CAPACITY MANAGEMENT PRACTICES AND OPERATIONAL PERFORMANCE OF STEEL MANUFACTURING FIRMS IN KENYA

BY

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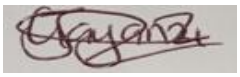
DECLARATION

Student Declaration

This research project is my original work and has not been submitted for a degree in any other university .

Signature….  … Date …24th November 2021 …

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Supervisor's Declaration

This research project has been submitted for examination with my approval as the university supervisor .

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ABSTRACT

Steel manufacturing industry faces problems associated with cost of raw materials, limited diversification of the market, inadequate technology, poor infrastructure and limited value addition to the industry. Manufacturing firms have to strategically implement capacity management practices to ensure scarce resources are properly managed to minimize wastages in terms of raw materials, over production, under production and idle time in order to remain competitive in terms of quality, cost, flexibility, dependably and speed. The objective of this research was to establish the association between capacity management practices and operational performance of Steel Kenyan Manufacturing Firms. The guiding objectives to the study included; to determine the capacity management practices implemented by Steel Manufacturing Firms in Kenya and to determine the effect of capacity management practices on operational performance of Steel Manufacturing Firms in Kenya. The study adopted descriptive research design to collect data from the target firms. Questionnaire was used as primary tool for collecting data; administration was by email and "drop and pick-up later" technique. The data collected was analyzed using descriptive statistics, regression and correlation analysis. The findings of the study indicate that capacity management practices have been implemented to a great degree by Steel Manufacturing Firms in Kenya. The findings further indicate that there exists a positive association between capacity management practices and operational performance. Quality, Cost, and Flexibility as operational performance measures were affected to a large extent by implementation of capacity management practices. The researcher recommends Steel Manufacturing Firms in Kenya to continually train their employees and implement capacity management practices as they were found to be positively correlated to operational. The study also recommends that the government needs to support Steel Manufacturing Firms in their quest of implementing capacity management practices by offering knowledge on the most effective approaches of implementing these practices. The constraint of the study is its focus on Steel Manufacturing Firms in Kenya, therefore, the outcomes might not be conclusive for other sectors of the economy.

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DEDICATION

This project is dedicated to my family and friends who have been very understanding and supportive throughout the process .

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ABBREVIATIONS AND ACRONYMS

COMESA	Common Market for Eastern and Southern Africa
EAC	East African Community
GDP	Gross Domestic Product
GOK	Government of Kenya
KAM	Kenya Association of Manufacturers
TOC	Theory of Constraints

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

In today's modern era of globalization, companies need to develop a strategic thinking and adopt appropriate strategies that will ensure they are sustainably competitive. Manufacturing companies require an efficient long-term capacity management to gain a competitive position and improve performance with respect to speed, flexibility, cost, dependability and delivery. The core purpose of capacity management is to facilitate the proper usage and maximization of resources in meeting the present and future needs and demands of the firm while reducing costs incurred (Fronheiser, 2018). Capacity can change due to various influences, which could be within or out of the company's control. Firms with an effective capacity management may experience increased revenue due to fulfilled orders, customer satisfaction and increased market share, (Bloomenthal, 2019). In developing manufacturing strategy, capacity falls in the category of structural decisions that handle dynamic reduction and expansion with regards to long-term level of demands changes (Olhanger, Rudberg and Winker, 2001).

In Kenya, the steel sector has recorded continuous growth despite the many problems it faces throughout the years (Republic of Kenya, 2017). The challenges that the industry face include; costly raw materials, limited diversification of the market, inadequate technology and limited value addition to the industry. These challenges are the key drivers for the paradigm shifts of firms that remain competitive. Steel companies, operate in an environment that faces many challenges. Enormous government infrastructure expenditure and financing large projects in Kenya is the driver for steel demand. The local companies have expanded their operations by building new factories while foreign investors have sought ways to invest in the country's steel sector. It's expected that new factories worth 50 billion Kenya Shillings will shortly be established in Kenya as investors seek to meet the increasing demand of steel products, (Mwende, 2019).

This research was steered by constraints and lean production theories. The TOC was advanced by Goldert (1980). The theory gives a method of identifying the vital limiting

factor that hinders the attainment of goals and improves the constraints to the level that they are no longer factors of limitation. The Theory of Lean Production originates from Japanese Toyota Production System in the 1990s. Lean production provides a procedural method of reducing waste within the system of manufacturing without negatively influencing production. Lean production is concerned with continuous waste elimination to increase the speed of operations, increase dependability and facilitate the production of quality products (Slack, Chambers and Johnson, 2007).

1.1.1 Capacity Management Practices

Capacity management practice is the strategy derived to account for resources needed within different projects. It affects the restricting decisions and ensures the available resources are being well-utilized and that the already being used resources are focused on the right priorities. Capacity management practices provide balance between capacity and demand in order to prevent the risk of over or under estimation, Gupta (2018). According to Jones and Kutsch, (2007) capacity management gives the managers an opportunity to address the requirements of the business and to efficiently allocate resources.

The four types of capacity management practices are: level capacity, chase demand, managed demand and mixed strategy. To begin with, Level capacity management maintains a constant rate of regular time output while attaining the variations of demand by using varying combinations, (Hill & Hill 2012). The second practice is chase demand, whereby capacity is matched to demand level. It assumes that the planned output will be equivalent to the expected demand, (Slack & Lewis 2011). The third, managed demand practice attempts to influence demand to fit available capacity through price, (Russell and Taylor (2009). Finally, mixed management practice employs a mix of all level and chase demand strategies. (Slack & Lewis 2011).

Well-implemented capacity management practices give manufacturing firms the opportunity to mitigate the change and growth risks while maintaining optimum costs of operations in the market. Moreover, capacity management posits that it is critical to adopt

an effort of regular reporting highlighting the advantages and effectiveness of using capacity management practices (Levy, 2018).

1.1.2 Operational Performance

Operational performance is the degree to which each unit within an organization's operations is contributing towards the business strategic goals. The organizational performance is weighed against its indicators of efficiency, effectiveness and environmental related responsibility to include productivity, reduction of waste, compliance to regulations, and cycle time. To attain operational performance organizations, need to align operational activities with strategic business priorities, (O'Brien, 2009).

There are five measures of operational performance; quality, cost, speed, flexibility, and dependability. Quality weighs the conformity of a product to particular requirements, which leads to easier operations, customer satisfaction as well as reduced costs, (Picincu, 2018). Cost objective measures the variations between product's unit cost measured by various factor changes such as different products and volume. Companies should aim to reduce costs through internal effectiveness by improving their objectives of operations (Keita, 2015). Flexibility measures the ability of a company to make operational changes in order to adapt to the very dynamic environment. It includes, introduction of modified or new products, production of different products, output level changes and changing the delivery time (Shakir, 2014).

Speed measures how fast an organization is able to make deliveries and sales. The goal focusses on specific issues such as time taken by manufacturing firms in producing one or many products or the time taken in the research or development of new goods (LaMarco, 2019). Dependability on the other hand is measured in the product's ability to function and operate as it was designed for a specific time (Taylor, 2013). This study will focus on cost, quality and flexibility. This is inspired with the need for firms to be flexible in making their products attractive, relevant and at low costs to sustain its competitiveness in the highly dynamic business environment, (Biwer, Filipek, Ankan and Jammernegg, 2018).

