

**CAPACITY MANAGEMENT STRATEGIES AND  
OPERATIONAL PERFORMANCE OF SUGAR  
MANUFACTURING FIRMS IN KENYA**


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**A research project submitted in partial fulfilment of the requirements for  
award of the Degree of Master of Business Administration in the School of  
Business, University of Nairobi Departments of Management Science.**

**November 2018**

## DECLARATION

This research project is my original work and has not been submitted elsewhere for examination, award of a degree or publication.

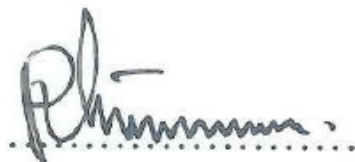


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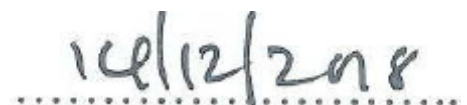


**Date**

This research project has been presented for examination with my approval as the University Supervisor.



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I thank all those in management within the sugar manufacturing firms who took their time to provide valuable insights that made it possible for this study. Finally, gratitude goes to my friends and colleagues for your motivation and moral support.

## **DEDICATION**

This document is dedicated to the entire Nangulu family for their inspiration and unwavering love. Special dedication to my wife Lucy Mburu for her encouragement throughout the study.

## ABSTRACT

This study was set out to determine the capacity management strategies adopted by the sugar manufacturing firms in Kenya. The study also sought to establish the relationship between these firms' capacity management strategies and their operational performance. Census survey study design was employed in this research in which all the entire population of the sugar manufacturing firms were considered. A total of eleven sugar manufacturing firms currently operational were sampled. Data was collected using structured questionnaires and the selection of respondents from each of these firms was non-probabilistic where the sample frame was selected based on their mandate and specialized knowledge in operations management. From the results obtained in this study, all the sugar firms in Kenya operated below their installed capacity and have adopted a mechanistic form of organization structure. Match (Chase) capacity management strategy emerged to be the most common strategy within the sugar firms in Kenya, this was closely followed by lead capacity management strategy. On challenges for the firms to effectively utilize their capacity, inadequate material supply, high cost of farm inputs and poor plant maintenance scheduling emerged to be the most outstanding factors.

Investing in innovation and learning for continuous improvement, establishing strategies to sustain financial position of the firms, customer satisfaction and employee satisfaction were the main operational performance measures employed by this firms. Political interference, weak policy backing for the industry and government support among others were the main limiting factors for these firms competitiveness. Inferential findings show that match (chase) capacity management strategy, lead capacity management strategy, lag capacity management strategy and level capacity management strategy were critical capacity management strategies that had a significant influence on operational performance of the sugar manufacturing firms in Kenya. To gain the sector productivity and hence competitiveness, this study recommends for sufficient funding through grants and loan schemes for technology enhancement, alignment of the existing policies that governs the sector supply chain to create an enabling business environment and spur growth. In conclusion, this study established that, there is no single capacity management strategy best for an organization. Organizations ought to be flexible to the market demands to remain competitive. Further research on the implication of various management styles adopted by these firms and their relationship to operational performance is encouraged. Research on sector products diversification is also encouraged.

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## **ABBREVIATIONS AND ACRONYMS**

ANOVA	Analysis of Variance
COMESA	Common Market for Eastern and Southern Africa
FAO	Food and Agriculture Organization
GDP	Gross Domestic Production
KSB	Kenya Sugar Board
TCD	Ton cane Delivered
UNIDO	United Nations Industrial Development Organization
US \$	United States Dollar

## CHAPTER ONE: INTRODUCTION

### 1.1 Background to the Study

The developments in industrialization globally has been at the forefront of nations to achieve Sustainable development by providing cutting edge competitiveness hence providing employment, facilitating international trade, enabling efficient use of resources hence a major driver of poverty alleviation (UNIDO 2017). In the present dynamic and competitive business environment world, organizations are continuously investing in efficient and innovative tools and approaches aimed at giving them a competitive advantage (Hana, 2013). According to Porter (1990), organizations that aspire to achieve competitive advantages must be innovative and adopt new and modern ways of doing things. Dekkers and Kanapathy (2012), noted that organizations that adopt adequate production capabilities while matching them with their organizational goals gain a competitive advantage.

In operations management research, the study of various manufacturing practices and strategies in relation to the organizational production capabilities have been of importance in establishing the overall organizational performance (Ward *et al.*, 1998). Größler and Grübner (2006) noted that organizational production capabilities are characterised by the set of practices in use production systems i.e. capacity management strategies employed and operational performance measurements. Olhager, Rudberg and Wikner (2003) noted that, a systematic production efficiency in the long term is necessary for production firms as it has a direct implication on competitive performance in terms of product quality, cost, speed of delivery and flexibility

Hayes and wheelwright (1984) described organizational capacity management strategies in variables; the form of capacity needed, the amount of capacity that needs to be added or reduced and the timing in which the capacity is to be changed. According to Hallgren (2007), the assessment of manufacturing performance is difficult as the organizations have both financial and operational measures in which financial measure such as return on investment and profitability are subject to other factors beyond operations. Thawatchai (2014) noted that, factors used in assessing and measuring organizational operations performance are product quality, speed of delivery, flexibility and cost performance which are the main competitive priorities for any organization.

### **1.1.1 Capacity Management Strategies**

According to Klammer (1996), the concept of capacity is least understood by professionals in the business and manufacturing world, this concept is measured variedly. In finance, capacity is measured in terms of installed machinery while in operations it is measured by workers efficiency. The concept of capacity and its utilization has been defined by various academia. Corrado and Matthey (1997), defined capacity as the maximum level of output an organization can achieve within its optimal resources and operational schedules/shifts. Alp and Tan (2008), defined capacity as the total production output of an organization by optimally utilizing its machinery and labour resources. Alp and Tan (2008) ,categorised these resources as permanent and contingent where; Permanent capacity is the maximum production output in a normal schedule while utilizing internal company resources and Contingent capacity as extra capacity that is temporary in nature (internal or external) through hiring or subcontracting.

Capacity management in accordance with Armistead and Clark (1991) is the ability of an organization to meet its customer demand. Sarbapriya (2013) noted that capacity management is a vital indicator of economic performance that provides an analysis of economic performance that provides insight of investment, inflation, and long run-output. According to Water (2006), Capacity management in an organization is responsible for all aspects of operations capacity. It is responsible for matching the long-term capacity of a process to the demand for its products. This is achieved through capacity planning, which describes specific approaches for achieving this match.

For organizations to meet their customer demands, they increase or reduce their production capacities. They achieve this by employing various capacity management strategies (Heizer and Render, 2004). These strategies have been further categorised by various scholars. Jacobs and Chase (2008) categorised Level capacity management strategy in which organizations maintain a steady labour input and production output rates over a planning period hence allowing the organization to maintain product inventory levels higher than expected in low demand variability. Hayes and wheelwright (1984) devised lead capacity management strategy which aspires for increasing the production output in expectation of an increase in customer demand (Olhager, Rudberg and Wikner 2001) categorised lag Capacity management strategy in which organizations increases capacity only when it's running at optimum while Chase and Aquilano (1985) devised Match (Chase) capacity management strategy in which organizations increases their capacity in smaller increments in response to the market demand

### **1.1.2 Operational Performance**

Operational performance is the overall company functioning against prescribed standards such as organizational overall productivity; resources use efficiency, compliance with regulations etc. According to Han *et al.*, (2014), organizations achieve a competitive advantage through innovation and outstanding performances in terms of customer satisfaction. Therefore, in the present competitive world, organizations are continually measuring their performance as it has direct implications to the overall organizational growth.

Organizational performance measurement is indispensable for managing organizations resources and providing a strategic direction for sustaining the organizational competitiveness. Inadequate performance measurement often leads to poor product delivery to customers hence low competitiveness (Han *et al.*, 2014). In accordance to Venkataraman (2014), measuring organizational performance is a key ingredient for achieving total quality management. Harrington (1991), quoted that “Measurement is the first step that leads to control and eventually to improvement. If you can’t measure something, you can’t understand it. If you can’t understand it, you can’t control it. If you can’t control is, you can’t improve it”.

Ridley (2008), noted that, organizational improvement is a continuous process in which measurement of performance is significant as it helps in tracking progress in line with set goals. It also aids the organization to gauge its performance against competitors. He further reiterated that, in ancient times, measures of organizational performance and their indicators were based only from cost accounting records based of outdated principles with minimal information to support performance improvement hence limiting continuous improvement due to inability to map process performance.

Ridley`s arguments were complements to Kaplan and Norton (1992) who reiterated that the ancient measures of performance were only relevant in the industrial era and cannot meet the organizational needs in terms of skills and competence required in present times.

### **1.1.3 Sugar manufacturing firms in Kenya**

Sugar processing in Kenya was first commissioned in 1922 at Miwani in Nyanza region. In 1927 the second sugar factory was set up in Ramisi in the coast region this is now the Kwale international sugar. After 1963, the Kenyan Government invested in the sugar production by enhancing its sugar farming and establishing more sugar companies namely Muhoroni (1969)

with a production capacity of 2200 TCD, Chemelil (1968) with a production capacity of 3000 TCD, Mumias (1973) with a production capacity of 8000 TCD, Nzoia (1978) with a production capacity of 3000 , South Nyanza (1979) this a production capacity of 2700 TCD, West Kenya (1978) with a production capacity of 4000 TCD , Butali (2011) with a production capacity of 2500 TCD , Kibos (2007) with a production capacity of 3500 TCD , Sukari (2011) with production capacity of 1500 TCD and Transmara (2011) with a production capacity of 4000. Out of these factories only eleven factories are currently operational of which five (5) are government co-owned and six (6) privately owned (KSB, 2013).

Based on (FAO 2013) statistics, these functional factories have a cumulative production capacity of about 600,000 metric tons against an annual domestic consumption of about 800,000 metric tons running a deficit of about 200,000 metric tons. According to the KSB (2013), the experienced deficit in sugar quantities in Kenya is as a result of high costs of production due to the utilization of old production technologies, incompetence within management and governance structures and inadequate investment in new sugar cane farming and production technologies.

To gain greater understanding of these factors affecting the industry, it is important to establish a comparative analysis of the institutional arrangements, management structure, capacity availability and their utilization and operation efficiencies within the private and government co-owned sugar firms.

