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LEAD TIME AND PERFORMANCE OF MANUFACTURING FIRMS IN NAIROBI CITY COUNTY, KENYA

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ABSTRACT

The main purpose of the study was to determine the relationship between lead time and performance of manufacturing firms in Nairobi City County, Kenya. The study used descriptive research design, where both qualitative and quantitative research was applied. The target population will be 328 respondents from the concerned firms in Nairobi city county, Kenya. The researcher carried census survey since respondents are manageable. The research technique was purposive sampling techniques. 10% (33) of the respondents was pilot tested for validity and reliability of the research instrument. Data was analysed using descriptive statistics and inferential statistics with the help of Statistical Package for Social Science version 28 and the same is now presented in a form of tables and figure. The reliability and validity results was acceptable with rating of over 0.7 and 0.5 respectively. This study concludes and recommends that lead time had a strongly relationship with performance of manufacturing firms in Nairobi city County, Kenya.

Key Words: Lead Time , Performance , Manufacturing Firms , Nairobi City County, Theory of Constraints

Background of the Study

In current world, companies have come up with a business strategy that has enabled them to be more competitive against their business competitors. Bode and Wagner (2015) argued that the competitive strategy is all about attracting the more customers towards by their products. The general aim of company's supply chain department is to ensure that the company remains more competitive on market. They also argued that the relationship between market competitive advantage and Supply Chain Management (SCM) are openly related. Many companies have focused on more improved and developed supply chain processes with an aim of ensuring that their customers are more satisfied while at the same time the company makes profit. Subsequently, most companies have become authoritative on handling the irregular market situations intensifying a competitive supply chain centred on quality production, quick response to customer complains, innovativeness and flexibility in production. The objective this is to shrink the production cost through increased efficiency and effectiveness. These are key characteristics of agile competencies (Cope, 2014).

According to Henderson *et al* (2019), lead time is an approach aimed at reducing the cost and time with a target of improving the supply efficiency. Cope (2014) stresses that agile, resilient and green are among the most used paradigms or strategies, but these approaches do not provide all the answers required for every organization. Lead time as Craig, Dehoratius, Jiang and Klabjan (2015) postulates, encompasses an institution being able to meet its goods and services' need in a manner that is conducive to the environment, that is cost effective for the organization, and also in a manner that adds value to the society at large.

Additionally, SP is defined by Dinu (2015) as the process of meeting organizational needs in terms of goods needed, services required as well as utilities and works, in a cost effective way while at the same time being conscious of the society and doing it with minimal damage to the environment. She posits that procurement performance is a paramount requirement for any organization intending to progress and improve competitively by improving the quality of their services. On the other hand, the absence of the procurement performance hinders the progression of the purchasing function and inhibits the organization's endeavour to change. As Dinu (2015) posits procurement performance is a unit of measuring is the degree to which the organization's purchasing function is meeting the goals and objectives cost effectively (with minimum costs possible). Procurement performance justifies the direction of resources to the purchasing function and shows the need of having the procurement function in the organization. Most organizations however do not have in place measures of performance for evaluating the effectiveness and efficiency of procurement.

Statement of the Problem

Manufacturing industry was the leading business activity in Kenya during the early 80's both in terms of size and employment. The industry was employing over 200,000 family households and about 30% of the labour force in the national manufacturing sector (Ekman, Thilenius & Windahl, 2014). Later the sub-sector started declining in the mid-1980s to the current situation where it registers losses of Ksh 50 million annually (KAM, 2013) which have been attributed to acquisition issues (Halldórsson & Vural, 2019).

There was therefore need for the manufacturing firms in Kenya to consider other management concepts with the potential of improving their procurement performance significantly. Lead time management concept, as suggested the potential to eliminate or minimize waste along procurement resulting to organization performance. Additionally, Hervani, Helms, and Sarkis, (2015) established a significant improvement in procurement performance of processing firms in South Korea due to application of agile practices within the procurement function. However,

Humphreys (2013) noted that the concept of lead time and its association with performance has not been empirically proved in Kenya. Kabergey and Richu (2015) added that empirical studies in this area is largely in other countries outside Kenya and mainly in America, Europe and limited parts of Asia. Thus, the study established the influence of lead time on the performance of manufacturing firms in Nairobi County, Kenya. In view of the foregoing this study is done in the Kenyan context so as to bridge the existing gap with new knowledge.