1.1.3 Steel Manufacturing Firms in Kenya

The steel industry is a core subsector in the development of infrastructure. Internationally, the per capita steel consumption is recognized as an indicator of a nation's development. In Kenya, the iron and steel sector accounts for about 13% of the manufacturing industry thus a contributor to the Gross Domestic Product (GDP). Around Ksh. 60 billion is used to import steel in Kenya. The annual demand for steel in Kenya is approximately 480,000 tons to 600,000 tons with the majority of importation coming from Japan, China, South Africa and India. Products made out of metal and steel are the largest goods manufactured in Kenya, which are exported within the East Africa Community (EAC) and COMESA (Mumero, 2012). Moreover, African Business Review and Technology (2012) posit that steel from firms in Kenya is also exported to DRC, Uganda, Rwanda and Tanzania.

The industry is perceived as a core propeller for economic development and growth in the realization of industrialization as vital in the success of the Big Four Agenda in the effort to achieving Vision 2030, The Iron and Steel African Review, August (2019). Locally, the sector uses imported and local steel billets, steel scrap and hot rolled coins to make products which are suited for the food, construction, hospitality and medical industry. The steel manufacturing sector also provides employment opportunities for both skilled and semi-skilled labor. About 10,000 jobs can be generated by a steel plant with a production capacity of 350,000 tons of steel annually (Ministry of Industry, Trade and Cooperatives, 2017).

1.2 Research Problem

According to Mieghem and Albert (2003) effective capacity management practices results in better operational performance and improved stakeholder. The issue of capacity management and quality of products emanates from demand uncertainty which often occurs as a result of supply and resource uncertainties needed to complete orders of the clients (Jones & Kutsch, 2007). Operational managers in the manufacturing sector can either succeed or fail in juggling the quality of products and effectively controlling assets with respect to the productiveness of assets, depending on their mechanisms to manipulate capacity to meet customer demands. Focus ought to be emphasized on the

capacity management practices that affect the operational performance of the steel industry (Bitner & Zeithamal, 2003).

The iron and steel industry is a complex sector that significantly relates to the nation's economy as a result of function of steel product in the automotive and construction industries. It requires a lot of energy and raw material as majority of the companies that produce raw materials are situated in remote areas from where the demand of steel is high. The products and inputs of steel are internationally traded in large quantities, this makes it's difficult to assess the iron and steel industry. Prices of steel are determined by different factors and there is no single steel price due to the many varieties of steel products sold. Gonzalez and Kaminski (2011) observed that the steel product prices rely on the interaction between supply and demand and on conditions of transportation. '

In Kenya, the steel and iron industry greatly depend on importation of raw materials such as the iron ore, billets which are not locally available hence the need for importation which increases the cost of production and sometimes lead to delay in production due to scarcity of the raw materials, Kenya Engineer (2018). The industry is characterized by high cost of production which makes the Kenyan manufacturers uncompetitive compared to other players in the region. The poor quality and high cost of electricity averages between 40-50% of the total conversion costs, Kenya Industrial Development: Policies, Performance and Prospects (2019). Poor infrastructure comprised of poor road conditions, rail services, port charges and insecurity have continued to increase the cost of production leading to increased prices of finished products, (Okutoyi, 2016).

Different studies have been conducted on practices of capacity management and operational performance. On a global context, Dekkers and Kanapathy, (2012) in Malaysia evaluated the practices of capacity management of manufacturing companies. The study revealed that adequate manufacturing capacity matching the strategic objectives provides a company with a competitive edge over its competition. Assa and Johansson, (2016) focused on the Swedish Migration Agency and revealed that public sector organizations seemed to be limited in their ability to influence medium and long-term strategies of capacity management.

Jadayil, Khraisat and Shakoor, (2017) identified the strategies that help boost production to attain the highest capacity in plastic companies. The study concluded that machines must be utilized to the maximum and operate at optimum pace to boost production and reduce costs. Chemendy, (2018) studied demand and capacity planning on "completely knocked-down" (CKD) vehicles at 'Mercedes-Benz Cars' (MBC). The study established that MBC operated a cross-functional procedure without an integration system and information which resulted in uncertainties with respect to the CKD-vehicle planning procedure, more lead time, and wrong predictions.

In the Kenyan situation, (On'gondo, 2013) assessed Safaricom Limited on capacity management and quality of service and concluded that the implementation of strategies of capacity management enhanced the provider's service quality. Wairimu (2014) on strategies of capacity management and quality service in petroleum oil distribution companies in Kenya established that strategies of capacity management positively and significantly affect quality of service. Gachunga (2018) assessed strategies of 'capacity management and operational efficiency in the energy sector in Kenya.' The research indicated that strategies of capacity management are positively correlated with operational efficiency. Nangulu (2018) studied strategies of capacity management and performance of operations among sugar manufacturing companies in Kenya and found that chase demand strategy was the common strategy employed among sugar firms.

From the above studies, much has not been done on capacity management practices and operational performance of Kenyan Steel Manufacturing Firms. This research sought to bridge the literature gap by answering the research questions; what are the capacity management practices adopted by Steel Manufacturing Firms in Kenya? What is the effect of capacity management practices on operational performance of Steel Manufacturing Firms in Kenya?

1.3 Research Objectives

The main objective of the study was to determine capacity management practices and operational performance of Steel Manufacturing Firms in Kenya.

1.3.1 Specific Research Objectives

The study was guided by the following specific research objectives:

i. To determine the capacity management practices implemented by Steel Manufacturing Firms in Kenya.

ii. To determine the effect of capacity management practices on operational performance of Steel Manufacturing Firms in Kenya.

1.4 Value of the Study

The research results may be of importance to the managerial system of Steel Manufacturing Firms in Kenya as they will give them a clear understanding of factors that will lead to successful implementation of capacity management. They will also help the management in preparing a strategy that will ensure the company's objectives are met.

The findings can also be used by the Kenyan government and the country's policy makers especially those in the steel industry since it will enable them to understand how the policies, they develop affect capacity management in the steel industry in their effort to better their practices to offer quality services and products. The policy makers are also enlightened on the challenges the players in the market face.

This study might be useful to current and future researchers as a secondary source of data in their research. It will be instrumental in expanding their knowledge on the subject matter. It also offers guidelines on the methodologies that can be used in conducting a similar research.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This section covers literature relevant to this study. It also presents a theoretical review, and empirical review. The chapter also identified the gaps presented by other studies in the empirical review. Additionally, this section will show the conceptual framework.

2.2 Theoretical Literature

Different theories characterize and portray capacity management practices in organizations and operational performance. In this instance, the theoretical framework for the research was informed by constraints and lean production theories. This section will discuss the theories of constraints and lean production. These theories relate to the variables under study and hence are deemed to be the best in explaining the existing phenomenon.

2.2.1 Theory of Constraints

Eliyah Goldart (1980) developed the TOC theory. The Theory of Constraints comprises of aspects of problem solving, project management, market segmentation, and measurement of performance. TOC gives a detailed systemic technique for making rapid improvements. The TOC in management is composed of the following procedures; identifying the constraints of the system, making a decision on the exploitation of the constraints, management or the alteration of the processes and policies of the system and other resources in support of the made decisions, and increase capacity (Bragg, 2018).

