EFFECT OF WAITING TIME PLANNING ON SUPPLY CHAIN PERFORMANCE IN FOOD AND BEVERAGE PROCESSING COMPANIES IN KENYA

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Abstract: The aim of this study was to assess the effect of lead time management practices on the supply chain performance of food and beverage processing companies in Kenya. Food and beverage processing companies have been at the stake of declined performance which has mainly been among other reasons as result of continued poor customer satisfaction and increased operational costs. Previous evidence shows that lead time through Waiting Tim Planning in manufacturing sector has only been addressed as a factor of supply chain performance but there is little evidence on how the lead time management practices contribute to supply chain performance hence the subject of this study. The study employed descriptive survey research design and the target population was the 187 food and beverage processing companies in Kenya. A purposive sampling was used where the 153 food and beverage processing companies in Nairobi were surveyed through the heads of procurement in these companies thus making the sample size to be 153. A structured questionnaire was used to collect the data which was analysed through descriptive and inferential statistics using SPSS. The findings from the study revealed that waiting time planning enhanced supply chain performance through warehouse and production plant decentralization and order prioritization. The study concluded that waiting time planning had a significant and positive effect of supply chain performance. The study therefore recommended that the supply chain and the procurement management departments in the food and beverage processing companies ought to focus on reducing lead time by reducing waiting time through waiting time planning.

Keywords: Waiting time panning, lead time management, supply chain management, supply chain performance, food and beverage processing firms.

1. INTRODUCTION

1.1 Background of the Study

In the 21st century, many business organizations are working their best to ensure they reduce the lead time which increasingly affects the customer satisfaction and the overall organizational performance. In today's highly competitive global marketplace, customers have lower tolerance to delays in service or product delivery. Suppliers have therefore begun to place more value on delivery time of their products and companies are trying to gain a competitive edge and improve profitability by cutting costs, increasing quality and improving lead time (Nuruzzaman, 2011). In competitive industries, short lead time will differentiate a company from its competitors, leading to increase in sales and enhanced performance (Jamshidi & Ghomi, 2015). Lead time management entails coming up with strategies and processes that are aimed at reducing the customers' waiting time to deliver the products within the shortest time possible while at the same time upholding quality and reducing costs (Bernado & Salido, 2018).

As defined by Nuruzzaman (2011), waiting time is the time interval for which the organization has to wait after placing an order from a supply and before the order is delivered for processing and delivery to the customer. This should not be confused with lead time which is the time period before the customer receives the final product while waiting time is the timeframe between the main supply (raw materials) and the producer (Aberdeen-Group, 2013). According to Penfield (2013), the production dynamics and cost of inventory may play an important role in lead time variability. Spitter, de Kok, and Dellaert (2010) contend that waiting time is also a factor that can determine lead time variability. Zong (2010) also argues that in manufacturing systems there are many factors contributed to long production lead-times. The waiting time plays an important role in lead time variability. In this case it is important to consider the expected waiting time for a single producer queue when using queuing theory where the service time and the inter-arrival time between the orders have a general distribution. When an order arrives and the producer is busy, the order waits in a queue. When all earlier arrived orders are finished, the order is produced. In this case the First In, First Out (FIFO) system is used. This therefore leads to variability in lead time (Su et al., 2014). Since process times are relatively constant for most production systems, reducing waiting times has been the major approach to lead-time reductions.

Supply chain is a component of procurement that is the major determinant of how best the entire procurement process performs. Supply chain Management (SCM) entails managing a network of interconnected businesses involved in the ultimate provision of products and services or service packages required by the end users (Johnston, Khalil, Jain & Cheng, 2012). Supply Chain Management practices are increasingly becoming an important feature in the attainment of competitive advantage in most service organizations in the global markets today.

The food industry is vast and diversified, categorized by different segments such as fresh food industry, organic food industry, processed food industry and livestock food industry. Kenya's economy has remained largely agriculture based and industrialization remains a key factor in Kenya's development plans (Government of Kenya, 2017). Food production has always been a precondition for the development of civilization (Kenya Institute for Public Policy Research and Analysis, 2013). Kenyan manufacturing firms are facing greater performance challenges and competitive pressures from both local and multinational organizations. The Kenyan food and beverage industry is experiencing an increase in competition with new entrants in the market, changes in environmental conditions thus affecting inputs as well as increased tastes and preferences taking the lead. According to Munguti (2013) food processing covers: foods, beverages, dairy, vegetable oil, grain milling, baking and confectionery, fruits and vegetables, meat and fish, honey, nuts, mushroom.