Objective of the Study

To establish the effect of lead-time on performance of manufacturing firms in Nairobi City County, Kenya

Research Question

What is the effect of lead-time on performance of manufacturing firms in Nairobi City County, Kenya?

LITERATURE REVIEW

Theoretical Review

Theory of Constraints

This theory used to assess the influence of lead-time on the performance of manufacturing firms in Nairobi City County, Kenya. The theory of constraints was developed by (Goldratt, 1990). This theory talks about a series of processes that are put in place to remove constraints in an organization that are preventing the achievement of organizational goals. Theory of constraints is applied to identify the factors that hinder an organization from achieving its goals, finding a solution to these factors and getting individuals to implement the required changes (Barney, 1991). Nowadays, companies struggle to survive in a global competition. Every company tries to find the best philosophy which is suitable with their strategy to gain any and every advantage among their rivals. Companies should be more focused on understanding their own structure in terms of processes whether they are in the production or service sector. In this situation, Theory of Constraints (TOC) becomes an important theory which focuses on the weakest ring(s) in the chain. TOC views processes as they are rings of the same chain is manufacturing of thinking they are independent from each other. At the same time, theory focuses on the weakest points which are bottlenecks for the entire company and try to determine the relationship of these bottlenecks. Therefore, this integrated management philosophy changes the way of thinking of managers and become an important tool for solving root problems (Barney, 1991). Originally TOC is used to plan the production process and allocate resources but its content is improved day by day as the technology evolves and competition between rival companies increases in business world. Nowadays it can be used a kind of management philosophy and can be integrated with cost accounting system

Conceptual Framework

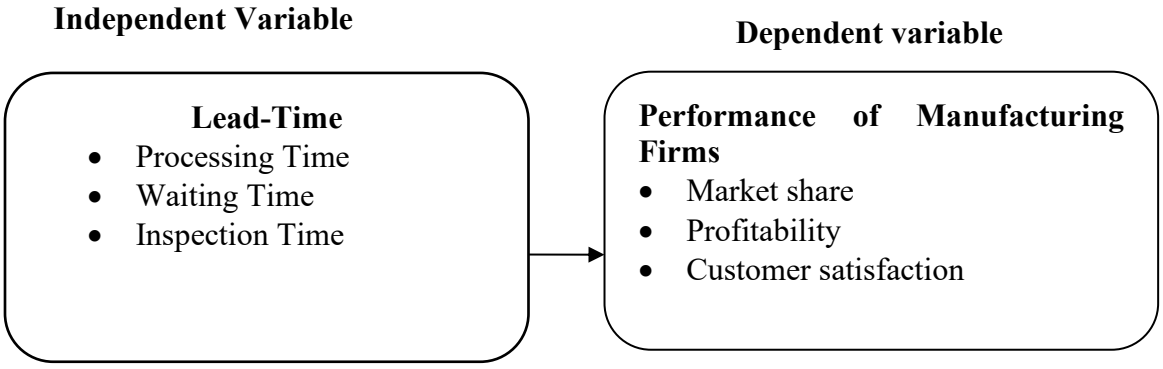

Figure 2.1 Conceptual Framework

Lead Time

There has been ample evidence showing the effect of lead-time in the fields of operations research and inventory management. There are conflicting effects of lead-time in the closely related literature. First, the literature implies that lead-time has a positive relationship with firms' preparation to absorb the impact of a disruption. An empirical study conducted using field data of U.S. public companies be-tween 1992 and 2002 finds that inventory level is positively related to procurement lead-time in all eight of the industry segments investigated (Kabergey & Richu, 2015).

In line with previous results, Bode and Wagner (2015) claim that shortening the replenishment lead-time is a more efficient way to decrease base-stock level compared to reducing lead-time variances in the case of high variation customer demand. These studies all point to the same idea: the faster an order replenishment is, the lower the optimal safety stock required to hedge against demand uncertainty since a shorter lead-time enables firms to dynamically respond to the shifting customer demand and provides less incentive for them to hold excessive inventory on-hand. However, when facing supply disruptions that stem from delivery problems or supply shortage, firms would be severely affected by the disruptive impact, such as production halt, stock out frequency, and backorder rate, due to low buffering inventory. On the contrary, in a supply chain with longer delivery lead-time, supply chain members tend to increase stock levels to offset the forecast error of relative lead-time demand (Cope, 2014).