TOC helps in the identification of factors that hinder the attainment of objectives and them improve the constraints until they are not limiting factors (Stefaud, 2017). Bottleneck is the term used to refer to constraints in manufacturing. (Goldratt, 2014) argued that the core priority is always the present constraints. As such, utilizing time in the optimization of non-constraints is not beneficial to a firm; only constraint improvements help attain a firm’s profit objective. The power of the TOC theory

emanates from its ability to strongly focus on a single objective and to remove any barriers obstructing the achievement of a firm's goal.

Goldratt (2014) posits that the successful implementation of the TOC theory records the following positive effects: reduced inventory (less work in progress), improved capacity, reduced lead times, fast improvement (good management of constraints), quality of services and products, improved competitive advantage and increased profits.

The TOC was relevant in this study in that it provided a framework in the determination of bottleneck(s) that hinder the attainment of goals. TOC also provided a systematic approach towards improving the current constraints to the level that they stop being factors of limitation. TOC was used to examine how limited resources are identified and utilized in order maintain continuous manufacturing flow and productivity improvement thereby influencing organizational performance.

2.2.2 Theory of Lean Production

The Lean Production theory focusses on the reduction or complete elimination of waste to facilitate faster operations, create operations that are dependable, improve product quality, and lower production costs. The lean operations approach is grounded on effectively conducting all operations in an efficient manner that allows the reduction of wastes and ensures staff are involved to continue making future adjustments and changes (Slack, Chambers & Johnson, 2007).

Manufacturers should align labor resources with their most urgent goals and projects to maximize profits in a competitive business environment. Enterprises use scheduling software to schedule the best employees that have matching skills for the job in each shift. This ensures there is improved production while keeping the labor costs to a minimum. Lean manufacturing is known to do away with overtime expenses while still enhancing productivity. This is also possible due to emphasis on the value stream by bringing the measuring processes to the business aspects and focusing on doing away with waste by ensuring employees work on important firm activities. The main objective

of lean manufacturing is to eliminate both material and idle time waste. Lean manufacturing complements many business objectives. When the process is paired with new innovation then the process effectiveness, efficiency and speed is enhanced, (Mrugalska & Wyrwicka, 2017).

The theory of lean production in the study was used to determine how the utilization of capacity impacts operational performance hence requiring an effective capacity management approach to reduce the wastage of scarce resources and lower production cost. The theory as such brings forth the chance of diversity on systems of operations used in monitoring stock levels and the varying products that may need to be treated differently (Eroglu and Hofer, 2011).

2.3 Capacity Management Practices

In times of capacity constraint, the prime concern of operations managers should be towards demand to create a balance between capacity and demand. Operations managers should focus more on the mix of capacity and the level to which they can be adjusted and the urgency of their reaction as well as cost involved (Slack, 2007). The core purpose of capacity management practices is to identify the whole level of resource capacity that offers support to a firm's long-term production strategy. Klassen and Rohleder (2004) suggests that "companies should pick the demand and capacity management strategies that will help them to achieve good service, lower costs and increased profitability."

There are four major capacity management strategies: level, chase demand, managed demand and mixed capacity strategies. Level capacity management aims to develop a plan that stabilizes the rate of production and the level of employment. Manufacturing capacity isn't adapted to demand differences but rather the use of delivery times and stock are completely, Hill and Hill (2012). The organization maintains a workforce level and a stable output rate during low demand. Slack *et al* (2011) observes that the stable output rate gives an organization the opportunity to have high levels of inventory that are presently needed. An increase in demand results in stable production and rate of

employment levels while at the same time allowing surplus inventory to absorb the increased demand.

Chase capacity management practice aims to change the level of output to mirror demand fluctuations. A chase strategy means that the utilization of capacity is adapted to demand in each period of planning (Slack et al, 2011). It needs varying staff numbers, working hours and equipment for every period making it hard plan to follow through. By imposing extra working hours on employees, organizations can develop a temporary capacity increase without any added costs of employing more staff members (Vollmann & Schmitt, 2011). The inventory of finished goods can be developed in slack demand periods and then utilized to fill demand during high demand periods.

Russell and Taylor (2009) suggest that managed demand capacity strategy aims to change demand to align with the present capacity using price. The strategies of managed demand include: price variation; improving marketing to lines of products with extra capacity; increasing sales through advertising; using present process for the creation of alternate products; and improving delivery time during low levels of demand (Slack & Lewis, 2011). Manufacturing firms need to lower or increase its levels of inventory following its anticipation of demand increase and decrease in order to satisfy the customer demand changes. The real time production element makes it important to match demand and supply in services that are capacity constrained where operational performance is related to the current capacity use (Russell & Taylor, 2009).

Finally, most manufacturing entities find it advantageous to employ mixed capacity strategy. This can meet the policies and /objectives of the organization and reduce lower costs than either of the pure strategies used independently, (Slack & Lewis, 2011). Operation managers ought to understand mixed capacity strategy approaches of the capacity management, the level to which it can be altered, urgency of the action and the costs involved, (Barnes, 2008). In this approach, number of staff need to be transferred to uplift the existing levels of service delivery and also new facility development will shift the demand increase expected as a result of new businesses downturn

2.4 Operational Performance

Manufacturing organization should focus in making their operations effective and efficient if they are to achieve their goals, (Cowie, 2017). Operational performance objectives enable organizations to measure performance. According to Slack et al. (2007) the objectives of performance comprise speed, cost, flexibility, dependability and quality.

Quality measures the extent to which a product meets the specifications of the customers. Product quality is measured how reliable a product is, should have desirable features, should be durable and easy to service. Quality is how well a product performs its intended role and the belief of the customers with regards to the value of the product (Spacey, 2017). The quality goal should keep in mind the quality policies in place and the required processes to achieve this goal. The quality objectives should not only be measurable but also relevant to the produced goods or services and pay attention to boosting the satisfaction of the customers.

All operations strive to ensure lower operational costs while maintaining the appropriate speed, flexibility, quality, and dependability required by the clients. The costs of production of services and goods ought to be minimized to attain high client satisfaction. Most manufacturing firms compete with prices (Spacey, 2017). Low prices are more attractive to customers, hence need for firms to maintain low cost of production. In the quest to achieve low costs to remain competitive, firms should ensure that they do not affect efficiency, safety and reliability of their operations and products. (Keita, 2015). Objectives relating to cost tend pay attention to efficiency and productivity.

Flexibility is described as the capacity of a firm to alter operations in adapting to the external and internal business environment. This may involve changing what the operation does, how it is doing it, or when it is doing it. Flexibility entails a firm's ability to present new or improved products to the business market, introduce a variety of products, produce different output levels at varying times and change delivery timing of the products. According to Slack, Bradon-Jones and Johnston (2013) a firm's ability to change and quickly adapt to its environment gives the firm a competitive edge over its opponents. Flexibility helps save time, money and as well as maintain dependability.