## **1.2 Reaserch Probelm**

Production capacity planning and its management in an organization is responsible for organization growth and performance. These elements are responsible for matching the long-term capacity of a process to the demand for its products. Various capacity management strategies such as lead capacity management strategy, lag capacity management strategy, and match (chase) capacity management strategy are widely employed by organizations to meet the customer demands while enhancing competitiveness. These strategies are complemented by an effective and efficient organizational operation performance.

According to the World Bank (2015), Kenya has an estimate Gross Domestic Production (GDP) of US \$ 69.977, with a per capita GDP of US \$ 1.587. Key drivers of the Kenyan economy include tourism, agriculture, mining manufacturing and the service sector. In agriculture, sugar cane farming emerges before coffee, tea, maize and other fresh produce that

collectively contribute about 7.5% of the GDP. The KSB (2013) reports that, the sugar manufacturing industry in Kenya plays a major role the growth of the national economy as is a source of income for millions of people in the agro-processing and final products distribution

According to the (KSB, 2010), the Kenyan sugar industry supports directly and indirectly six million Kenyans. Despite the sector significance to the national economic growth, it has been marked with gross mismanagement, use of obsolete technology, insufficient incentives to farmers, and inconsistent policy support base for both government and private sugar firms at micro (firm), macro (national) and supra-national levels, including trade liberalisation actions resulting in drastic decline in production levels and very low returns on investment to farmers.

Nearly all the factories now operate below capacity. Currently, the industry has a deficit of above 200, 000 metric tonnes of sugar for national consumption (KSB, 2013). As a result, the country since 2002 been importing sugar from Brazil, Swaziland and the Common Market for Eastern and Southern Africa (COMESA) region to enable it take measures to improve competitiveness of its sugar industry (KSB, 2013). The average cost of production of sugar locally is \$870 per metric ton therefore cannot compete with some Common Markets within the Eastern and Southern Africa (COMESA) countries producing at \$ 400 per metric ton (KSD 2017). As a result the consumers have been subjected to incessant high prices for locally produced sugar.

Over the years various research on capacity management and operational performance both in the manufacturing and service sectors have be carried out by scholars. Kaburu (2014), carried out a study whose aim was to determine the extent of liberalization within the sugar processing industry in Kenya and establish how sugar processing companies are strategically positioned in response to liberalization of the sugar industry in Kenya. This study established that in Kenya, there is slow adoption of competitive strategies by sugar processing firms towards the effects of intended liberalization. This study further noted the poor implementation of policies set by the sugar directorate in the registration and management of sugar firms.

Kamau (2014), In his study measured the performance measures index(level) by manufacturing firms in Kenya and established the relationship between operations performance measures index (level) with each component of performance measurement practices and factors affecting implementation of performance measurement. This study found that operational performance measures index by manufacturing firms in Kenya is at 63.95%. It also established that a positive

association between operational performance measures index and components of performance measurement practices such as process, tools, systems metrics and approaches exists. Lastly it revealed that the manufacturing firms in Kenya lack proper training and well-articulated vision.

Gasselin (2005) researched on the relationship between performance measurements among Canadian manufacturing firms. This study established that the firms that adopted modern approaches to performance measurement performed better than those that used traditional approaches while those that used traditional approaches performed better than those that did not measure performance.

It is worth noting that scholars in the reviewed studies have vividly discussed the aspects of capacity management and operational performance but mostly in the service sectors. Despite the evident challenges the country is facing in regard to sugar production and meeting the consumption demands, none of these scholars has established the managerial and operation strategies these sugar factories have put in place to meet the national consumption demand . This scenario evokes the need to determine the capacity management strategies commonly adopted by the sugar manufacturing firms in Kenya and to establish the links between capacity management strategies and the operational performance of sugar manufacturing firms in Kenya with a view to unveiling appropriate approaches for increased productivity

### **1.3 Overall objective**

To establish the influences of capacity management on operational performance of the sugar manufacturing firms in Kenya with a view to strengthening the evidence base for increasing competitiveness of the sector.

### **1.4 Specific Objectives**

- I. To determine the capacity management strategies adopted by the sugar manufacturing firms in Kenya
- II. To establish the relationship between capacity management strategies and operational performance of sugar manufacturing firms in Kenya.

### **1.5 Value of the study**

This study findings will form part of the knowledge vital for theoretical and policy decision making options among key players in the sub sector and the academia at large. On the theoretical front, the recommendations will be useful in providing potential directions for



further research and theory building on the influences of capacity management strategies on the operations of the sugar firms in Kenya.

From a policy-practice perspective, the findings will constitute an important recourse to empirical source of information for guiding policy development, planning and design of programmes geared toward fostering the productivity of the sugar industry in Kenya.

## **CHAPTER TWO: LITERATURE REVIEW**

### **2.1 Introduction**

This chapter provides a theoretical foundations and review of organizational capacity management and operational performance measures set forth by various scholars by reviewing theories and empirical studies of existing literature in the same field. The theoretical study will provide the foundation of the study and aid to gain insight of the current body of knowledge relevant to the research topic while the empirical review will unearth the findings and suggestions of related studies.

### **2.2 Theoretical foundation**

There are various theories that explain organizational capacity management strategies and operational performance. Among these theories are the goal setting and resource advantage theories.

#### **2.2.1 The goal setting theory**

Locke (1968), devised the goal setting theory of motivation which state that setting goals is essentially linked to task performance. It denotes that challenging and specific goals along with appropriate feedback yields higher and better task performance. This is based on the fact that goals provides the organization and its employees what need to be achieved and what strategies are essential. The urge to work towards attainment of certain goals in an organization is the motivating factor for employees and in return it enhances operational performance (Salaman 2005).

Locke and Latham (2002) developed a linear relationship between goal complexity, performance level and effort required. As a result they inferred that the relationship will correlate positively as long as the individual or organization has commitment to the goal, has the ability to attain it and has no contradicting goals. In an organization, goals have a direct influence on employee's behaviour and performance (Locke & Latham 2002). Lunenburg (2011) noted that, organization in the modern world employ various forms of goal setting in their operation to achieve competitiveness. Search forms are information technology and management information systems, management by objective, key performance indicators,

benchmarking, strategic planning and systems thinking. This theory is relevant to this study as it relates the employee's goals with organizational operational performance.

### **2.2.2 Resource advantage theory**

The resource advantage theory devised by Hunt and Morgan (1995) is a theory of competition in which innovation and organizational learning are endogenic. This theory emphasises that the value of resources to firms is valued by their potential to enhance the organizational competitive advantage (Peranginanin 2015). Hunt and wooldcroft (2012) emphasised the importance of market segmentation, heterogeneous firms resources with comparative advantage is vital to organization. these scholars further noted that resources are noted that resources to any organization are more than land, human capital and capital base rather resource are classified as financial, equipments, legal, skills and knowledge of individuals, organizational culture, relationship with suppliers etc.

According to Zemanek and Pride (1996), an organization has strengths to direct its customers, such as price, quantity, product line, advertising and promotion, service, stock availability, credit to the customers, and display. The organization is expected to make the optimal use of its resources in order to maintain the advantage. Organizations maintain their advantage if they are capable of adding value to their customers and when their competitors replicate their strategy (Barney 1991). In accordance with Zamanek and Pride (1996), organizational strength and competitive advantage to its customers is dependent on price, quality, delivery, credit to customers etc. therefore organizations are expected to optimally use their resources to maintain their competitive advantage. This theory is relevant to this study as it provides the relationship of optimal utilization of available resources and organizational performance and hence competitiveness.

### **2.3 Theoretical review**

Kirkley and Squires (1999), noted that understanding organizational capacity and its measurement is necessary to properly design a capacity management program, especially when capacity is managed by explicit limitations. Capacity utilization as a concept in production often arises in the discussions of applied and theoretical issues at both macro and micro economic levels as its importance is becoming more crucial for firms decision makers. The foremost work on the economic concept of capacity is attributed to Cassel (1937), he made a clear distinction between excess capacity of fixed factors (short-run cost curves)

and excess capacity of all factors (long-run cost curves). Cassel further pointed out that since the absolute technical upper limit of the output obtainable from the fixed factors is likely to lie far beyond the realm of practical economic operations, capacity output should be taken as that which the average total costs are at their minimum.

Capacity management in accordance with Armistead and Clark (1991) is the organizational ability to meet its customer demands. Sarbapriya (2013) noted that capacity management is a vital indicator of economic performance that provides an analysis of economic performance, insight of investment, inflation, and long run-output. According to Water (2006), Capacity management in an organization is responsible for all aspects of organizational operations. It is responsible for matching the long-term capacity of a process to the demand for its products. This is achieved through capacity planning, which describes specific approaches for achieving this match.

Capacity as defined by Corrado and Matthey (1997), is the maximum level of output an organization can achieve within its optimal resources and operational schedules/shifts. Alp and Tan (2008), defined capacity as the total production output of an organization by optimally utilizing its machinery and labour resources. Alp and Tan (2008) ,categorised these resources as permanent and contingent where; Permanent capacity is the maximum production output in a normal schedule while utilizing internal company resources and Contingent capacity as extra capacity that is temporary in nature (internal or external) through hiring or subcontracting

## **2.4 Capacity Management Strategies**

For organizations to meet their customer demands, they increase or reduce their production capacities. They achieve this by employing various capacity management strategies (Heizer and Render, 2004). These strategies have been further categorised by various scholars. Jacobs and Chase (2008) categorised Level capacity management strategy in which organizations maintain a steady labour input and production output rates over a planning period hence allowing the organization to maintain product inventory levels higher than expected in low demand variability.

Hayes and wheelwright (1984) devised lead capacity management strategy which aspires for increasing the production output in expectation of an increase in customer demand (Olhager, Rudberg and Wikner 2001) categorised lag Capacity management strategy in which organizations increases capacity only when it's running at optimum while Chase and Aquilano

(1985) devised Match (Chase) capacity management strategy in which organizations increase their capacity in smaller increments in response to the market demand.

#### **2.4.1 Level Capacity Management Strategy**

Level capacity management strategy helps organizations to maintain a steady input and production output rates over a planning period. The strategy allows the organization to maintain product inventory levels above the requirement in low customer demand seasons and when the demand increases above the steady output, the organization maintains the steady output and work force rate as the surplus products inventory accumulated in the period of low demand are utilized to absorb the incremental demand. (Jacobs and Chase, 2008).

Geng and Jiang (2009) noted that limited utilization of available resources at organization level increases the cost of production under this strategy and also this strategy is important in situations when the opportunity of losing the product market to other competitors when the market demand is high.