1.2 Statement of the Problem

In Kenya's big-four agenda, manufacturing is one of the items that the Kenyan government upholds as a key economic driver that ought to be enhanced for the country to achieve the vision 2030 (GOK, 2018). The manufacturing industry in the country has over 20% of its composition from the food and beverage processing companies. Despite their significance contribution to the country's economy, the companies continue to face a wide range of challenges ranging from completion, increased globalization and increased cost of production. These challenges have threatened the effectiveness of the supply chain of these companies thus affecting their performance and competitiveness. Most of the food and beverage processing companies in Kenya continue to operate in old production means such as centralized methods, poor distribution and supply chain frameworks and lack of proper transport mechanisms. A report by the Kenya National Bureau of Statistics (KNBS) (2017) revealed that the food and beverage manufacturing sub-sector loses more than KSHs. 9 billion annually as a result of poor quality and increased defectives. The report further revealed that the food manufacturing industry was facing a steep competition from external markets with the demand of the locally produced food and beverages reducing by 7.4% between 2012 and 2016. A study by the FAO (2018) further revealed that the food and beverages exports from other East African countries to Kenya had increased by between 2.9% to 5% while the exports from Kenya of the same commodities had recorded a lesser increase. Increased lead time and poor quality as well as high prices due to high costs of operation have been blamed for decline in the performance of the food and beverage processing companies in Kenya (Kinyua, 2015). This has seen increased frustrated customers whose needs are not met thus opting out for other alternatives such as importation (Waithaka, Mburu, Koror & Muathe, 2012).

Empirical studies have revealed lead-time management as one of the major ways through which modern businesses steer their supply chain performance and the overall competitiveness (Godinho & Veloso, 2012; Spitter, de Kok, & Dellaert, 2010; and Glock & Ries, 2013). According to Stolyar and Qiong (2018) in a study titled 'Exploiting random lead times for significant inventory cost savings', reducing the lead time helps save on the operational costs and increase customer

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satisfaction while at the same time reducing the inventory levels which enhances the supply chain performance and organizational competitiveness. The empirical evidence however has been on different scope while there is no subsequent literature on the lead-time management practices particularly in the context of food and beverage processing companies in Kenya. This study therefore sought to fill these gaps by assessing the effect of lead-time management practices on the supply chain performance of food and beverage processing companies in Kenya.

1.3 Objectives

i. To find out the effect of Waiting Time Planning on supply chain performance of food and beverage processing companies in Kenya.

1.4 Research Question

i. What is the effect of Waiting Time Planning on supply chain performance of food and beverage processing companies in Kenya?

2. LITERATURE REVIEW

2.1 Waiting Time Planning and Supply Chain Performance

Waiting time planning has been termed as a key strategy towards ensuring that the purchases of an organization are delivered within the required time to ensure lead-time reduction. Pohl (2014) did a study on the impact of waiting time management on supply chain performance of manufacturing firms in Pakistan. The findings revealed that lead time management significantly influenced the reduction of lead time and customer satisfaction which are all aspects of supply chain performance. According to Pohl (2014), waiting time planning scheduling of products based on their urgency and having a production plant near the source of raw materials helps enhance the ability of the organization to meet customer needs in terms of time as well as reducing costs hence enhancing performance.

Vinelli (2017) did a study on the effect of waiting time planning on customer satisfaction among textile companies in South Africa. The study revealed that through effective waiting time planning, the customer orders were sufficiently met thus promoting their satisfaction. According to Vinelli (2017), customer satisfaction is a matter of how well the customer needs are met in terms of quality, timeliness and cost efficient. On the other hand, Vinelli notes that waiting time management ensures that the raw materials are availed at the required time hence enabling the organization to process customer orders timely and if the cost of materials is reduced through proper waiting time management, then the cost of production and the final product is reduced hence promoting customer satisfaction.