Firms should always work toward ensuring that they consistently meeting customers promised delivery time for their products. Dependability measures the reliability of a firm with regards to timely product deliveries that follow the set costs and prices (Cowie, 2017). Internally, dependability implies the firm stability, firm confidence and lower costs of production. External dependability means the opportunity for a firm to show its reliability in terms of delivery (Tuta, 2016). Dependability results in improved customer service since the client is able to trust that product delivery will be carried out at the appropriate and required time.

The objective of speed concentrates on the aspects of the time of manufacturing a product or the time taken in conducting research about a product. Greasy (2008) posit that sped allows a firm to lower its costs and deliver products on time improving customer service. According to Cowie (2017) responding to customers is enhanced by fast decision making and speedy movement of information and materials in a firm. Speed ensures a reduction in inventories. This study focused on quality, cost and flexibility performance measure that relate to the internal and external factors needed in gaining a competitive edge over the opponents.

2.5 Empirical Literature Review

This section discusses existing studies on 'capacity management and operational performance.' In the global perspective, Dekkers & Kanapathy, (2012) study focused on the practices used for strategic capacity management in Malaysian manufacturing companies. The research used the case study methodology and revealed that the core propeller of the formulation of manufacturing strategies include ensuring complete orders and cost reduction this is despite the clear understanding by the managers that the alignment of business and manufacturing strategies are vital. In addition, the results showed that the structure of the company mirror the requirements of performance, responsiveness and flexibility that are aligned with the firm structures. The study did not indicate the link amid capacity management and performance of business operations in the steel sector.

Focusing on the Swedish Migration Agency, Assa and Johansson (2016) conducted a research on the framework of capacity management in the public sector. The study discovered that public sector organizations seemed to be limited in their ability to influence medium and long-term strategies of capacity management. The research was conducted in the Swedish public sector and its application to Kenyan steel manufacturing firm's context can only be determined by this study.

Jadayil, Khraisat and Shakoor (2017) conducted a study to identify strategies for production improvement to attain the required capacity in plastic firms. Primary and secondary data was collected using both quantitative and qualitative techniques. The outcome of the study showed that machines must be utilized to the maximum and ensure appropriate speed for production improvement and reduce extra costs. The study is limited to capacity management strategies in plastic industry. There is need for the study to be conducted in Steel Manufacturing Firms in Kenyan context.

Chemendy, (2018) evaluated demand and capacity planning on CKD vehicles at MBC. Data gathering was through observation, interviews and focus group techniques. The findings of the research revealed that MBC operated a cross-functional process without an integration system and adequate information. The research only reviewed one capacity type. This study will incorporate other aspects of capacity management practices and review the link between practices of 'capacity management and operational performance' of Steel Manufacturing Firms.

Locally, On'gondo (2013) focused on the effect of strategies of capacity management on quality of services at Safaricom Limited. A descriptive design was applied for the study where the gathering of data was carried out through questionnaires. The results of the research revealed that the implementation of strategies of capacity management by Safaricom Limited in all its outlets in Kenya improved the service quality. The research did not focus on the manufacturing sector but rather concentrated on the service industry.

Wairimu (2014) focused on strategies of capacity management and quality of services. The research employed a descriptive survey design and questionnaires were employed in the collection of research data. The outcomes of the research indicated that 'chase

capacity management strategy' is the common strategy used by companies in Kenya in the sector of oil distribution. The research drew the conclusion that strategies of capacity management significantly and positively impact the quality of services in the petroleum distribution industry in Kenya. The research did not concentrate on the Steel Manufacturing Firms in Kenya, but rather focused on the oil distribution sector.

Gachunga (2018) carried out a research on strategies of capacity management a research and operational efficiency in the energy sector in Kenya. Primary and secondary data were collected. The study revealed that there was option of redefining the activities of the companies by employees. The operations costs of the firms reduced due to 'improved activity and work in the organizations proving they were efficient'. The study did not consider other measures operational performance.

Nangulu (2018) carried out a study on strategies of capacity management and operational performance of Kenyan sugar manufacturing companies. The research employed a census survey design and structured questionnaires to collect primary data. The research results indicate that all the Kenya sugar companies were operating in a lower capacity than their installed capacity and mostly used a mechanistic organizational structure. The capacity management method that most of these firms used was the chase form of management. The study is limited to capacity management strategies in sugar manufacturing companies in Kenya. It failed to target Steel Manufacturing Firms in Kenya.

2.6 Summary of Empirical Literature and Knowledge Gaps

Table 2. 1 Empirical studies and knowledge gaps.

Scholar	Study	Methodology	Findings	Knowledge Gap(s)	Focus of Study
Natascha Chemendy (2018)	Demand and capacity planning on CKD vehicles at MBC.	Gathering of data was done using focus groups, observation and interviews. The gathered data analysis was done using content analysis.	MBC used a cross-functional strategy that did not support system integration or the integration of information leading to uncertainty in the planning process. It also led to erroneous forecasting and more lead-time.	The model in the study focused to one type of capacity that is staff yet capacity management which contains other elements.	The study will assess four aspects of capacity; Level capacity strategy, Chase strategy, Managed demand strategy and Mixed strategy
Wisam Abu Jadayi, Walid Khraisat and Mwafak Shakoor (2017)	Various methods to enhance the production to achieve the plastic firm optimum capacity	Primary and secondary data were gathered using both quantitative and qualitative techniques.	The study concluded that there was need for the effective use of machines and that they should be run at optimum speed if the production was to be enhanced and to minimize the cost of maintenance. It also established that the productivity of employees improves with better working conditions. The allocation of resources and effective work shifts scheduling also improved significantly the production	The study is limited to capacity management strategies in plastic industry. There is need for the study to be conducted in Steel Manufacturing Firms in Kenyan context.	This study will assess the association between “capacity management practices and operational performance in Steel Manufacturing Firms”

Ida Aasa and Viktor Johansson (2016)	A framework for 'capacity management in public sector. A case study of the Swedish Migration Agency'	The study adopted both unstructured and semi-structured interviews	The study results show that although the long term and medium-term capacity management methods were connected to the capabilities of the firms to meet the changing demand, the public sector's ability were limited when it came to affecting the choosing of the strategies.	The study was done in Swedish public sector and the study application to Kenyan private sector context can only be determined by this study.	The scope of the study will assess different capacity management practices and operational performance in Steel Manufacturing Firms
Dekkers and Kanapathy (2012)	Practices for strategic capacity management in Malaysian manufacturing	Structured research method. Case study methodology. Data was gathered using both primary and secondary methods.	The research revealed that adequate manufacturing capacity matching the strategic objectives provides firms with a competitive advantage.	The research has not reviewed the connection between capacity management and operation performance.	The research aims to examine the association between capacity management practices and operational performance
Nangulu (2018)	Capacity management strategies and operational performance of Kenyan sugar manufacturing firms.	Census survey study design was employed and entire population of the sugar manufacturing firms were considered. Data gathering was done using structured questionnaires	The findings of the study indicated that all the Kenya sugar company's operations were below their optimum capacities and they used a mechanistic organizational structure. Chase capacity management was the most popular strategy used by Kenyan sugar companies.	The study is limited to capacity management strategies in sugar manufacturing companies in Kenya. There is need for the study to be conducted in steel industry in Kenyan context.	This study will focus on 'capacity management practices and operational performance in Steel Manufacturing Firms