#### **2.4.2 Lead Capacity Management Strategy**

This is the strategy in which organizations increase the production capacity based on projections in increased customer demand. This strategy allows for the organization to rent its excess capacity to other companies in the same sector. Organizations that employ this strategy have the merits of ensuring that they have sufficient capacity to meet their demands and use this strategy to pre-empt competition among other companies (Hayes and Wheelwright, 1984).

#### **2.4.3 Lag Capacity management Strategy.**

This is the opposite of lead capacity. In this strategy, organizations increase capacity only when it's running at optimum. This is a more conservative strategy as it decreases the risks of waste. This strategy helps organizations to use their resources efficiently with enhanced resources productivity as a result of enhanced capacity utilization. Lag capacity management strategy yields to cost effective products. (Olhager, Rudberg and Wikner 2001).

#### **2.4.4 Match (Chase) Capacity Management Strategy**

This is a more moderate strategy in which an organization increases its capacity in smaller increments in response to the market demand (Chase and Aquilano, 1985). This strategy

minimises the over and under capacity of the lead and lag strategies. The advantage of this strategy is that, the organization optimises its supply chain by being able to supply customers with what they want, when they want it at minimal costs possible. (Gary, 2017).

## 2.5 Operational performance and measurement

According to Gomes (2004), performance measurement practices dates back to 1970s as a result of inaccuracies of using traditional accounting systems. Oakland (2006) reiterated that, operational performance determines organization competitiveness. Operations should be efficient and effective in order to achieve the organizational strategic goals. Han and Co-workers (2014) noted that, organizations achieve a competitive advantage through innovation and outstanding performances in terms of customer satisfaction. Therefore, in the present competitive world, organizations are continually measuring their performance as it has direct implications to the overall organizational growth. Among the performance measurement frameworks introduced by various scholars are the performance pyramid (Cross and Lynch, 1981), balance score card (Kaplan and Norton, 1996), Performance Measurement Questionnaire (Dixon, 1990) etc.

### 2.5.1 Performance Pyramid

Cross and Lynch (1991) suggested that, there are several measures of performance a part from the traditional financial approaches. These measures include profitability, cash flow and return on investment. This argument gave rise to the performance pyramid which include other measures such as fulfilment of customer needs, flexibility in operations and organizational productivity as driving forces upon which measures should be based.

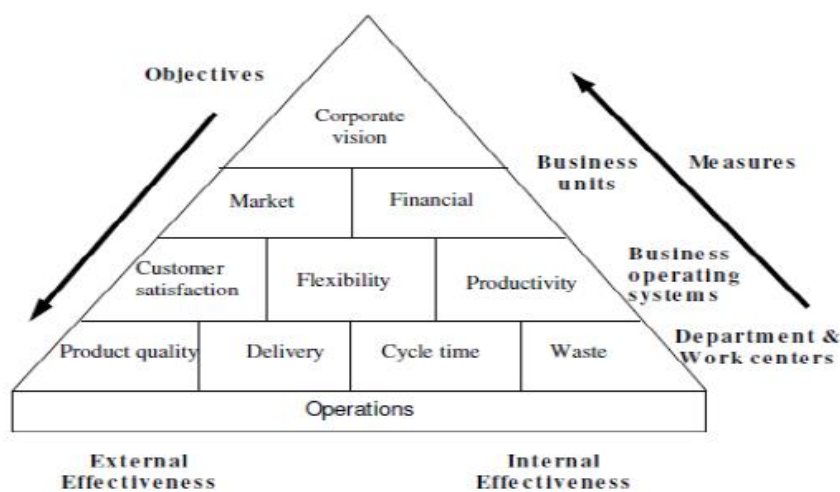
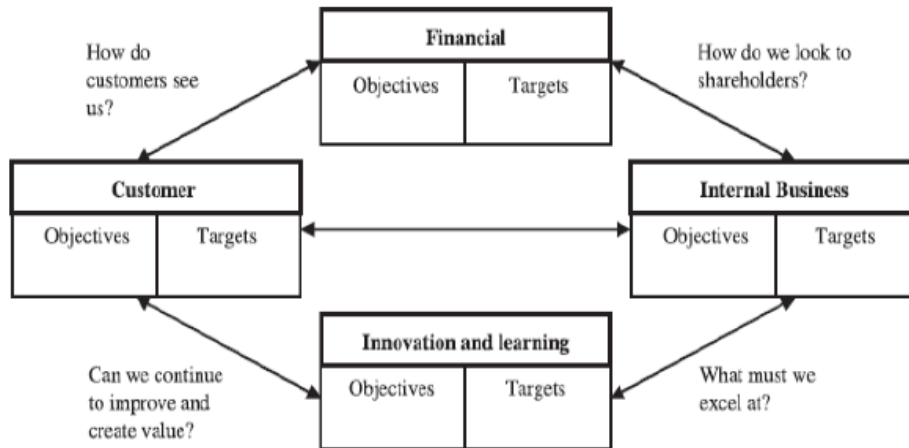


Figure 2.1: Performance Pyramid (Cross and Lynch, 1989)

### 2.5.2 Balanced Score Card

Kaplan and Norton (1992), devised a balance scorecard framework in which management should measure their organizations in four perspectives; financial, learning, innovation, customer and internal business. This framework provides timely indicators hence aiding organizations in planning to achieve strategic goals (Bell *et al.*, 2013).



**Figure 2.2: The Balanced Score Card Framework (Kaplan and Norton, 1992)**

### 2.5.3 Performance Measurement Questionnaire

Dixon *et al.*, (1990) developed the performance measurement questionnaire aimed at establishing what performance measures companies employ. This questionnaire was divided into two parts (Dixon *et al.*, 1991). Part one; to aid in establishing areas of improvement and the adopted improvement measures. Part two; to help in establishing improvements to be attained in the longer term. Dixon *et al.*, (1990) identified quality, labour efficiency and machine efficiency as improvement areas for organizations.

Long-run importance of improvement	Improvement areas	Effect of current performance measures on improvement
None >>>> Great		Inhibit >>>> Support
1 2 3 4 5 6 7	Quality	1 2 3 4 5 6 7
1 2 3 4 5 6 7	Labour efficiency	1 2 3 4 5 6 7
1 2 3 4 5 6 7	Machine efficiency	1 2 3 4 5 6 7

**Figure 2.3: Performance Measurement Questionnaire (Dixon *et al.*, 1990)**

## **2.6 Empirical Review on Capacity Management Strategies and Operational Performance**

Organizational operations and their contribution to competitive advantage has been an epitome of research in operations management dating back 1960s in Skinners work in which the contributions of manufacturing were based on economies of scale and later complemented by the innovation to achieve quality, flexibility and speed of delivery (Hayes and wheelwright, 1984). These scholars work demonstrates a linkage between capacity management strategies and organizational operations performance.

Armistead and Clark (1991) noted that operations managers deploy various capacity utilization and management strategies to balance resources use productivity, quality and delivery. On the other hand, managers enhance operational performance to meet the desired quality while optimising resources productivity. These aspects are vital in providing organizational strategic direction (Bowman, 1990).



Various scholars over the years have researched on either capacity management or operational performance both in the manufacturing and service sectors Table 1: highlights some of these studies, their findings and gaps.

**Table 2.1: Empirical Review**

Author	Study Topic	Research Objective	Findings	Gap
Kaburu (2014)	Sugar sector Liberalization and competitive strategies commonly used by manufacturing companies in Kenya,	I. Determining the extend of liberalization within the sugar processing industry in Kenya  II. Establishing key strategies employed by sugar manufacturing companies in Kenya as a response to liberalization of the sugar sector	This study established that in Kenya there is slow adoption of competitive strategies by sugar processing firms towards the effects of intended liberalization. This study further noted that poor implementation of policies set by the sugar directorate in the registration and management of sugar firms	The research does not link the competitive strategies adopted by sugar firms to their overall operational performance and competitiveness
Kamau (2014).	Performance measurement and	I. Measuring the performance measures	This study found that operational performance	This study does not provide specific performance

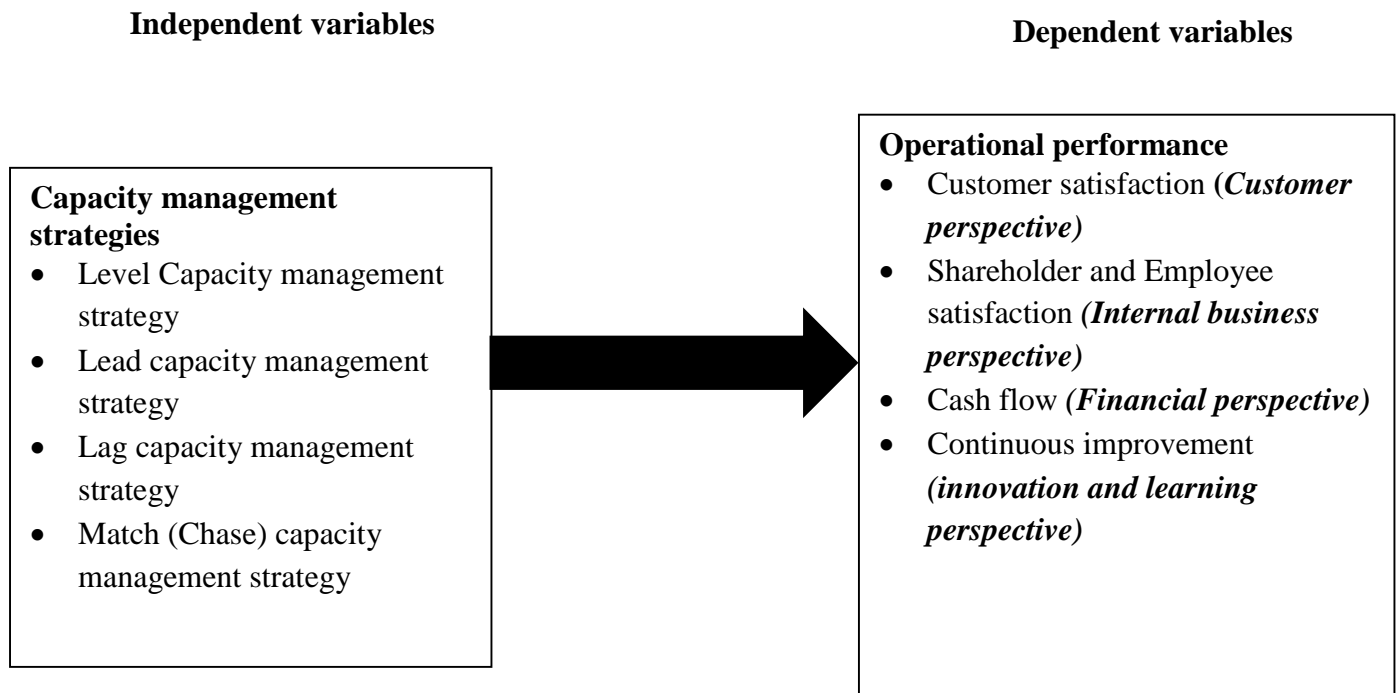
	operational performance of manufacturing companies in Kenya	<p>index(level) by manufacturing firms</p> <p>II. Establishing the relationship between operations performance measures index (level) with each component of performance measurement practices and factors affecting implementation of performance measurement</p>	<p>measures index by manufacturing firms in Kenya is at 63.95%. It also established that a positive association between operational performance measures index and components of performance measurement practices such as process, tools, systems metrics and approaches exists. Lastly it revealed that the manufacturing firms in Kenya lack proper training and well-articulated vision.</p>	<p>measurement practices employed by manufacturing firms in Kenya with linkages on how they enhance operational performance of these firms.</p>
Nguyo (2014)	Capacity management strategies and	I. Establishing capacity management strategies adopted by the oil	Her research revealed that the capacity management strategy mostly employed	The study does not provide vivid measurements of the perceived quality in the petroleum industry

