in Kenya.

Table 12: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.842	.709	.700	.52356

The results of ANOVA indicate that Post Processing lead Time, Fixed processing lead Time, Pre Processing lead Time and Processing lead Time were significant predictor variables of procurement management in motor industry in Kenya. This was indicated by the F-statistics results (F=74.942, p=0.000) indicating that the model used to link the independent variables and dependent variable was statistically significant.

Table 13: ANOVA Results

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	82.172	4	20.543	74.942	.000[b]
	Residual	33.717	123	.274		
	Total	115.889	127			

In the multivariate regression model, Fixed processing lead Time (β_1 = 0.098, p=0.126) was found to have a positive but insignificant relationship with procurement management this because the p-value was greater than 0.05. On the other hand, Pre Processing lead Time (β_2 = 0.404, p=0.000), Processing lead Time (β_3= 0.25, p=0.001), and Post Processing lead Time (β_3= 0.325, p=0.000), were found to have a significant and positive relationship with procurement management this because the p-value was less than 0.05.

Table 14: Multivariate Regression Coefficient Results

	B	Std. Error	Beta	t	Sig.
(Constant)	0.449	0.288		1.56	0.121
Fixed processing lead Time	0.098	0.064	0.082	1.542	0.126
Pre Processing lead Time	0.404	0.082	0.361	4.924	0.000
Processing lead Time	0.25	0.075	0.262	3.341	

Post Processing lead Time	0.325	0.081	0.285	4.013	0.000

The findings in the model implied that a unit change in fixed processing lead time would cause a positive change of 0.098 units in procurement management. The findings also implied that a unit change in preprocessing lead time would case a positive variation of 0.0404 units in procurement. Similarly, the findings implied that a unit change in processing lead time would cause a variation of 0.25 units in procurement management. Finally, the findings in the optimal model implied that a unit change in post processing lead time would result in 0.325 units' variations in procurement management.

The findings of this study concurred with Rad (2008) who established that identification and elimination of waste makes it easier to focus on value adding activities and to become more cost efficient. Simialarly, Nordas and Geloso (2006) concluded that logistics management is an essential ingredient in the reduction of lead time. Tarty (2012) also established that logistics management was influenced by equipment failures; poor warehouse management; poor flow of information; poor order shipping, poor order listing; poor order sorting; ordering costs; bureaucracy in government; order packaging challenges and poor warehouse planning.

Mäe & Ohno (2012) study further indicated the most influential factors related to the lead time changes. For production these are costs of ownership and flexibility. These factors are positively affected by the rule and further reduction of the lead time requirement. For purchasing it is most beneficial when goods are picked up from the suppliers' site. This due to the product cost will be separated from the logistics costs.

The study findings concurred with Mfwaya (2013) who conducted a study to analyze the good lead time management of telecommunications companies in Kenya. The study findings indicated that the companies good lead time management that is having multiple suppliers of various products and services, trying as much as possible to reduce variability, always having a smooth workflow in the organization, having proper queue control to avoid delays, expediting some processes to avoid delays, using multi modal transportation to avoid delays and offering warranty of the products/services for at least 12 months significantly affects customer satisfaction positively.

Conclusion

Procurement management entails what to procure; when to procure it; where to procure them from; when the resources be available; the methods of procurement to be use; how timely procurement will affect the user of the item(s); the procuring and disposing entity; efficient in the procurement process; and the people to be involved in the procurement. From the study findings lead time was found to be an important aspect in procurement management. Long lead times increases the costs due to larger buffers, increased uncertainty about requirements, larger safety stocks and broken delivery promises, whereas short lead times are beneficial for both the supplier and the customer demand will increase with lower delivery times as well as with lower prices. Eliminating delays invariably improves throughput and customer services in motor industry.

The study concluded that the companies good lead time management that is having multiple suppliers of various products and services, trying as much as possible to reduce variability, always having a smooth workflow in the organization, having proper queue control to avoid delays, expediting some processes to avoid delays, using multi modal transportation to avoid delays and offering warranty of the products/services for at least 12 months significantly affects procurement management.

Recommendations

The study recommended that companies need to determine in real time if and when an order can be fulfilled profitably and should also promise a constant lead time to all customers, regardless of the characteristics of the order and the current status of the system. The motor industry managers should strive to ensure good lead time

management and good customer satisfaction within the motor industry. This will ensure that the organization environment is conducive for economic growth resulting to higher productivity in investment.
It would be beneficial for the companies in the motor industry to develop a process to define the most appropriate reaction time and logistics setup, according to specifications of product category. This work could be done within a cross-functional team that could develop optimal solutions and probably inspire other employees to commit.

Conflict of Interest
No potential conflict of interest was reported by the authors.

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