Gachunga (2018)	"Capacity management strategies and operational efficiency in the Kenyan energy sector."	The research used a survey design. Data gathering was by a structured questionnaires and analysis by use of descriptive statistics.	The recorded results showed a favorable association amid "capacity management strategies and operational efficiency."	The study did not consider all measures of operational efficiency that make up operational performance.	This study will consider three measures of operational performance; Quality, Cost, and Flexibility
Wairimu (2014)	Capacity management strategies and service quality in Kenyan petroleum distribution firms.	Descriptive survey research, Stratified strategic random sampling,	The study established that capacity management methods significantly and favorably impacted the quality of service of the Kenyan petroleum distribution sector and most of oil companies in the country used chase strategy.	The research was done on oil distribution firms and did not cover the steel industry in Kenya	The study's scope focused on determining the association between capacity management practices and operational performance in Steel manufacturing firms
Ongondo (2013)	Capacity management strategies on Safaricom's service quality.	Correlation and cross-sectional survey were employed Descriptive statistics	The implementation of capacity management strategies enhanced the provider's service quality.	The study concentrated on the service industry hence the manufacturing industry was not covered.	This research will focus on Steel Manufacturing Firms

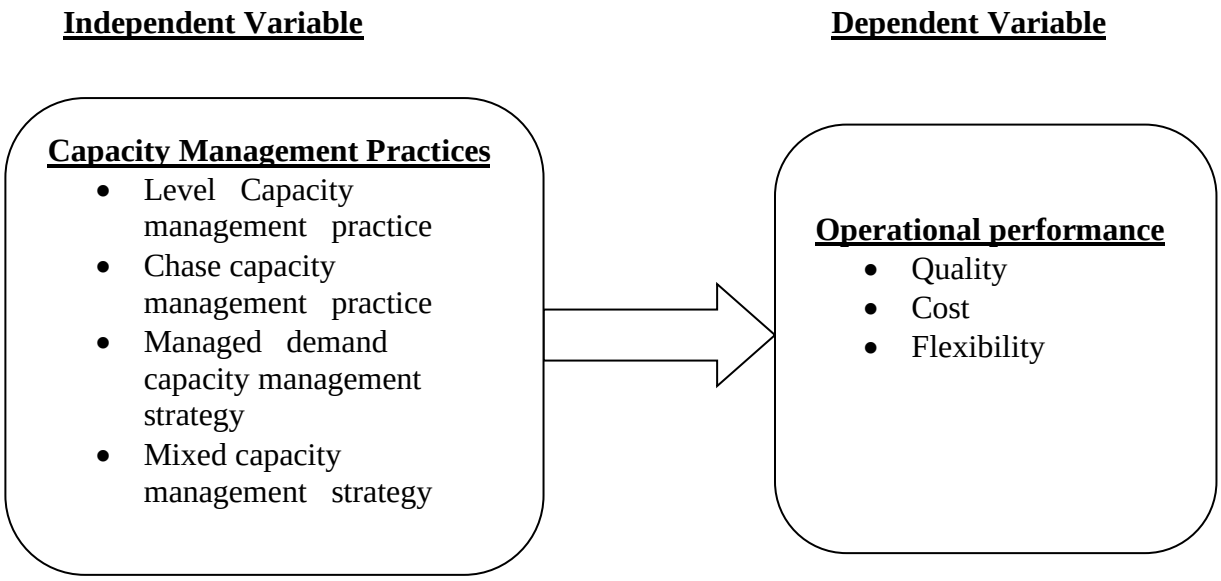
Source: Researcher (2021)

2.7 Conceptual Framework

The independent variable for this research was capacity management practices which is characterized by four constructs namely; level capacity, chase capacity, managed demand and mixed capacity management practices. The dependent variable was operational performance which for this study is measured by three constructs namely flexibility, cost and product quality. It was hypothesized that implementation of capacity management practices will lead to better operational performance.

This relationship is depicted schematically in conceptual model in Figure 2.1 below.

Figure 2.1 Conceptual Model



Source: Researcher (2021)

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter provides the methodologies that was used to complete the project. It provides the research design, research population, the techniques for collection and analysis of the gathered data.

3.2 Research Design

A descriptive design was employed for the research since it entails the description of phenomenon in a careful and well-planned manner which allowed the researcher to obtain complete and accurate information. Descriptive research design minimized bias hence maximizing the reliability of the data collected with due concern for the economical completion of the research study. It also provided the researcher with a wide choice of ways of collecting the data such as questionnaires, interviews, observation. The study targeted Kenya Steel Manufacturing Firms.

3.3 Population

The population constituted Steel Manufacturing Firms in Kenya which according to KAM are forty-five (45) in number as indicated in Appendix II. Due to small population, a census survey was caried out.

3.4 Data Collection

The research employed primary raw data which was gathered through questionnaires. The research questionnaire composed of three sections; collection of data on the demographics of the respondents, questions on capacity management practices and collection of data on the measures of operational performance. Both open and close-ended questions were included in the research instrument. Additionally, a Likert scale was employed to standardize the research instruments and make them easy for the researcher to analyze. Emails and drop & pick later technique were used to distribute the research instruments to the operational managers or their equivalent in Steel Manufacturing Firms in Kenya.

3.5 Data Analysis

The data gathering tool were assessed for accuracy and completeness. The first objective; determining capacity management practices adopted by Kenya Steel Manufacturing Firms was evaluated by descriptive statistics by use of standard deviations, percentages, frequencies and means. To express the connection between the independent and dependent variables, a regression and correlation analysis were conducted. Tables and graphical presentations were used for analysis.

The multivariable regression was provided as:

$$\mathbf{Y= \beta_0 +\beta_1 X_1+ \beta_2 X_2+\beta_3 X_3+ \beta_4 X_4+e}$$

Where, Y is Operational Performance,

Y_1 is Product Quality

Y_2 is Cost

Y_3 is Flexibility

B_0 is the constant

B_1, B_2, B_3 and B_4 are coefficients

X_1 is Level capacity management practice

X_2 is Chase capacity management practice

X_3 is Managed demand capacity management practice

X_4 Mixed capacity management practice

e is the error term

Table 3. 1 Summary of Data Collection and Data Analysis

Objective	**Questionnaire**	**Technique of Data Analysis**
Overall information	Section A	Descriptive statistics
Capacity management practices implemented by Steel Manufacturing Firms in Kenya	Section B	Descriptive statistics
Effect of 'capacity management practices on operational performance of Kenya Steel Manufacturing Firms'	Section C	Regression and correlation analysis

CHAPTER FOUR: DATA ANALYSIS, FINDINGS AND DISCUSSION

4.1 Introduction

This chapter provides data analysis, findings and interprets the analyzed data. It also presents findings of the data collected on capacity management practices and operational performance of Steel Manufacturing Firms in Kenya. The target population of the study was operations managers or their equivalents.

4.2 Response Rate

The research sample was made up of 45 respondents in collecting data. Out of the 45, 35 of them responded to the data gathering tool and returned for analysis. This represents 77.8% response rate as provided in table 4.1. Conferring to Mugenda and Mugenda (2003), any response rate above 70% is excellent and adequate for comprehensive data analysis. From this recommendation, the current response rate is good enough or excellent.