	service quality a case of the petroleum distribution companies in Kenya.	<p>distribution companies in Kenya.</p> <p>II. Determine the relationship between approaches of capacity management adopted and the quality in the distribution service</p> <p>III. Determining the interaction of capacity management approach and service context and their impact on the perceived quality in the oil distribution sector in Kenya</p>	by firms in the oil distribution industry in Kenya is chase capacity management strategy and the capacity management approach of service context can interact and positively influence perceived quality.	with clear linkages to various capacity management strategies employed by the distribution firms.
Gessline. (2005).	An empirical study of Performance	I. An assessment of the extent to which organizations are enhancing use of non-	This study established that the firms that adopted modern approaches to	The study does not vividly show the extent of how organizational structure and strategy shapes

	<p>measurement in manufacturing firms</p>	<p>financial measures to measure their performance and the importance of adopting modern measurement approaches i.e. Balanced Scorecard in relation to their organizational structure and strategy.</p>	<p>performance measurement performed better than those that used traditional approaches while those that used traditional approaches performed better than those that did not measure performance.</p>	<p>organizational performance. The study also does not clearly demonstrate the shortcoming of the balance score card framework to organization performance measurements. .</p>
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## 2.7 Conceptual Framework

This section describes the logical interrelations of capacity management strategies and organizational operational performance in the sugar industry setting. It specifies the indicators and measures corresponding to these independent and dependent variables respectively.



**Figure 2.4: Conceptual Model**

## **CHAPTER THREE: RESEARCH METHODOLOGY**

### **3.1 Introduction**

This chapter gives highlight of the research design, the population, data collection and the technique applied.

### **3.2 Study Design**

A census survey research design approach was used in this study in order to enlist a rigorous analysis of capacity management strategies employed and operations design that ultimately determines the operational performance of the sugar firms in Kenya. Under this design, all the manufacturing sugar firms in Kenya were considered. The research targeted industry production, field, and quality assurance and finance managers to provide relevant primary and secondary information for evaluation.

### **3.3 Population**

Since this was a census survey, the target population was all the sugar milling firms from in Kenya to better understand the influence of organizational forms and structure to the overall performance of these firms. A total of 11 sugar firms currently operational were surveyed and their responses analysed.

### **3.4 Data Collection**

Qualitative and quantitative data from primary sources on capacity management strategies and operational performance was collected in all the sugar firms using structured questionnaire. The questionnaire was structured into three section in which section A captured the general information about the sugar firm, section B captured organizational capacity; utilization practices, management initiatives and strategies employed by the firm while section c recorded the organizational performance and their measurement. The selection of respondents from each of these firms was non-probabilistic where the sample frame was selected based on their mandate and specialized knowledge in operations management.

### **3.5 Data Analysis**

Data collected was analysed using the Statistical Package for Social Science (SPSS) software version 22. First the data was cleaned, validated and coded. Descriptive statistics was generated in which the frequency and percentile scores were obtained. Across sectional synthesis of data analysis was considered in this study as opposed to individual case analysis. Inferential data analysis by linear regression function was used explain relationship between the capacity management strategies as a function of organizational operational performance. The significance of coefficient for each independent variable was indicated by the p-value. The test of significance of the study was performed at 95% confidence level. Analysis of variance (ANOVA) was used to determine the significance of the regression model. Correlation analysis was undertaken to identify the kind of relationship that exist between capacity management strategies adopted by the Kenya sugar firms and their operational performance.

## CHAPTER FOUR: DATA ANALYSIS AND RESULTS

### 4.1 Introduction

This Chapter presents the results of obtained data analysis. The chapter is divided into two sections. The first section describes the general information relating to the characteristics of sugar manufacturing firms in Kenya and those of the respondents. The second part presents the results on capacity management strategies and operational performance measures employed by sugar manufacturing firms in Kenya and their relationships in accordance with the study objectives.

### 4.2 General Information

The data required was obtained from all the sugar manufacturing firms in Kenya operational at the time of the study. This data was provided by different personnel of the respective firms drawn across levels of management. The respondents were different in personal background, characteristics in terms of age and duration served in the firms. Table 4.1 summarises those details.

**Table 4.1: Characteristics of respondents**

<b>Characteristic</b>	<b>Frequency</b>	<b>Valid %</b>
Respondents age		
21-40 years	3	27.3
41-60 years	7	63.6
>60 years	1	9.1
<b>Total</b>	<b>11</b>	<b>100</b>
Position held		
Production manager	3	27.3
General manager	3	27.3
Process manager	1	9.1
Other management level	4	36.4
<b>Total</b>	<b>11</b>	<b>100</b>
Years of service to the firm		
2-5 Years	5	45.4
6-10 years	2	18.2
> 10 years	4	36.4
<b>Total</b>	<b>11</b>	<b>100</b>

**Source: Research data (2018)**

Form the results in table 4.1, it shows that the data came from people who are mature adults implying that data was provided by people who are likely to have a solid experience and intellectual capability to make sense of the response required. All of them were in top management positions an indication that they possessed the organization skills and knowledge critical to



discerning capacity management and organizational performance of the representative sugar firms. In addition, over half of them served the firms for a period of over six years at 54.6%. Only 45.4 % had been in their firms for less than 6 years. This points out the possibility that the data obtained reliably expressed the true picture about the results attributes gained out of several years of experience.

**Table 4.2: Characteristics of the firms**

<b>Characteristic</b>	<b>Frequency</b>	<b>Valid %</b>
Duration of operation		
6-9 years	4	36.4
>10 Years	7	63.6
<b>Total</b>	<b>11</b>	<b>100</b>
Current number of employees		
500-1000	1	9.1
>1000	10	90.9
<b>Total</b>	<b>11</b>	<b>100</b>
Current installed capacity		
2001 - 3000 TCD	7	63.6
3001-4000 TCD	3	27.3
>4000 TCD	1	9.1
<b>Total</b>	<b>11</b>	<b>100</b>
Capacity Utilization %		
39-50%	6	54.5
51-70%	3	27.3
>70%	2	18.2
<b>Total</b>	<b>11</b>	<b>100</b>
Current Revenue (Ksh. Billions)		
1-2	2	18.2
3-4	1	9.1
>4	5	45.4
Not stated	3	27.3
<b>Total</b>	<b>11</b>	<b>100</b>
Forms of organizational structure.		
Organic	3	27.3
Mechanistic	8	73.7
<b>Total</b>	<b>11</b>	<b>100</b>

**Source: Research data (2018)**

Table 4.2 shows that 63.6 % of the total Number of sugar firms in Kenya have been in operations for at least 10 years at the time of the study. Only 36.4% were less than 10 years in the bracket of 6 to 9 years. This demonstrates that the data used in the analysis were gathered for the firms with established pattern of production schedules that can be used to deduce their capacity management

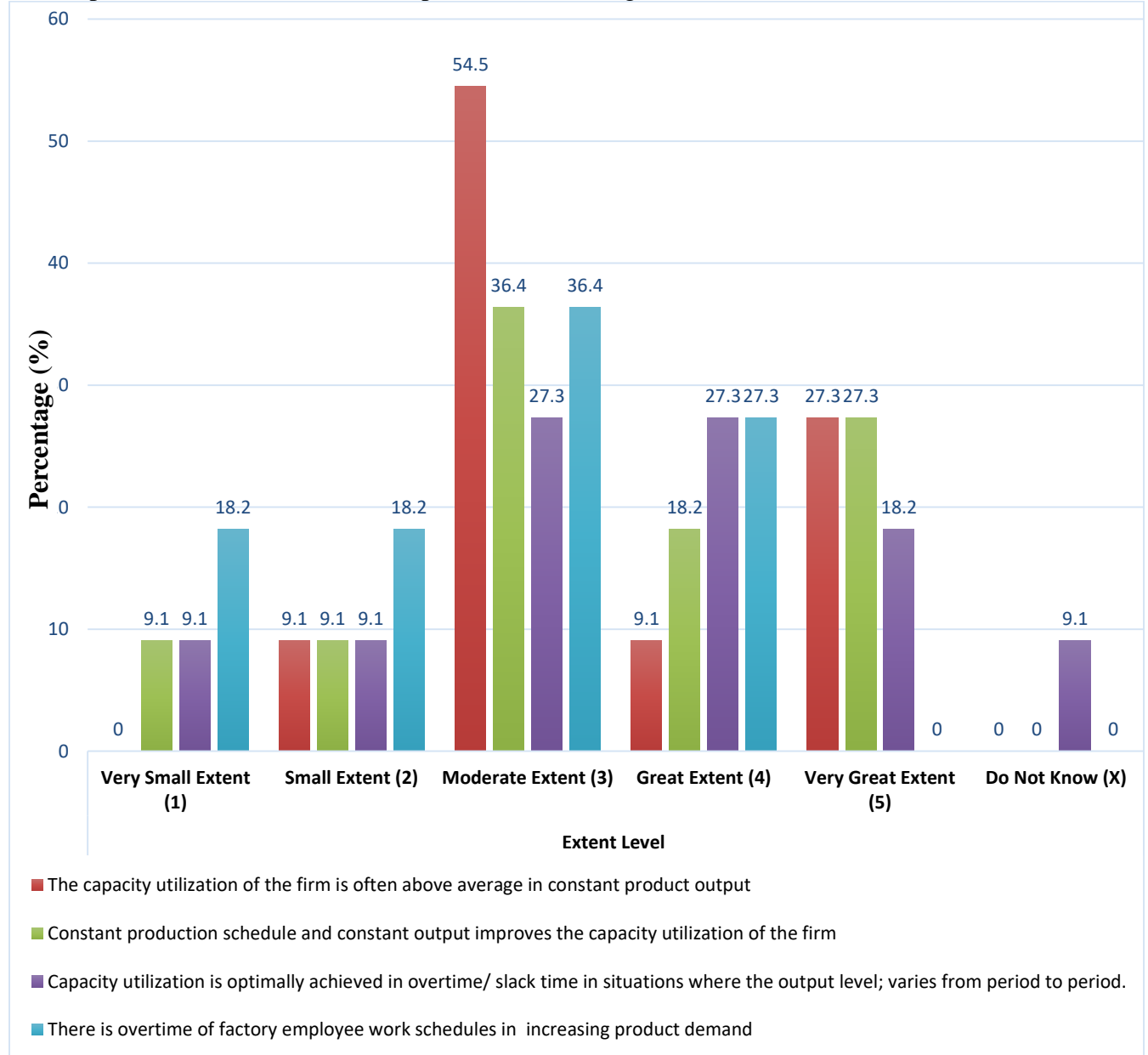
strategies and operational performance. The 90.9 % of the firms had a large size of employees reporting over 1000. This raises the possibility that the firms researched on had sound human resource grounding for discerning the situation of capacity management and operational performance in the industry. Six firms (54.5%) of these firms were operating at a capacity utilization of below 50%, three firms (27.3%) were operating in the range of 51% to 70 % capacity utilization while only two firms were above 70% utilization of their total capacity. None of these firms operated at above 80% of the installed capacity. In terms of revenue, majority of the firms reported a revenue flow of above Ksh.4 billion for the current year at 45.4%. 18.2 % of the firms reported a revenue of Ksh.1-2 Billions while 27.3% did not provide the data as it was deemed confidential. Finally, the table shows that majority of the firms have a mechanistic forms of organizational structure in that their managerial decision making is vested at the top management at 73.7 % and organic at 27.3%.