This unintentionally increases the degree of abundance to mitigate the disruptive impact; therefore, the severity of the initial impact would be alleviated. Second, a longer lead-time might not be beneficial in responding to the disruption. In the absence of real-time announcement of disruption events, the replenishment lead-time of upstream sup-pliers would cause a delay in responding to disruptions, which is crucial for downstream customers in alleviating the disruption impact. To be more specific, in supply chains with shorter order replenishment time, the downstream customer is more flexible in executing contingency strategies due to earlier awareness of the disruptive event, thus resulting in an increased agility, which is measured in this study by two indicators, responsiveness and recovery (Kagwiria, 2014).

Furthermore, a longer lead-time could intensify inventory in-efficiency since firms with longer delivery lead-time could face a greater risk in terms of supply disruptions due to less accurate inventory management. According to Kagwiria (2014) how that longer replenishment lead-times cause inflated order variance at upper echelons by modelling a simple supply chain and

manipulating different deterministic lead-times with autoregressive customer demand. Kim et al. (2006) show that wide lead-time variance enhances the magnitude of bullwhip effect1more than the mean lead-time does. Many studies also suggest that reducing lead-time is significantly beneficial for improving the phenomenon of up-stream order oscillation which could cause an imbalance between supply and demand, and thus leads to firms' In ability to handle the disruption appropriate.

Performance of Manufacturing Firms in Nairobi city county, kenya

This study examined a focal firm's supply chain performance for the relationships with partners. Traditionally, most studies have assessed organizational performance based largely on financial indicators (Muttimos, 2014). These indicators are important to assess whether operational changes are improving the financial condition of a firms, but insufficient to measure supply chain performance. These indicators do not relate to important organizational strategies and non-financial performances, such as product quality and customer satisfaction More specifically, several studies have proposed a classification for supply chain strategies with the nature of different products, such as efficient supply chains for functional products and responsive supply chains for innovative products (Kim & Chai, 2017). With the development of SCM, domestic and foreign experts and scholars put forward a number of different the performance assessment system of supply chain.

Their studies indicate that supply chain performance affects more than 85% of manufacturer's costs and a large percent of its revenues. Different methods have been proposed for the performance evaluation of supply chain (Muttimos, 2014). They implied that product-related characteristics are crucial in determining the types of supply chain strategies either more efficient or more responsive, and accordingly, are considered as the potential measures of supply chain performance. Lot of research has been done in the area of supply chain performance improvement including reducing information asymmetry, reducing lead time, taming bullwhip effect, and minimizing total costs (Kim & Chai, 2017).

A fundamental requirement to achieve that is to share information among the supply chain members. For example, they stated that information orientation and information collection could effectively reduce information asymmetry (Muttimos, 2014). They reported that better coordination and revenue sharing could reduce lead time and transaction uncertainty in supply chain. Supply chain and demand chain, and investigated the role of lead time reduction in improving demand chain performance. Many other studies have confirmed that information integration is an essential mechanism to reduce the bullwhip effect. The performance of supply chain on the basis of buyer-supplier partnership and information integration in supply chain management.

The research herein, empirically tests the linkages of supply chain performance with buyer-supplier partnership and information integration (Quality information, Real-time information) with suppliers (Muttimos, 2014). Moreover, basing the argument on the lack of explicit research especially in Chinese manufacturing industries regarding the relationship among buyer-supplier partnership, information integration and supply chain performance, the research investigates the relationship in consideration. Chinese firms have a long tradition of using relational ties (guanxi) to conduct business, though the use of contracts has become more prevalent with economic reforms. A survey study was conducted to collect empirical data through questionnaire. The questionnaire was developed in English first and then translated into Chinese by Business Administration Faculty of China University of Geosciences (Kim & Chai, 2017). The instrument used to test the hypotheses was a mail survey and includes a two-part questionnaire and part-I collects basic information about organizational characteristics including industry type, annual revenue, and number of employees, as well as These insights

to the practical problem are thus based on longitudinal immersion in the field by collaborative research (Muttimos, 2014).