Table 4. 1 Response Rate

Response	Frequency	Percentage
Responded	35	77.8
Not responded	10	22.2
Total	45	100.0

Source: Research Data (2021)

4.3 Respondents Demographics

The current section provides the background data of the participants working in Kenya Steel Manufacturing Firms. The study specifically sought data on the participant's age,

period of service, designation, and period which has elapsed the participant still holds the current position.

4.3.1 Age Distribution

The respondents were requested to provide their age. Table 4.2 is a representation of the responses given by the respondents regarding their age.

Table 4. 2 Age Distribution

Age (years)	**Frequency**	**Percentage**
20-29	7	20.0
30-39	11	31.4
40-49	13	37.1
Above 50	4	11.4
Total	35	100

Source: Research Data (2020)

Resutls show that the age of 37.1% of the respondents was 40-49 years, the age of 31.4% of the respondents was between 30-39 years, the age of 20.0% of the respondents was between 20-29 years, while the age of 11.4% of the total respondents was Above 50 years. This implied that the different age groups were well represented in the study.

4.3.2 Respondents' Work Tenure

The respondents were requested to fill in the number of years they have been working for the different organizations. Table 4.3 represents information based on their responses.

Table 4. 3 Work Tenure

	Frequency	**Percentage**
Less than one-year	2	5.7
1 -5 years	4	11.4
6 to 9	11	31.4
10 and above	18	51.4
Total	**35**	**100.0**

Source: Research Data (2021)

According to Table 4.3, most respondents (51.4%) had been in their current workplace for more than ten years, 31.4% of the total participants had been working in their current company for 6 to 9years. Further, 11.4% of the respondents reported they had been with the current company for 1 -5 years while 5.7 percent of the respondents indicated that they had been working in their current workplace for less than 5 years. From these results, it's apparent that the participants in this research had been working for the Steel Manufacturing Firms for some time and could therefore give reliable information on the study subject.

4.3.3 Respondents Current Position

Participants were requested to provide the current position they held in the organization. Results show that respondents held various position including operations managers, production managers, accounting officers, procurement officers and sales managers.

Table 4. 4 Duration the respondent had held in current position

	Frequency	Percentage
Less Than 2 Years	7	20.0
3 To 7 Years	10	28.6
More Than 8 Years	18	51.4
Total	35	100.0

Source: Research Data (2021)

Results show that 51.4% had held the current position for more than 8 years, 28.6% of the participants recorded to have held the present position for a duration of 3 to 7 years while 20.0% indicated not more than 2 years. This infers that majority of the participants had held the current position for a good duration implying that they had been in the positions long enough to give credible and reliable data from their experience.

4.4 Extent to which Capacity Management Practices Have Been Implemented by Steel Manufacturing Firms

The study determined the extent to which capacity management practices had been implemented by Steel Manufacturing Firms. The researcher uncovered the association between the capacity management practices and performance among steel manufacturing firms. The respondents in various steel manufacturing firms were requested to rate the level of capacity management implementation using a Likert scale that was subdivided into 5 parts whereby 1 = very little degree, 2=little degree, 3=moderate, 4=large degree, and 5=very large degree.

Table 4. 5 Extent to which capacity management practices have been implemented by Steel Manufacturing Firms

Capacity management practices	Mean	Std
Mixed strategy capacity management practice	4.0571	.80231
Level capacity management practice	4.0000	1.02899
Chase capacity management practice	4.0000	1.00000
Managed demand capacity management practice	3.9714	1.12422

Source: Research Data (2021)

Recorded findings indicate most of the participants greatly agree that their manufacturing firms had implemented level capacity management practices (such initiatives included adjusting stock level, adjusting delivery time or use of backorders to match fluctuating demand) to a large degree, as provided by (M= 4.00, SD= 1.03).

On chase capacity management practice, most of the participants agreed to a large degree that their firms had implemented chase capacity management practice, as indicated by (M= 4.00, SD= 1.00), such initiatives included hiring extra staff, hiring part time staff, laying off staff, sub-contracting with other firms or varying number of productive hours.

Results further showed that major group of the participants moderately agreed that their firms had implemented managed demand capacity management practice, as indicated by (M= 3.97, SD= 1.12). This therefore implies that most of the manufacturing firms had implemented managed demand capacity management practice to a moderate extent; such measures included adjusting prices of products, use of alternative products, advertising to increase demand.

Results further show that most of the respondents greatly agreed that their manufacturing firms had implemented mixed strategy capacity management practice as indicated by (M= 4.06, SD= 0.80). This infers that most of the steel manufacturing firms had adopted mixed strategy capacity management practices.

4.5 Correlation Analysis

The study analyzed the findings with correlation analysis to ascertain the linear relation among the variables. Pearsonian correlation was applied in the study in determination of the existing correlation among the variables since it employs correlation coefficient r to measure the level of association. The variables will have a weak positive relationship when the r values are between 0 and 0.5 and strong positive relationship when the r values are between 0.5 and 1. On the other hand, r values that range between 0 and -0.5

indicates a weak negative relationship among variables and strong negative relationship among variables is indicated by r values than range between -0.5 and -1.

Table 4. 6 Correlation Results

	Level capacity management practice	Chase capacity management practice	Managed demand capacity management practice	Mixed strategy capacity management practice	Operational performance
Level capacity management practice	1				
Chase capacity management practice	.800**	1			
Managed demand capacity management practice	.890**	.759**	1		
Mixed strategy capacity management practice	.356*	.477**	.263	1	
Operational performance	.861**	.799**	.817**	.438**	1

Source: Research Data (2021)

The results from the correlation analysis indicates that all the variables under investigation had a positive association with the operational performance of steel manufacturing firms. The operational performance had a positive and significant correlation with 'level capacity management, chased capacity management,' management

demand capacity management and mixed strategy capacity management as shown by r values of 0.861, 0.799, 0.817 and 0.438 respectively.

4.6 Effect of Capacity Management Practices on Operational Performance Among Steel Manufacturing Firms in Kenya

The research was to examine the impact of capacity management practices on the operational performance among the steel companies in Kenya. The firms were requested to indicate the level of agreement to how the capacity management practices impact the operations.

4.6.1 Quality as the Dependent Variable

The research applied multiple regression on all the operational performance measures. The focus of test regression was to determine whether quality has a weighty effect on operational performance of steel companies in Kenya.