### **4.3 Capacity utilization practices initiatives and strategies**

The objectives of this study was determine the capacity management strategies adopted by the sugar manufacturing firms in Kenya and establish their relationship. To better understand this, this study exploited the strength of application of various capacity utilization practices, initiatives and strategies within the sugar manufacturing firms in Kenya. To determine the level of application of these management aspects, a series of possible capacity utilization practices, initiatives attributes were prepared in the questionnaire. Against this provisions, respondents were asked to rate their views on extent of their applications in their firms on a Likert type scale of (1) for very small extent, (2) for small extent, (3) for moderate extent, (4) for great extent (5) for very great extent and (X) for do not know. The results of the responses obtained are as presented in the sub section that follows.

### 4.3.1 Capacity utilization practices

The responses to this attributes are as presented in the Figure 4.1



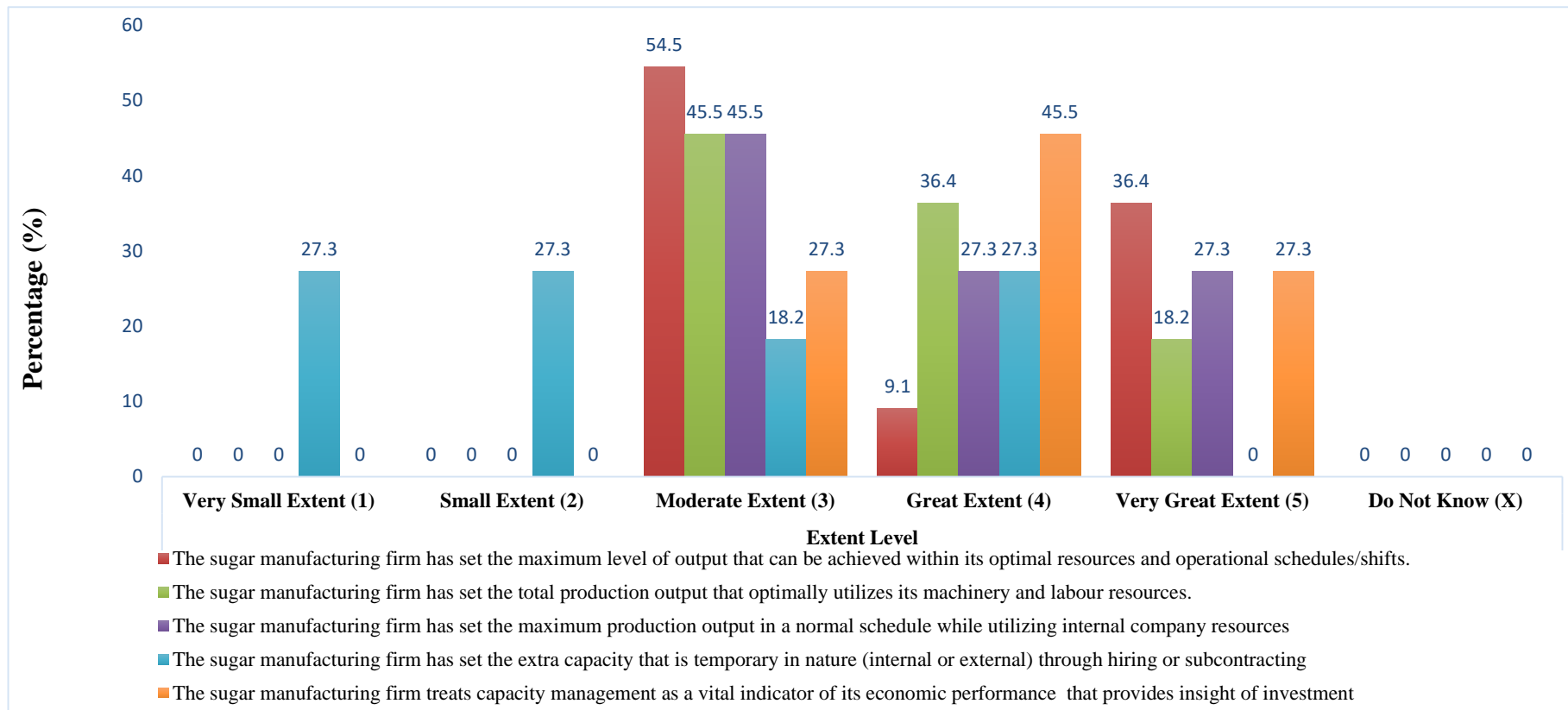
Source: Research data (2018)

Figure 4.1: Capacity Utilization Practices

Figure 4.1 depicts that 54.5% of the sugar manufacturing firms have moderately leveraged their capacity above average in constant production output. 36.4% of the sugar firms assessed moderately believe that by organizations setting constant production schedule and sustaining a constant production output improves the capacity utilization of the firm. Based on this result, it is also evident that 36.4 % of the firms moderately have overtime work schedules during high demands period of the product. To greater extent, 27.3% of the firms achieves its capacity utilization optimally in situations where the production output level varies from time to time. Also to a greater extent 27.3% of the firms studied have overtime work schedules during high demands period of the product. On a very greater extent, 27.3% of the firms qualified that their capacity utilization is often above average in constant production output and 27.3% that constant production schedule and constant output improves their overall capacity utilization.

### 4.3.2 Capacity management initiatives

The study also sought to establish the various capacity management initiatives put in place by the sugar firms. The findings of this attributes are as presented in figure 4.3.



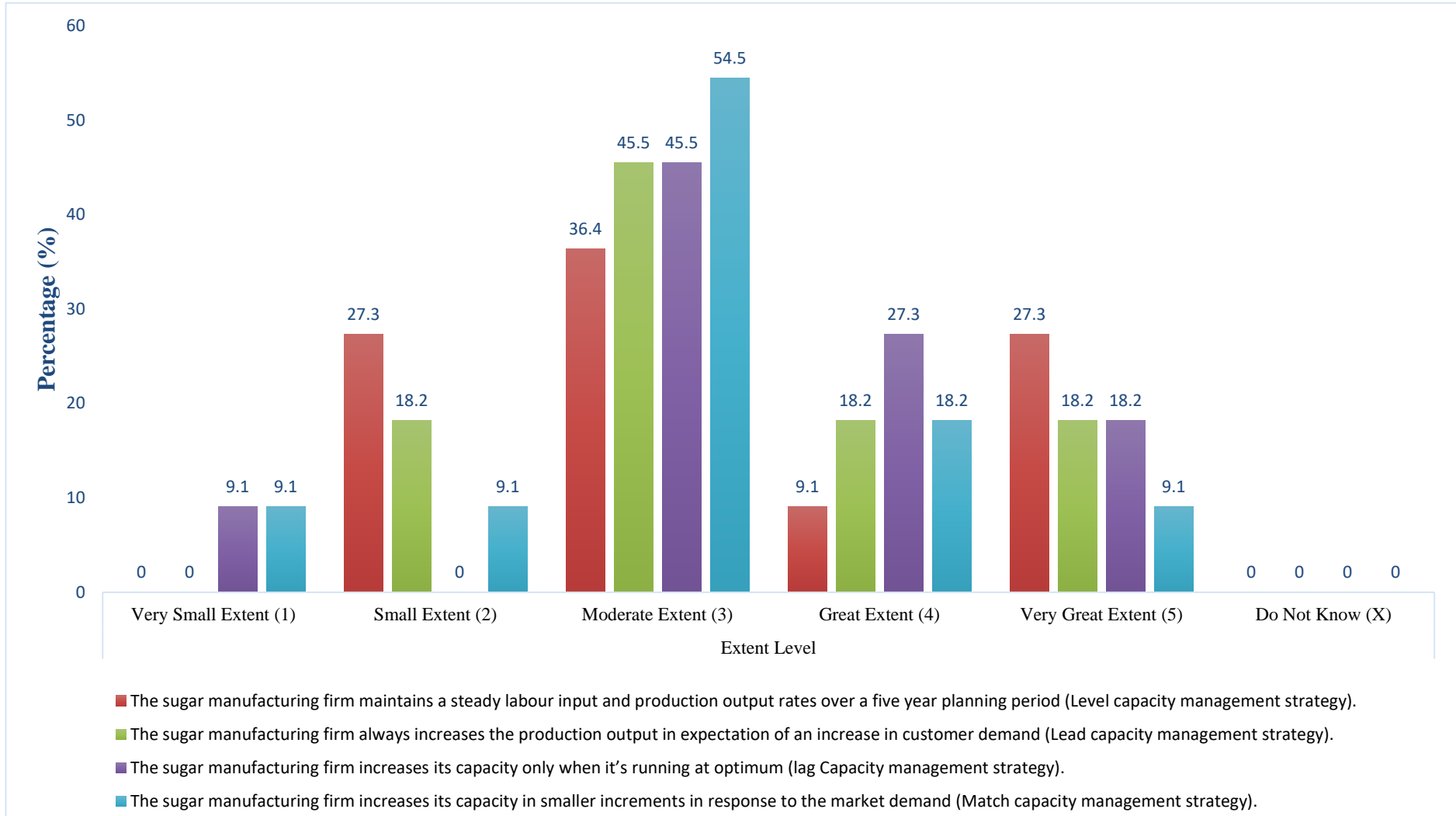
Source: Research data (2018)

Figure 4.2: Capacity Management Initiatives

From figure 4.3, a vast number of the sugar firms had adequate capacity management initiatives in place. The most outstanding area was respect to fact that the firms have moderately set the maximum level of production output that can be achieved within their optimal resources and operational schedules at 54.5%. This is closely followed at moderate by these firms having set the total production output that optimally utilizes their machineries and resources and labour resources at 45.5%. Similar scenario is depicted by the fact that these firms have also set their maximum production output in a normal schedule while maximizing their internal resources. At a great extent, most of the firms treat capacity management as a vital indicator for economic performance that provide insight of their investment at 45.5%. Only 27.3% of these firms on a very small and small extend incorporate extra capacity by hiring or subcontracting in their production schedules.