Empirical Review

In uncertain environments, flexibility to adapt previously made decisions to recently observed outcomes is always valuable. A special case of this general concept has found vast use in supply chain (SC) literature such as quantity flexibility or buyback contracts (Ongeri & Osoro, 2021). However, most SC contracts have dealt with quantity flexibility while totally ignoring lead time flexibility to the best of our knowledge. Lead time flexibility refers to an arrangement between the retailer and the transporter or the manufacturer, where delivery lead times are not firm when orders are placed but they evolve into firm(er) times. This evolution is controlled by the retailer as long as it is within limits posed by the transporter/manufacturer. The retailer monitors its demand and requests lead times accordingly; high demand observations lead to shorter lead times, e.g. expediting deliveries via using a faster transportation mode or via rushing the production at the manufacturer or buying a portion of the production lot from a spot market. Conversely, low demand observations suggest using a slower transportation mode or postponing deliveries from the manufacture where inventory holding costs are lower (Razmi & Haghighi, 2014).

For example, Boeing provides delivery lead time flexibility to its customers, such as Delta airlines. Airlines place aircraft orders to Boeing without firm delivery (lead) times, timing is made firmer with expediting or postponing deliveries as airlines observe more passenger demand. Under uncertainty, flexibility provides a hedge that distributes or reduces the risk. In the well-known example of quantity flexibility contracts the manufacturer and the supplier share the risk by promising the availability and purchase of a certain amount of goods. This set up gives retailer some leverage to counter against extreme demands which are unlikely but possible. It is possible to provide a similar hedging mechanism to retailer with flexible lead times. Our objective is to study this hedging mechanism, its benefits to the retailer and also to SC overall (Ongeri & Osoro, 2021).

RESEARCH METHODOLOGY

The study used descriptive cross-sectional research design. The target population was 217 respondents. According to KAM (2018) there are 217 in the manufacturing firms. This study adopted a census technique. Data was collected using a self-administered semi-structured questionnaire. Data obtained from the field was coded, cleaned, and entered into the computer for analysis using the Statistical Package for Social Science (SPSS) version 26. Qualitative reports are now presented in form of essay which was discussed as per the study objectives aligned with the theories and empirical study. Quantiatative data was analysed using descriptive and inferential statistics.

RESEARCH FINDINGS AND DISCUSSION

Out of 195 questionnaires that were send to the respondents,188 of them were dully filled and retuned by the respondents; yielding a response of 96.4%. This was considered every reliable response rate for the generalization of study findings is in line with Kothari (2011), states that a response rate of 70% and above is believed to be a reliable response rate.

Descriptive Statistics

Lead Time

Respondents were asked to give their responses in regard to lead time in a five point Likert scale where SA=Strongly Agree, A=Agree, N= Neutral, D=Disagree, and SD= Strongly

Disagree. Results obtained were presented in Table 1. Respondents were asked to give their opinion on the variable lead time. From table 4.7, the respondents unanimously agreement that lead time ensured performance of Manufacturing firms in Nairobi City County, Kenya (M=3.471, SD=1.1605); Through processing time assessment the manufacturing firms has been able been the cause of non-performance of manufacturing firms in Nairobi city county, Kenya (M=3.931, SD=.9201); willingness to have waiting time has contribution to performance of manufacturing firms in Nairobi city county, Kenya ((M=3.902, SD=.9005); assessment of inspection time accurately in lead time is important to manufacturing firms in Nairobi city county, Kenya ((M=4.159, SD=.8251); The management in Nairobi City County wants to improve performance of Manufacturing firms through lead time management (M=3.838, SD=1.2018); and lead time enhances performance of Manufacturing firms at Nairobi City County, Kenya (M=3.665, SD=.8015). The result concurs with the findings of Nyile *et al.* (2022) who observed that clear description of lead time, can enhance effective performance of Manufacturing firms.