Table 4. 7 Regression Coefficients

	Unstandardized Coefficients		**Standardized Coefficients**		
Model	**B**	**Std. Error**	**Beta**	**t**	**Sig.**
(Constant)	3.872	0.396		7.625	.000
Level capacity management practice	.760	.284	.565	2.987	.005
Chase capacity management practice	.464	.250	.125	2.586	.007

Managed demand capacity management practice	.343	.299	.076	2.287	.018
Mixed strategy capacity management practice	.385	.158	.070	2.517	.008

a. Dependent Variable: Quality

Source: Research Data (2021)

The general equation for this regression will be:

$Y = 3.872 + 0.760X_1 + 0.464X_2 + 0.343X_3 + 0.385X_4$

Whereby;

Y = Dependent Variable (Quality as an indicator of operational performance)

X_1 = Level capacity management practice

X_2 = Chase capacity management practice

X_3 = Managed demand capacity management practice

X_4 = Mixed strategy capacity management practice

From Table 4.7, it is found that all variables are positively and significantly related to the quality as an indicator of operational performance in steel manufacturing firms in Kenya. The coefficient of level capacity management is 0.760 indicating that any unit rise in level capacity management practice will result to 0.760 unit rise in the quality of operational performance in a steel manufacturing firm in Kenya. Furthermore, the relationship is significant since it has a T-value of 2.987 and a p-value of 0.005 which is less than 5% significance level. The rise in chase capacity management was established to increase the quality of operational performance among steel manufacturing firms in

Kenya as shown by the coefficient value of 0.464. Also, the association was significant due the p value of 0.007 which is less than 0.05 and t value of 2.586.

Moreover, managed demand capacity management practice has a coefficient of 0.343 which positively influences the quality of operational performance whereby any unit rise will lead to a 34.3% increase in the quality of performance among steel manufacturing firms in Kenya. It is significant due to its p value of 0.018. It was determined that mixed strategy capacity management practice influences the quality of operational performance positively since it had a coefficient of 0.385. It implies that any unit increase in the variable will lead to a 38.5% rise in quality of operational performance. Also, mixed strategy is significant (t=2.517, p=0.008).

Level capacity management practice had the highest impact on the quality of operational performance among steel manufacturing firms in Kenya followed by chase capacity management practice then mixed strategy capacity management practice and managed demand capacity management practice had the least influence on the quality of operational performance among steel manufacturing firms in Kenya. All independent variables are significant since they have p values of below 5%.

Table 4. 8 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.768[a]	.590	.535	1.43978

a. Predictors: (Constant), Mixed strategy capacity management practice, Managed demand capacity management practice, Chase capacity management practice, Level capacity management practice

Source: Research Data (2021)

The findings indicated an R value of 76.8%. R squared value is 59.0% meaning that 59.0% of the variations in quality is explained by the variation in the independent variables: level, chase demand, managed demand and mixed capacity strategies. Unexplained variations are 41.0%. This is due to variables not included in the model also pure chance factors.

In tandem, the study established that demand practices helped Steel Manufacturing Firms in determining quality of resources required. Such included the raw materials required, the total available machine hours, the number of employees required for optimal production progress, packaging, and tools needed for an efficient manufacturing process to transpire. Similar conclusion was made by Wisam Abu Jadayi, Walid Khraisat and Mwafak Shakoor (2017) that demand strategy helps to firms to figure out the all the production metrics need in advance.

Table 4. 9 ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	89.354	4	22.339	10.776	.000[b]
Residual	62.189	30	2.073		
Total	151.543	34			

a. Dependent Variable: Quality

b. Predictors: (Constant), Mixed strategy capacity management practice, Managed demand capacity management practice, Chase capacity management practice, Level capacity management practice

Source: Research Data (2021)

The results on ANOVA show that the model is statistically significant since the value of P=0.000 which is lower than 5%. Further, the results imply that the capacity management practices can reliably predict operational performance of steel manufacturing firms. The outcomes further show that the F-critical of 3.11 is less than F-calculated value of 10.776 hence the overall model is statistically significant. This is line with the study done by Dekkers and Kanapathy (2012) where the capacity management practices improve the quality of operational performance of a company leading to competitive advantage.

4.6.2 Cost as Dependent Variable

The association between the independent variables that include; level capacity, chase capacity, managed demand capacity and mixed strategy capacity and the dependent variable; cost of operational performance was conducted and multiple regression analysis done.

Table 4. 10 Regression Coefficient

	Unstandardized Coefficients		**Standardized Coefficients**		
Model	**B**	**Std. Error**	**Beta**	**t**	**Sig.**
(Constant)	3.508	0.378		8.094	.0000
Level capacity management practice	.656	.376	.239	2.792	.0061
Chase capacity management practice	.579	.244	.193	2.853	.0042

Managed demand capacity management practice	.740	.292	.309	1.097	.0383
Mixed strategy capacity management practice	.506	.153	.084	2.582	.0084

a. Dependent Variable: Cost

Source: Research Data (2021)

The general equation for this regression will be:

$Y = 3.508 + 0.656X_1 + 0.579X_2 + 0.740X_3 + 0.506X_4$

Whereby;

Y = Dependent Variable (Cost as an indicator of operational performance)

X_1 = Level capacity management practice

X_2 = Chase capacity management practice

X_3 = Managed demand capacity management practice

X_4 = Mixed strategy capacity management practice

From the Table 4.10, it found that all variables are positively related to the cost as the dependent variable of operational performance among steel manufacturing firms in Kenya. The coefficient of level capacity management is 0.656 indicating that any unit rise in level capacity management practice will result to 65.6% reduction in the cost of operational performance among steel manufacturing firm in Kenya. Moreover, the relationship is significant since it has a p-value of 0.0061 which is less than 5% significance level. The rise in chase capacity management was established to reduce the cost of operational performance among steel manufacturing firms in Kenya as shown by

the coefficient value of 0.579. Also, the association was significant due the p value of 0.0042 which is less than 0.05.

Moreover, managed demand capacity management has a coefficient of 0.740 which positively influences the cost of operational performance; any unit rise will lead to a 74.0% decrease in the cost of performance in steel manufacturing firms. It is significant due to its P value of 0.0383. It was determined that mixed strategy capacity management practice influences the cost of operational performance positively since it had a coefficient of 0.506. Any unit increase in mixed capacity management will lead to 50.6% decrease in cost of operational performance. Also, mixed strategy is significant since it had a P value of 0.0084.

Managed demand capacity management practice had the highest impact on the cost of operational performance among steel manufacturing firms in Kenya followed by level capacity management practice, then chase capacity management practice; mixed strategy capacity management practice had the least effect on the cost of operational performance among steel manufacturing firms in Kenya.

Table 4. 11 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.733[a]	.537	.475	1.42158

a. Predictors: (Constant), Mixed strategy capacity management practice, Managed demand capacity management practice, Chase capacity management practice, Level capacity management practice

Source: Research Data (2021)

The findings indicated an R value of 73.3%. R squared value is 53.7% meaning that 53.7% of the variations in cost is explained by the variation in the independent variables: level, chase, managed demand and mixed capacity strategies. Unexplained variation is 47.3%. This is due to variables not included in the model also pure chance factors.

These findings go hand in hand with assertion by Slack et al. (2011) By imposing extra working hours on employees, organizations can develop a temporary capacity increase without any added costs of employing more staff members.

Table 4. 12 ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
Regression		70.345	4	17.586	8.702	.000[b]
Residual		60.626	30	2.021		
Total		**130.971**	**34**			

a. Dependent Variable: Cost

b. Predictors: (Constant), Mixed strategy capacity management practice, Managed demand capacity management practice, Chase capacity management practice, Level capacity management practice

Source: Research Data (2021)

From the ANOVA results, the model is statistically significant since the value of p=0.000 which was lower than 5%. Further, the results imply that capacity management practices can be used to predict operational performance of steel manufacturing firms. The outcomes further indicate that the F-critical of 3.11 is less than F-calculated value of 8.702 hence the overall model is statistically significant.