#### **4.3.3 Capacity management strategies.**

Following the tradition of analysis adopted for the capacity management practices and initiatives, the corresponding results for the capacity management strategies were as s summarised in figure 4.3



Source: Research data (2018)

Figure 4.3: Capacity Management Strategies

From figure 4.3, most of the sugar firms in Kenya on a moderate extent adopts match capacity management strategy in which they increase their capacity in smaller increments in response to the market demand at 54.5%. This scenario justified by the fact that most of these firms were established with small production capacities and have been increasing their capacities in gradually depending on the demand for sugar in the country. Respectively, these firms also adopts lead and lag capacity management strategies in which they increase their production in anticipation of an increase in the customer demand and as well increase their capacity only when they are producing optimally moderately at 45.5%. At great extent, some of these firms adopt lag capacity management strategy at 27.3% and 27.3% of them as well adopt level capacity at a very great extent. From the results obtained, it is well demonstrated that the match capacity management strategy is most adopted but nonetheless, no single factory maintained a single strategy.

In order to gain greater insight into the enabling factors and challenges these firms face in adoption of these capacity management strategies, opinions and views of the respondents were sought out. The responses received to this effect were numerous. they included lack of in adequate material as a result of poor husbandry hence low cane yield, competition for raw material among the firms and cane poaching,, unpredictable rainfall patterns, limited capital flow, existence of old production technologies, attracting and retaining skilled manpower, inefficacy in the existing technologies due to poor plant maintenance practices, inadequate human resource development, unpredictable sugar prices in the market, land subdivisions and completion from other food crops, high level of extraneous material in the cane delivered to the factory, high cost of plant maintenance, delays in farm inputs facilitation e.g. fertilizer hence staggered growth and plant down time. From the results analysis, the most outstanding factor across the firms was in adequate materials at 90.0% response, high costs of farm inputs at 36.4%, poor plant maintained scheduling at 27.3%.

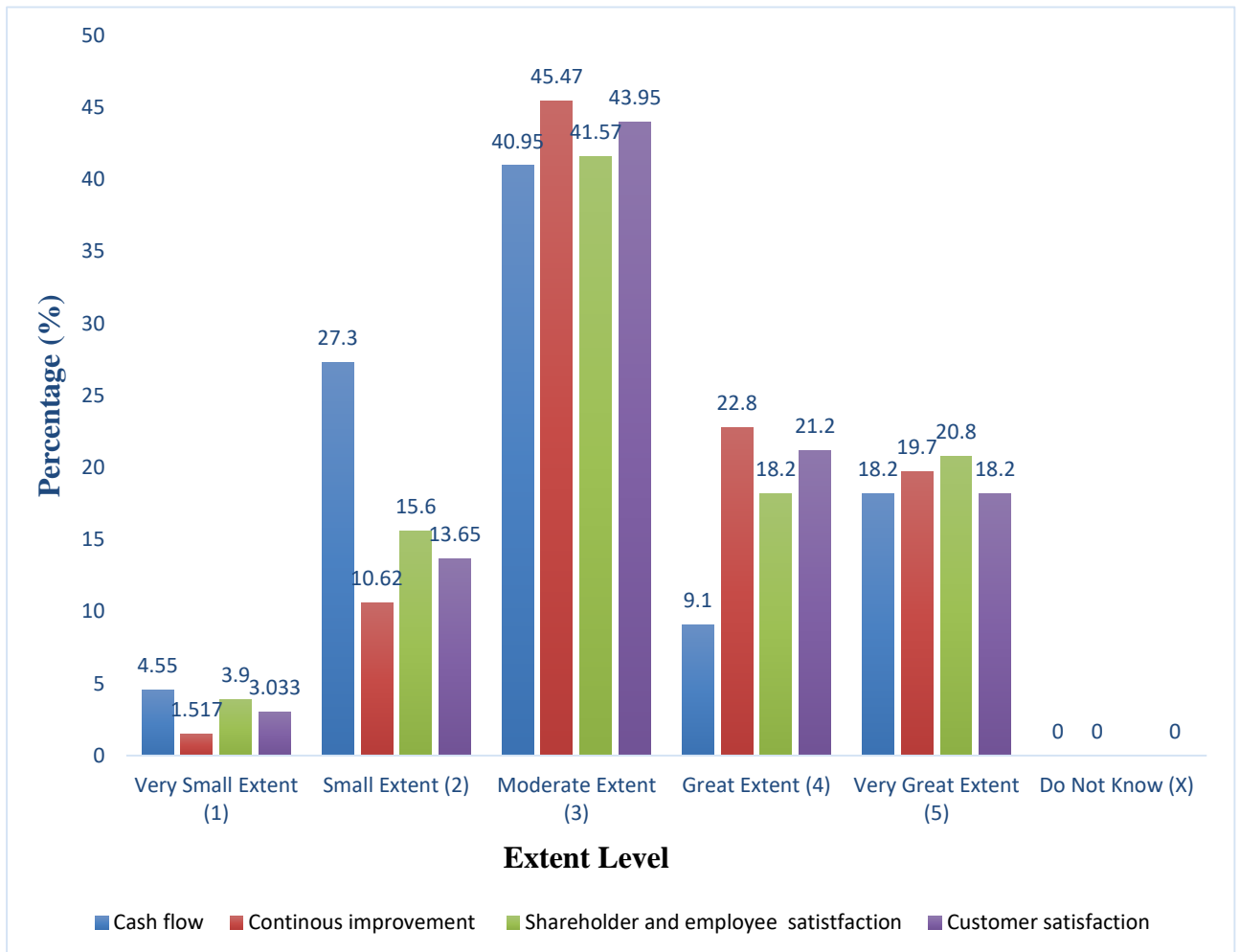
#### **4.4 Capacity Management and Operational Perfomance**

The second objective of this study ventured to unravel the operational performance measures employed by the sugar manufacturing firms in Kenya and establish their relationship to the capacity management strategies adopted in enhancing productivity. To answer this question in array, possible forms of operational performance measures were presented to the respondents. Results of this attributes are presented in the next subsections.



#### 4.4.1 Operational Performance Measures.

During the analysis of the responses on operational performance, these set attributes were further consolidated into four categories in accordance with Kaplan and Norton (1992) balanced score card as Cash flow, Continuous improvement, Shareholder and employee satisfaction and customer satisfaction. Based on this framework, the responses from the firms are presented in figure 4.5.



Source: Research data (2018)

**Figure 4.4: Operational Performance Measures**

From the results presented in figure 4.4, it is evident that all the firms studied have moderately put on emphasis on all operational performance measures i.e. measures to support innovation and learning for continuous improvement of the firm at 45.47%, measures to sustain their financial position at 40.95%, measures to attain customer satisfaction at 43.95%, measures to maximise the shareholders expectations and satisfy employees at 41.57%. To a very greater

extent, 20.8 % of the firms considered shareholder satisfaction key and to a great extent at 22.8 % of the firms strives for continuous improvement. On a small extent 27.3 % of the firms were keen on those attributes that aid their organization sustain a cash flow.

In response to those factors that affect these firms operational performance, political interference emerged the top at 54.5% at a greater extent, weak policy backing for the industry and government support at 45.5%, at a very greater extent and importation of cheap sugar at 36.4% other factors echoed were poor information and technology infrastructure within the industry and poor integration of strategic planning and budgeting.

#### **4.5 The Relationship Between Capacity Management Strategies and Operational Performance**

The relationship between capacity management strategies and operational performance in the Kenya sugar firms was evaluated using correlation and regression analysis as described below;

##### **4.5.1 Correlation Analysis**

Pearson Correlation Coefficient was used to test the direction and magnitude of the relationship between the dependent variable (operational performance) and independent variables (level capacity management strategy, lead capacity management strategy, lag capacity management strategy and match (chase) capacity management strategy) at 5% level of significance. The results are as shown in Table 4.3.

**Table 4.3: Correlation Matrix**

		Operational performance	Level capacity management strategy	Lead capacity management strategy	Lag capacity management strategy	Match (Chase) capacity management strategy
	(r)	1				
Operational performance	Sig. (2-tailed)					
Level capacity management strategy	(r)	.422*	1			
	Sig. (2-tailed)	.017				
Lead capacity management strategy	(r)	.673*	.227	1		
	Sig. (2-tailed)	.000	.309			
Lag capacity management strategy	(r)	.549*	.306	.091	1	
	Sig. (2-tailed)	.000	.121	.363		
Match(Chase) capacity management strategy	(r)	.484*	.112	.412	.219	1
	Sig. (2-tailed)	.003	.106	.098	.170	

\*Correlation is significant at the 0.05 level (2-tailed)

**Source: Research data (2018)**

Results of the Pearson correlation, as shown in Table 4.3, indicate that there was a significant positive correlation between level capacity management strategy and operational performance measures employed by the firms ( $r=0.422$ ,  $p$  value= $0.017$  which was  $< 0.05$ ); a significant positive correlation between lead capacity management strategy and operational performance ( $r=0.673$ ,  $p$  value= $0.000$  which was  $< 0.05$ ); a significant positive correlation between lag capacity management strategy and operational performance ( $r=0.549$ ,  $p$  value= $0.000$  which was  $< 0.05$ ) and a significant positive correlation between chase capacity management strategy and operational performance ( $r=0.484$ ,  $p$  value= $0.003$  which was  $< 0.05$ ). This implied that

level capacity management strategy, lead capacity management strategy, lag capacity management strategy and match (chase) capacity management strategy were critical capacity management strategies that had a significant influence on operational performance of the sugar manufacturing firms in Kenya.