Palawatta (2015) studied the impact of waiting time management on customer satisfaction among banking industries in North Africa. The importance of customer waiting time management lies in the fact that customers' perception of waiting time of service providers could affect their current and future relationship with service providers (Palawatta, 2015). This perception means that when customers are satisfied with the amount of time they wait for services, it can induce loyalty behaviours in customers and influence them to desire more future business with service providers. It is therefore important that service providers do not gloss over customer Perceived Waiting Time (PWT), rather they should develop effective strategies to manage customer PWT in the service delivery process (Lee, Chen & Ilie 2012).

Kirui and Makau (2015) did a study on the effect of lead time on the efficient delivery of essential drugs in Kenya: A Case Study of the Kenya Medical Supplies Authority. The study established that waiting time had a significant influence on the efficient delivery of essential drugs in Kenya through reduction of the period between ordering and reception of orders and availing a framework for scheduling products based on the lead time. According to Kirui and Makau (2015), waiting time provides a framework for the organization to effectively analyse and work towards meeting the customer needs.

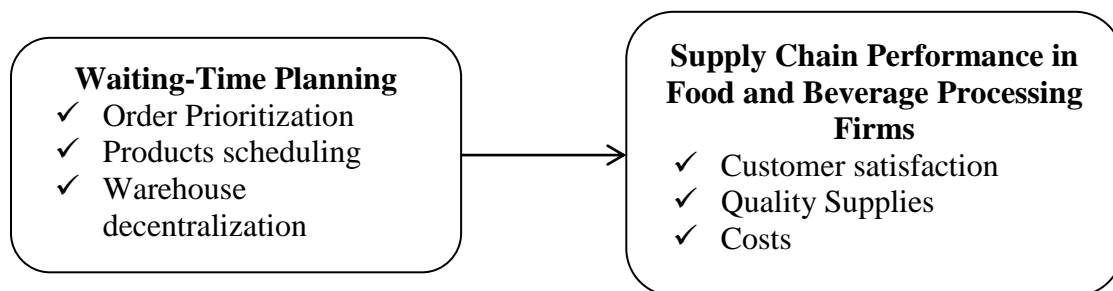### 2.2 Theoretical Review

2.2.1 Goldrat's Theory of Constraints

The Theory of Constraints (TOC) has been widely known as a management philosophy. It was coined by Goldratt (1990) with an aim to initiate and implement breakthrough improvement through focusing on a constraint that prevents a system from achieving a higher level of performance. The TOC paradigm essentially states that every firm must have at least one

constraint. Goldratt and Cox (1992) define a constraint as any element or factor that limits the system from doing more of what it was designed to accomplish. The owner of a system is assumed to establish its goal. The fundamental goal of most business entities is to make money now and in the future. Other stakeholders may develop necessary conditions that must be met to allow the system to continue operating.

The TOC thus encourages managers to identify what is preventing them from moving towards their goals - as well as necessary conditions - and find solutions to overcome this limitation. Literature on TOC supply chain solutions deals mainly with managing the supply chain from a single enterprise perspective (Cox & Spencer, 1998). Gupta (1997) recognizes that the TOC approach can be used to guide a single firm to concentrate on exploiting resources based on different logistics cost along the supply chain.

2.3 Conceptual Framework

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┌─────────────────────────┐              ┌───────────────────────────────┐
│  Waiting-Time Planning  │              │  Supply Chain Performance in  │
│  ✓ Order Prioritization │  ─────────▶  │  Food and Beverage Processing │
│  ✓ Products scheduling  │              │             Firms             │
│  ✓ Warehouse            │              │  ✓ Customer satisfaction      │
│    decentralization     │              │  ✓ Quality Supplies           │
│                         │              │  ✓ Costs                      │
└─────────────────────────┘              └───────────────────────────────┘
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 Independent Variables   **Dependent Variable**

2.4 Research Gap

The studies reviewed herein have gone a long way towards explaining the relationship between waiting time planning practices and supply chain performance. The studies by Boas *et al.* (2014); Vijayaraghavan and Raju (2018) and Lukhoba (2015) were based on a different context where they focused on a single aspect of lead time management hence being too narrow to make extensive conclusions and recommendations. The study by Gohary, Hamzelu, Pourazizi and Hanzaee (2016) addressed lead time as a dependent variable unlike the current study that considers lead time management practices as the independent variable and indication that the findings may not entail the same results. Some studies reviewed herein were carried out in more than a decade ago where since then much as changed in terms of technological changes and the overall practices of supply chain management. There is therefore need for a more updated study to bring a more modern context of lead time management practices and supply chain performance.