Table 1: Lead time

Statement	Mean	Std. Dev.
We ensure conformance of lead time on manufacturing firms in Nairobi city county, Kenya (	3.471	1.0605
Through processing time on manufacturing firms' in Nairobi city county, Kenya	3.931	.9202
Waiting time has contribution to performance of Manufacturing firms in Nairobi City County	3.902	.9005
inspection time through good lead time on manufacturing firms in Nairobi city county, Kenya	4.159	.8251
The management of Lead time on manufacturing firms in Nairobi city county, Kenya	3.838	1.2018
Lead time enhances performance of Manufacturing firms at Nairobi City County	3.664	.8015

Performance Of Manufacturing Firms In Nairobi City County, Kenya

Respondents gave their level of agreement on various statements relating with performance of Manufacturing firms in Nairobi City County, Kenya. The results were as presented in Table 4.10 below: From the findings, respondents were in agreement that performance of Manufacturing firms in Nairobi City , Kenya is being affect by market shares management, they gave 53.1%; when asked about profitability of firms and its effect on procurement performance in Nairobi City , Kenya they gave 69.1 %; When the respondents were asked to show their level of agreement on customer satisfaction affects performance of Manufacturing firms in Nairobi City , Kenya they gave 8%; When also the respondents were asked to show their level of agreement on growth of the county manufacturing on performance of Manufacturing firms in Nairobi City , Kenya they gave 49.8. The findings is in line with the findings of Mutai and Osoro (2021) they observed that some of the factors that contribute to inefficiency in public procurement as corruption, delayed payments, poor planning, statutory amendments, insufficient use supplier evaluation low public participation, and improper payment procedures negatively affects performance of Manufacturing firms in Nairobi City County, Kenya.

Table 2: Performance of Manufacturing firms

Statements	Yes (%)	No (%)
Customer Satisfaction can affect performance of Manufacturing firms in Nairobi City, Kenya	53.1	46.9
Profitability can affect performance of Manufacturing firms in Nairobi City, Kenya	68.9	31.1
customer satisfaction can affect performance of Manufacturing firms in Nairobi City, Kenya	58.2	41.8
Reduction on complaints can affect performance of Manufacturing firms in Nairobi City, Kenya	69.8	31.2
Quality of goods can affect performance of of Nairobi City, Kenya	22.6	77.4
Production schedule on performance of manufacturing firms of Nairobi City, Kenya	74.3	25.7

Pearson Correlation Analysis

Table 3: Correlation Coefficients

		Performance Of MAN	Lead time
Performance Of Man.	Pearson Correlation	1	
	Sig. (2-tailed)		
Lead time	Pearson Correlation	.871*	1
	N.	188*	
	Sig. (2-tailed)	.000	

From the findings, a positive correlation is seen between lead time and performance. The correlation was established between lead time and performance of Manufacturing firms in Nairobi City County to be r = 0.871.

Regression Analysis

Table 4: Regression Coefficient Results

	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	-.137	.060	-1.144	.004	.004
Lead time.	.471	.132	.838	5.471	.002

A unit change in Lead time would thus lead to a .471 effect on performance of Manufacturing firms in Nairobi City County sector ceteris paribus. This finding is in line with the findings of Ongeri and Osoro (2021). This implies that among other factors, lead time is a significant determinants of performance of Manufacturing firms in Nairobi City County, Kenya.

Conclusion

The study concludes that there is a positive relationship between lead time and Performance of Manufacturing firms. Speciation identification, periodic design assessment, continues improvement and proactive assessment are among the lead time factors that significantly influenced the performance of Manufacturing firms in Nairobi City county, Kenya. The study further concludes that by implementing lead time has enhanced performance of Manufacturing firms in Nairobi City County, Kenya, leading to operational increase in efficiency and

effectiveness. Therefore, the study concludes Nairobi City County has significantly increased their suppliers' quality management in the County government in the supply chain practices.

Recommendations

The study recommend that lead time formalizes relations between parties within a robust legal framework, but is much more besides; it is an opportunity to define the arrangements that encompass every aspect of what outcomes the Nairobi City wants from the supplier and how it wants the relationship to work. This means that the county needs to take an active role in the development of the quality mechanism early on; it should not be left as a supplementary activity post negotiation. At preparation of every quality management can contribute to supplier evaluation on performance of Manufacturing firms in Nairobi City County, Kenya. Proper lead time can result to high procurement in Nairobi City County.

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