#### 4.5.2 Regression Analysis

A regression analysis was performed in order to analyze the relationship between the study variables. The results are as summarized below;

**Table 4.4: Model Summary**

Model	R	R Square	Adjusted Square	R	Std. Error of the Estimate
1	.904 <sup>a</sup>	0.817	0.695		1.3302

Predictors: (Constant), level capacity management strategy, lead capacity management strategy, lag capacity management strategy and chase capacity management strategy

**Source: Research data (2018)**

According to Table 4.4, R square which is the coefficient of determination tells us the variation in the dependent variable due to changes in the independent variables. Based on Table 4.4, the value of R square was 0.817 which means that 81.7% variation in the operational performance of the sugar manufacturing firms in Kenya was due to variations in level, lead, lag and chase capacity management strategies. Hence, 18.3% of variations in the operational performance of the sugar manufacturing firms in Kenya was explained by other factors not in the model or not focused on in the current study.

**Table 4.5: ANOVA (Analysis of Variance)**

Model		Sum of Squares	df	Mean Square	F	Sig.
	Regression	71.113	4	17.77825	6.699	.0211 <sup>a</sup>
1	Residual	15.924	6	2.654		
	Total	87.037	10			

a. Predictors: (Constant), level capacity management strategy, lead capacity management strategy, lag capacity management strategy and match (chase) capacity management strategy

b. Dependent Variable: Operational performance

**Source: Research data (2018)**

Analysis of Variance (ANOVA) consists of calculations that provide information about levels of variability within a regression model and forms a basis for tests of significance. The "F" column provides a statistic for testing the hypothesis that all  $\beta \neq 0$  against the null hypothesis that  $\beta = 0$ . From the findings in Table 4.5, the significance value is .0211 which is less than 0.05 implying that the study's regression model was statistically significant in predicting how the predictor variables (level capacity management strategy, lead capacity management strategy, lag capacity management strategy and match (chase) capacity management strategy) influenced the response variable (operational performance of the sugar manufacturing firms in Kenya). The F critical at 5% level of significance is 4.53. Since F calculated (F value = 6.699) was greater than the F critical value of 4.53, this also showed that the overall model was fit

**Table 4.6: Regression analysis results**

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	6.431	.812		7.920	.0000
Level capacity management strategy [X <sub>1</sub> ]	0.596	.186	.527	3.204	.0031
Lead capacity management strategy [X <sub>2</sub> ]	0.712	.192	.581	3.708	.0005
Lag capacity management strategy [X <sub>3</sub> ]	0.761	.168	.624	4.530	.0000
Match (Chase) capacity management strategy [X <sub>4</sub> ]	0.668	.213	.512	3.136	.0027

**Source: Research data (2018)**

Based on the regression results shown in Table 4.6, the regression model becomes;

$$Y = 6.431 + 0.596 X_1 + 0.712 X_2 + 0.761 X_3 + 0.668 X_4$$

From the regression equation above, taking all the predictor variables (level capacity management strategy, lead capacity management strategy, lag capacity management strategy and match capacity management strategy) constant at zero, operational performance of the sugar manufacturing firms in Kenya would be at 6.431. The results further indicate that a unit

increase in level capacity management strategy would lead to a 0.596 unit increase in operational performance of the sugar manufacturing firms in Kenya; a unit increase in lead capacity management strategy would lead to a 0.712 unit increase in operational performance of the sugar manufacturing firms in Kenya; a unit increase in lag capacity management strategy would lead to a 0.761 unit increase in operational performance of the sugar manufacturing firms in Kenya while a unit increase in match (chase) capacity management strategy would lead to a 0.668 unit increase in operational performance of the sugar manufacturing firms in Kenya. At 5% significance level or 95% level of confidence all the predictor variables were significant as their p values were  $< 0.05$ . These findings imply that there was a significant positive relationship between level, lead, lag and match (chase) capacity management strategies and operational performance of the sugar manufacturing firms in Kenya.

## **CHAPTER FIVE : FINDINGS, CONCLUSSIONS AND RECOMENDATIONS**

### **5.1 Introduction**

This chapter provides the summary of the research finding, study limitation, conclusion based on the findings and recommendations in line with the study objectives which sought to determine the capacity management strategies adopted by sugar manufacturing firms in Kenya and their relationship to operational performance.

### **5.2 Summery of the findings**

This study established that most of the sugar firms in Kenya have adopted a mechanistic form of organization structure at a rate of 73.7 %. Of all the sugar firms studied none of them attained 80 % capacity utilization of their installed capacities 54.5 % of them were below 50% capacity utilization while only 18.4% attained 70% -75% capacity utilization. Data provided on their current revenue flow was skeptical as most of the firms provided and approximations as it was confidential. In effort to sustain their productivity, 54.5% of these firms moderately leveraged their capacity in constant production output as their capacity utilization practice and 36.4 % of these firms moderately improves their capacity utilization by having a uniform pattern of production schedule and sustaining a constant production output. Similar on a moderate scale these companies use overtime work schedules in periods of the product high demand. To meet the customer demand and enhance their productivities, moderately, 54.5 % of these firms have set the maximum level of production output achievable within their optimal resources and operational schedules as a their capacity management initiative. This is closely followed by these firms having set their production output that optimally utilizes their resources both machinery and human capital at 45.5% and at 45.5 % the firms at a greater extent manages their capacity to enhance economic performance. Incorporation of extra capacity through hiring and subcontracting was not strongly supported in the industry as these firms strongly utilizes their internal capacity.

The trend in the capacity management practices and initiatives set forth by these firms positively relates to the overall capacity management strategies adopted by these firms. From the analysis results, 54.5% of these firms moderately adopted match capacity management strategy in that they increase their capacity in response to the market demand. This could be justified by the fact that most of this firms have continually expanded their production capacity in bits. At moderate 45.5% adopted lead capacity management strategy in which they increases

their production in anticipation of increased demand. Overall, from the results obtained it is evident that these firms do not only adopt one strategy in managing their capacity utilization. This could be as a result of other factors both internally and externally within the industry. Some of the factors that contribute to the ineffective capacity utilization and the adoption of various capacity management strategies as per the responses provide include: lack of adequate material as a result of poor husbandry hence low cane yield, competition for raw material among the firms and cane poaching,, unpredictable rainfall patterns, limited capital flow, existence of old production technologies, attracting and retaining skilled manpower, inefficacy in the existing technologies due to poor plant maintenance practices, inadequate human resource development, unpredictable sugar prices in the market, land subdivisions,, high cost of plant maintenance, delays in farm inputs facilitation e.g. fertilizer hence staggered growth and plant down time. With inadequate material supply at 90.9% being the most outstanding followed by high cost of farm inputs at 36.4% and poor plant maintenance scheduling at 27.3%.

To enhance the sugar manufacturing firms operational performance, 45.47 % of these firms moderately invest in innovation and learning for continuous improvement, 40.95% to sustain their financial position by cushioning their return on asset/investment above the industry average and 43.95% attain customer satisfaction and 41.57% to satisfy shareholders and employee. In response to those factors that affect these firms operational performance, political interference emerged the top at 54.5% at a greater extent, weak policy backing for the industry and government support at 45.5%, at a very greater extent and importation of cheap sugar at 36.4% other factors echoed were poor information and technology infrastructure within the industry and poor integration of strategic planning and budgeting by the management.

Results of the Pearson correlation, indicate that there was a significant positive correlation between level capacity management strategy and operational performance ( $r=0.422$ ,  $p$  value= $0.017$  which was  $< 0.05$ ); a significant positive correlation between lead capacity management strategy and operational performance ( $r=0.673$ ,  $p$  value= $0.000$  which was  $< 0.05$ ); a significant positive correlation between lag capacity management strategy and operational performance ( $r=0.549$ ,  $p$  value= $0.000$  which was  $< 0.05$ ) and a significant positive correlation between chase capacity management strategy and operational performance ( $r=0.484$ ,  $p$  value= $0.003$  which was  $< 0.05$ ).The regression findings show that, taking all the predictor variables level capacity management strategy, lead capacity management strategy, lag capacity



management strategy and match (chase) capacity management strategy constant at zero, operational performance of the sugar manufacturing firms in Kenya would be at 6.431.

### **5.3 Conclusion**

In conclusion, this study affirms that, capacity planning and its management is a vital element for any organizational productivity and performance. By evaluating and forecasting the market demand of a product, organizations are able to plan for their capacity utilization to meet this demand. Organizations with sound capacity management practices and initiative are always in a position to make sound decisions on which strategies to adopt to meet customer satisfaction. From this study, it is concluded that there is no single capacity management strategy best for an organization. Organizations ought to be flexible to the market demands to remain competitive. There exist a significant positive correlation between capacity management strategies adopted by a firm and its operational performance. Level capacity management strategy, lead capacity management strategy, lag capacity management strategy and match (chase) capacity management strategies were critical capacity management strategies that had a significant influence on operational performance of the sugar manufacturing firms in Kenya.

### **5.4 Limitation of the study.**

This study used structured questionnaires in data collection therefore, the reliability of the data collected entirely relies on the effectiveness of the questionnaire design as a tool and the views of the respondents may be biased to produce valid results. Financial performance from all the firms was confidential and was not provided. Data on current capacity utilization and efficiency also proved difficult to be reported. Given the size of the sugar industry in Kenya only few sample frame/size was available and the information provided from each firm came strictly from the top management therefore the sample size may not have been sufficient to draw conclusions.

### **5.5 Recommendation**

Based on this research findings, the following recommendations are suggested.

- I. There is need for the sugar manufacturing firms to enhance their field extensions service to the farmers and provide farm input on timely basis as this will enhance material productivity.