3. RESEARCH METHODOLOGY

3.1 Research Design

This study employed a descriptive research design. A descriptive survey research design is used when the problem has been well designed and where the researcher can engage in a field survey by going to the population of interest in order for the respondents to explain certain features about the problem under study (Creswell, 2013).

3.2 Study Population

The target population for this study was the food and beverage processing firms in Nairobi, Kenya. According to Kenya Association of Manufacturers (KAM) (2018), there are a total of 187 food and beverage processing companies registered under the association. The procurement heads or their representatives in these companies were targeted as the unit of observation.

3.3 Sampling

Purposive sampling was used to obtain the sample size for the study. Out of the total 187 food and beverage processing companies registered under KAM, 153 of these companies which is equivalent to 81.9% are located in Nairobi. This therefore justifies the choice of Nairobi as the locale of the study. The unit of observation comprised of one (1) procurement head/personnel from each of the companies making it a total of 153 respondents for the study. This means

that the study used purposive sampling to pick both the unit of analysis (food and beverage processing firms in Nairobi County) and the units of observation (Heads of procurement/supply chain).

3.4 Data Collection

A structured questionnaire was used to collect the primary data for the study. The questionnaires included closed and open ended questions. The questionnaires were administered individually by the researcher to all respondents. Care and control was exercised to ensure that most of the questionnaires issued to the respondents are received.

3.5 Data Analysis and Presentation

Quantitative data was analyzed by descriptive statistics using statistical package for social sciences (SPSS). Simple regression analysis was used to test for the relationship between each individual variable and the dependent variable. The model equations were derived from the research questions as herein outlined;

What is the effect of Waiting Time Planning on supply chain performance of food and beverage processing companies in Kenya?

$$Y = ß_0 + ß_1X_1 + e$$

Where;

Y = Dependent Variable (Supply Chain Performance)

$ß_0$ = Constant

$ß_1$ = Coefficient for the variable

X_1 = Independent variable (waiting time planning)

ε = Error term

4. RESEARCH FINDINGS

4.1 Response Rate

The study obtained a response rate of 81.3%. This was from a sample size of 153 respondents where 124 questionnaires were dully filled and returned for analysis.

4.2 Waiting Time Planning

The study sought to examine the influence of waiting time planning on supply chain performance. The respondents were asked to indicate their level of agreement on specific statements on the waiting time planning. The findings revealed that waiting-time planning through proper designation of the warehouses as well as order prioritization enhanced easier and faster processing of customer orders thus steering supply chain performance. The findings concur with those by Lee *et al.* (2012) who established that effective planning of the waiting time enabled proper coordination of the supply chain process thus reducing the lead time and enhancing customer satisfaction. According to Palawatta (2015), minimizing the waiting time in the supply chain is essential for minimizing supply chain costs while upholding the effective flow of materials for better customer satisfaction.

Table 1: Level of Agreement with Statements Waiting Time Planning

Statement	Mean	Std. Dev.
We prioritize orders to our suppliers based on the customer orders and the urgency of the orders	3.43	1.35
The products that have more accessible raw materials are prioritized than those with lesser available materials	3.64	1.14
Our suppliers are given the timelines by our customers to ensure they speed the supply of raw materials based on the customer timelines	3.55	1.28
We schedule products based on their demand to reduce the waiting time from our suppliers	3.31	1.45

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The products are manufactured based on the availability of the raw materials from our suppliers	3.57	1.26
The dispatch of the produced gods is made based on the production plan to avoid wastages	3.73	1.07
The warehouses are designed in a way that easies the moving-in of the raw materials	3.81	0.98
We have warehouses and processing plants closer to the source of raw materials to reduce the lead time	3.93	0.70
Through focus on waiting time and reduce it significantly we have achieved better supply chain performance	3.93	0.70

4.3 Supply Chain Performance

The study sought to establish the supply chain performance of the food and beverage processing companies in Kenya. This was done using specific parameters of supply chain performance which are; customer satisfaction, quality supplies and cost saving. The findings showed that most of the food and beverage processing firms upheld quality supplies more than cost saving and cost saving more than customer satisfaction. According to Ellram (2015) supply chain performance ought to be upheld on the perspectives of meeting customer needs and ensuring that the needs are satisfactory to the customers' perspective not only to the organization's perspective.

Table 2: Level of Agreement with Statements on Supply Chain Performance

Statement	Mean	Std. Dev.
The company has continually met the customer needs in terms of timeliness thus enhancing their satisfaction	3.45	1.40
Our customers are always willing to do business with us and also refer others	3.91	1.04
We have embraced consistency in the production to maintain high quality of our supplies	3.75	1.18
The distribution of our products is effectively done to minimize on poor quality on transit	3.60	1.41
The costs of managing inventories have reduced in our company due to focus on lead time management	3.51	1.30

4.4 Inferential Statistics on Waiting time Planning

The study sought to establish the statistical relationship between waiting time planning and Supply Chain Performance of food and beverage processing firms in Kenya and the results are as shown in table 3. The model summary results revealed that the standardized coefficient (R) was 0.711 whereas the R^2 was 0.505. This implied that 50.5% of the variation in supply chain performance of the food and beverage processing firms was explained by the waiting time planning. This shows that waiting time planning has a strong variation effect on the supply chain performance.

The ANOVA results revealed that the model was positively significant where the p-value was 0.000 which is below the standard p-value of 0.05. This indicates that waiting time planning has a significant effect on the supply chain performance. The model for the variable was $Y = \beta_0 + \beta_1 X_1 + e$ which becomes $Y = 0.386 + 0.850X_1 + e$. The findings imply that a unit change in waiting time planning would influence up to 85% change in supply chain performance of the food processing companies. The P-value for the variable was 0.000 implying that waiting time Planning is positively and significantly related to supply chain performance in that it is lower than the standard p-value of 0.05. The findings are in agreement with those by Taticchi, Tonelli, and Pasqualino (2013) who found out that waiting time planning significantly influenced time-saving and cost saving in the supply chain process thus enhancing supply chain performance through promoting customer satisfaction.

Table 3: Model Summary, ANOVA and Regression Coefficients (Waiting time Planning)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.711[a]	.505	.504	.71280

a. Predictors: (Constant), Waiting time Planning
b. Dependent Variable: Supply Chain Performance

ANOVA Results

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	152.571	1	152.571	300.288	.000[b]
	Residual	149.376	122	.508		
	Total	301.946	123			

a. Dependent Variable: Supply Chain Performance
b. Predictors: (Constant), Waiting time Planning

Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.386	.187		2.065	.040
	Waiting time Planning	.850	.049	.711	17.329	.000

a. Dependent Variable: Supply Chain Performance

The study sought to analyze the influence of waiting time planning on the supply chain performance among food and beverage processing firms in Kenya. The findings revealed that most of the organizations prioritized their production processes based on the products whose raw materials were easily accessible. The companies decentralized their warehouses and production plants as a way of being closer to the raw materials thus reducing the waiting time. The findings from the model showed that waiting time management had a P-value lesser than the standard p-value of 0.05 hence it significantly influenced the supply chain performance of the food and beverage processing companies. The respondents indicated that as a result of continued focus on waiting time reduction methods, their respective companies had significantly reduced the lead time thus steering customer satisfaction.

5. CONCLUSIONS

Waiting time planning has a significant influence on the supply chain performance of food and beverage processing companies in Kenya. Through continued focus on order prioritization, product scheduling and warehouse decentralization, the waiting time is reduced through which the delivery of the orders is enhanced thus enabling customer satisfaction. The study concludes that the waiting-time planning among the food and beverage processing firms is not effectively done and this could be the reason behind continued supply chain underperformance.

6. RECOMMENDATIONS

The study recommends that the management of food and beverage processing companies ought to keenly focus on reduction of waiting time by ensuring an extensive planning is done through which the orders are prioritized based on their timelines and scheduling the production as per the customer order. This will require that the supply chain department works closely with other departments such as the manufacturing department and the procurement department so as to ensure the time taken to bring the raw materials to the production plant is reduced.

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