- II. The government of Kenya need to enforce the regulations on sugar importation to cushion the local manufactures and further explore the opportunity of privatization of the government co-owned sugar firms to enhance productivity.
- III. There is need for the government to review those policies that regulates the sugar industry within the entire supply chain in order to create an enabling business environment for the sector. Opportunism for alternative products from the sector should be sought to enhance their productivity i.e. Cogeneration of electricity from the excess bagasse fuel which has been largely hampered by the government independent power production and supply policy. This will enhance the economic performance of these firms.
- IV. There is need for the government to establish a financing mechanism for the sugar sector especially the government co-owned to adopt modern and more efficient production technologies as experienced in the newer private companies.
- V. The appointments of top management within the government co-owned sugar firms should not be politically motivated rather experienced and skilled manpower should be sought.
- VI. The proposed zoning of sugar farms to specific manufacturing firms should be implemented to cab the challenge of sugar poaching. This will also sole the problem of harvesting immature cane as a result of competition for the material.

### **5.6 Suggestion for further research.**

This research only focused on level, lead, lag and match (chase) capacity management strategies and operational performance measures adopted by the sugar firms in Kenya. More research on other factors other than these strategies and their influence to operational performance need to be conducted, a study the implication of organizational forms of structure and various management styles adopted by these firms and their relationship to operational performance is encouraged. To spur the growth of the sector, further research on product diversification within the sugar sector is encouraged to unearth opportunities for other sugar products.

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## APPENDIX I: RESEARCH QUESTIONNAIRE

### Introduction

This questionnaire is for collection of data on capacity management strategies and operational performance measures employed by sugar manufacturing firm in Kenya. The data collected will be used for academic purposes only and will be treated with utmost confidentiality.

### Section A: General and Demographic Data

1. Average number of employees in year 2017/2018

1 – 50 [ ] 50 - 249 [ ] 250 – 499 [ ] 500 – 999 [ ] 1000 and more [ ]

2. Revenues in 2017/2018 Kshs.....

3. When was the firm commissioned? .....

4. What is your firms installed production capacity? .....

5. Name of respondent and position in the firm .....

6. What is your firms form organization structure

Organic [ ]                      Mechanistic [ ]

7. What is your age bracket?

Bellow 20 years [ ]    21 to 40 [ ]    41 to 60 [ ]    Above 60 [ ]

8. For how long have you been working with the firm?

Less than two years [ ]    2 to 5 years [ ]    6 to 10 years [ ]    Over 10 years [ ]

9. What is the total number of employees in the firm?

Less than 100 [ ]    101 to 300 [ ]    301 to 500 [ ]    Over 500 [ ]

### Section B: Capacity Management Initiatives and Strategies

10. In a scale of 1-5, kindly indicate the extent to which your organization optimize its capacity utilization where: 1 = Very Small Extent, 2 = Small Extent, 3 = Moderate Extent, 4 = Great Extent, 5 = Very Great Extent; X = do not know.

Capacity utilization practices	Extent						
	Very Small	Small	Moderate Extent (3)	Great Extent (4)	Very Great	Do Not Know (X)	
The capacity utilization of the firm is often above average in constant product output	(1)	(2)	(3)	(4)	(5)	(X)	

Constant production schedule and constant output improves the capacity utilization of the firm	(1)	(2)	(3)	(4)	(5)	(X)
Capacity utilization is optimally achieved in overtime/ slack time in situations where the output level; varies from period to period.	(1)	(2)	(3)	(4)	(5)	(X)
There is overtime of factory employee work schedules in increasing product demand	(1)	(2)	(3)	(4)	(5)	(X)

**11.** Indicate the extent to which your sugar company has adopted the following capacity management initiatives in its operations situation at its best. Please circle one choice for each of the following statements using the following scale where: 1 = Very Small Extent, 2 = Small Extent, 3 = Moderate Extent, 4 = Great Extent, 5 = Very Great Extent; X = do not know.

Capacity Management Initiatives	Extent					
	Very Small Extent (1)	Small Extent (2)	Moderate Extent (3)	Great Extent (4)	Very Great Extent (5)	Do Not Know (X)
The sugar manufacturing firm has set the maximum level of output that can be achieved within its optimal resources and operational schedules/shifts.	(1)	(2)	(3)	(4)	(5)	(X)
The sugar manufacturing firm has set the total production output that optimally utilizes its machinery and labour resources.	(1)	(2)	(3)	(4)	(5)	(X)
The sugar manufacturing firm has set the maximum production output in a normal schedule while utilizing internal company resources	(1)	(2)	(3)	(4)	(5)	(X)
The sugar manufacturing firm has set the extra capacity that is temporary in nature (internal or external) through hiring or subcontracting.	(1)	(2)	(3)	(4)	(5)	(X)
The sugar manufacturing firm treats capacity management as a vital indicator of its economic performance that provides insight of investment	(1)	(2)	(3)	(4)	(5)	(X)

**12.** To what extent has your sugar company adopted the following capacity management strategies in its operations situation? Please circle one choice for each of the following statements using the following scale where: 1 = Very Small Extent, 2 = Small Extent, 3 = Moderate Extent, 4 = Great Extent, 5 = Very Great Extent; X = do not know.

Capacity Management strategies	Extent
--------------------------------	--------

	Very Small Extent (1)	Small Extent (2)	Moderate Extent (3)	Great Extent (4)	Very Great Extent (5)	Do Not Know (X)
The sugar manufacturing firm maintains a steady labour input and production output rates over a five year planning period (Level capacity management strategy).	(1)	(2)	(3)	(4)	(5)	(X)
The sugar manufacturing firm always increases the production output in expectation of an increase in customer demand (Lead capacity management strategy).	(1)	(2)	(3)	(4)	(5)	(X)
The sugar manufacturing firm increases its capacity only when it's running at optimum (lag Capacity management strategy).	(1)	(2)	(3)	(4)	(5)	(X)
The sugar manufacturing firm increases their capacity in smaller increments in response to the market demand (Match or chase capacity management strategy).	(1)	(2)	(3)	(4)	(5)	(X)

13. Kindly state the factors which you think hinders effective utilization of your production capacity and the implementation of these capacity management strategies.

- I. ....
- II. ....

### Section C: Organizational/Operational Performance

14. Please evaluate organizational performance in last three years. Please circle one choice for each of the following statements using the following scale where: 1 = Very Small Extent, 2 = Small Extent, 3 = Moderate Extent, 4 = Great Extent, 5 = Very Great Extent; X = do not know.

Organizational/Operational Performance	Extent					
	Very Small Extent (1)	Small Extent (2)	Moderate Extent (3)	Great Extent (4)	Very Great Extent (5)	Do Not Know (X)
Return on assets (ROA, %) in the sugar manufacturing firm is well above the industry average.	(1)	(2)	(3)	(4)	(5)	(X)
Value added per employee in the sugar manufacturing firm is well above the industry average.	(1)	(2)	(3)	(4)	(5)	(X)
The sugar manufacturing firm considers its relations with suppliers to be excellent because we maintain genuine partnerships with them.	(1)	(2)	(3)	(4)	(5)	(X)
The sugar manufacturing firm has long-term partner relationships with its suppliers	(1)	(2)	(3)	(4)	(5)	(X)
The sugar manufacturing firm strongly involves its suppliers in research and development processes.	(1)	(2)	(3)	(4)	(5)	(X)

There are no cases in sugar manufacturing firm employees leaving for internal reasons.	(1)	(2)	(3)	(4)	(5)	(X)
Productivity of employees in sugar manufacturing firm is much higher than industry average.	(1)	(2)	(3)	(4)	(5)	(X)
Employees' trust into leadership is high in the sugar manufacturing firm.	(1)	(2)	(3)	(4)	(5)	(X)
Trust among employees is strong in the sugar manufacturing firm.	(1)	(2)	(3)	(4)	(5)	(X)
Work organization is efficient in the sugar manufacturing firm.	(1)	(2)	(3)	(4)	(5)	(X)
Employees feel very committed to the sugar manufacturing firm	(1)	(2)	(3)	(4)	(5)	(X)
Employees are prepared to go an extra mile for the sugar manufacturing firm	(1)	(2)	(3)	(4)	(5)	(X)
Work costs per employee in the sugar manufacturing firm are well below the industry average.	(1)	(2)	(3)	(4)	(5)	(X)
Absenteeism in sugar manufacturing firm (relative to competition) is very low.	(1)	(2)	(3)	(4)	(5)	(X)
Employees are very satisfied with the situation within the sugar manufacturing firm	(1)	(2)	(3)	(4)	(5)	(X)
Learning ability and adaptability of employees is high in sugar manufacturing firm in comparison to competition.	(1)	(2)	(3)	(4)	(5)	(X)
Risk-taking within the sugar manufacturing firm is better than it is by our competitors.	(1)	(2)	(3)	(4)	(5)	(X)
The number of customer complaints within the last period has decreased strongly.	(1)	(2)	(3)	(4)	(5)	(X)
The sugar manufacturing firm deals with customer complaints faster than our competition.	(1)	(2)	(3)	(4)	(5)	(X)
The sugar manufacturing firm retains existing clients and manages to attract new-ones.	(1)	(2)	(3)	(4)	(5)	(X)
The reputation of our sugar manufacturing firm in eyes of the customers has improved.	(1)	(2)	(3)	(4)	(5)	(X)

15. Please provide the following information on the operational performance of your sugar manufacturing firm

Operational Performance Measure	Unit of Measure	2015	2016	2017
Revenue	Kshs. "000,000"			
Cost of Sales	Kshs. "000,000"			
Gross Profit	Kshs. "000,000"			
Marketing and Distribution Costs	Kshs. "000,000"			
Administrative Expenses	Kshs. "000,000"			
Finance Income	Kshs. "000,000"			
Finance Costs	Kshs. "000,000"			
Capacity Utilization	%			
Efficiency	%			

16. Kindly state the factors which you think affect your firms operational performance

I. ....

## APPENDIX II: UNIVERSITY DATA COLLECTION SUPPORT LETTER



### UNIVERSITY OF NAIROBI SCHOOL OF BUSINESS

Telephone: 020-2059162  
Telegrams: "Varsity", Nairobi  
Telex: 22095 Varsity

P.O. Box 30197  
Nairobi, Kenya

DATE 15<sup>th</sup> November 2018

#### **TO WHOM IT MAY CONCERN**

The bearer of this letter EVANS NANGULU


Registration No. D61/77555/2015

is a bona fide continuing student in the Master of Business Administration (MBA) degree program in this University.

He/she is required to submit as part of his/her coursework assessment a research project report on a management problem. We would like the students to do their projects on real problems affecting firms in Kenya. We would, therefore, appreciate your assistance to enable him/her collect data in your organization.

The results of the report will be used solely for academic purposes and a copy of the same will be availed to the interviewed organizations on request.

Thank you.

  
**PROF. JAMES M. NJIHIA**  
**DEAN, SCHOOL OF BUSINESS**