4.6.3 Flexibility as Dependent Variable

The relationship between the independent variables which include; level capacity, chase capacity, managed demand capacity and mixed strategy capacity and the flexibility of operational performance was conducted and multiple regression analysis done.

Table 4. 13 Regression Coefficient

Model	Unstandardized Coefficients		Standardized Coefficients		
	B	**Std. Error**	**Beta**	**t**	**Sig.**
(Constant)	4.357	.921		9.388	.0000
Level capacity management practice	.818	.385	.584	3.903	.0021
Chase capacity management practice	.520	.297	.264	2.749	.0063
Managed demand capacity management practice	.405	.329	.060	2.319	.0090
Mixed strategy capacity management practice	.452	.236	.062	2.645	.0074

a. Dependent Variable: Flexibility

Source: Research Data (2021)

The general equation for this regression will be:

$Y = 4.357 + 0.818X_1 + 0.520X_2 + 0.405X_3 + 0.452X_4$

Whereby;

Y = Dependent Variable (Flexibility as an indicator of operational performance)

X_1 = Level capacity management practice

X_2 = Chase capacity management practice

X_3 = Managed demand capacity management practice

X_4 = Mixed strategy capacity management practice

From the Table 4.13, it found that all variables are positively and significantly related to the flexibility as the indicator of operational performance among steel manufacturing firms in Kenya. The coefficient of level capacity management was 0.818 indicating that any unit rise in level capacity management practice will result to 81.8% units increase in the flexibility of operational performance in a steel manufacturing firm in Kenya. Furthermore, the relationship significant since it had a T-value of 3.903 and a p-value of 0.0021 which is less than 5% significance level. The rise in chase capacity management was established to increase the flexibility of operational performance in steel manufacturing firms in Kenya as shown by the coefficient value of 0.520. Also, the association was significant due the p value of 0.0063 and t value was 2.749.

Moreover, managed demand capacity management has a positive coefficient of 0.405 which influences the flexibility of operational performance positively and any rise in unit will results to a 40.5% rise in the flexibility of performance in steel manufacturing firms in Kenya. It is significant due to its p value of 0.009 which is less than 0.05. It was determined that mixed strategy capacity management practice influences the flexibility of operational performance positively since it had a coefficient of 0.452. Any unit rise in the variable will result to a 45.2% rise in flexibility of operational performance. Also, mixed strategy is significant since it had a p value of 0.0074.

Level capacity management practice had the highest impact on the quality of operational performance among steel manufacturing firms in Kenya followed by chase capacity management practice then mixed strategy capacity management practice; managed demand capacity management practice had the least effect on the flexibility of operational performance among steel manufacturing firms in Kenya. They are all significant because they had p values of less than 5%.

Table 4. 14 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.890[a]	.791	.763	.82382

a. Predictors: (Constant), Mixed strategy capacity management practice, Managed demand capacity management practice, Chase capacity management practice, Level capacity management practice

Source: Research Data (2021)

The findings indicated the value of R as 89.0%. The value of R squared is 79.1% which means that 79.1% of the changes in flexibility is described by the variation in the independent variables: level, chase demand, managed demand and mixed capacity strategies. Unexplained variation is 20.9%. This is due to variables not included in the model also pure chance factors. These findings concur with Chemendy, (2018) that high chase management promotes flexibility to meet the demand fluctuation.

Table 4. 15 ANOVA

Model	**Sum of Squares**	**Df**	**Mean Square**	**F**	**Sig.**
Regression	77.183	4	19.296	28.431	.000[b]
Residual	20.360	30	.679		

Total	97.543	34

a. Dependent Variable: Operational performance

b. Predictors: (Constant), Mixed strategy capacity management practice, Managed demand capacity management practice, Chase capacity management practice, Level capacity management practice

Source: Research Data (2021)

The ANOVA findings show that the model is 'statistically significant as the value of p=0.000 which is lower than 5%.' Further, the results imply that the capacity management practices can predict the changes in the operational performance in steel companies in Kenya. The results further indicate that the F-critical of 3.11 is below F-calculated value of 28.431 hence the overall model is statistically significant.

4.7 Discussion

Evidence from the statistical findings reveal that capacity management practices enabled Steel Manufacturing Firms to identify the least expensive methods of meeting dynamic resource needs. Manufacturing organizations were in a position to ensure optimal utilization of their resources through elimination of chances that led to wastage either through excess deployment of resources of capacities. Quality utilization of resources achieved through capacity management practices helped to save organization from financial loses, time wastage and also enhanced proper utilization of time for enhanced productivity. These findings concur with Slack et al, (2011) manufacturing organizations must ensure quality planning for optimal operational performance.

Results also show that capacity management practices were implemented by most of the manufacturing firms through an in-depth process that involved comparisons on utilizations against maximum production capacities and abilities to meet workload forecasts with array of resources provided at a given time. According to Russell and Taylor (2009) failure by the management ensure capacity planning can consequently occasion a situation linked with over utilization of production machineries, overworking of staff which ultimately leads to crippled operational efficiency.

Further, the that study established that chase management avails an element of farsightedness which enhances flexibility within the manufacturing sector, this was achieved through matching of demand at supply while minimizing the waiting period for the clients in view of maximizing operational efficiencies. These findings concur with Chemendy, (2018) that high chase management promotes flexibility to meet the demand fluctuation.

Descriptive results show that managed demand practices significantly impacted operational performance of Kenya Steel Manufacturing Firms; most of them had adopted managed demand practices. Demand planning practices helps manufacturing firms to calculate various capacities, for example, number of units which can be produced on daily basis, weekly and in a month. Thus, this helps in identification of production strengths and weaknesses. These findings concur with Nangulu, (2018) who asserts that demand strategy cuts down excessive warehouse expenses which is achieved through optimal utilization of storage space.

Further most of the manufacturing firms had adopted hybrid strategy (integration of both level and chase strategies) in view of getting a better operational result. Adoption of

mixed strategies helped to maintain adequate balance between stock levels, hiring, terminations and production rate. These findings support the conclusion by On'gondo (2013) hybrid strategies promotes cultures rich in comprehensive planning mixed strategies allow firms to build up inventories before demand rises.

Additionally, this study is in harmony with the theory of TOC which posits that the successful implementation of the TOC theory records the following positive effects: reduced inventory (less work in progress), improved capacity, reduced lead times, fast improvement (good management of constraints), quality of services and products, improved competitive advantage and increased profits.

The study also established that through mixed strategies manufacturing firms could easily cover-up short-term peaks through hiring employees temporarily contracts or through sub contraction of production process. Further results show that mixed strategies helped the manufacturing organizations to manage its production processes and facilities in a lean way. These outcomes are in agreement with the results from Gachunga, (2018) reveled that through mixed strategies helps firms in adjusting its capacity so that it can meet demands efficiently.

CHAPTER FIVE: SUMMARY, CONCLUSION AND RECCOMENDATIONS

5.1 Introduction

This chapter provides the research summarized findings, conclusions and the recommendations made. The research endeavored to determine the implementation of capacity management practices and its effects on operations performance of Steel Manufacturing Firms in Kenya.

5.2 Summary

This study was on capacity management and operational performance of Steel manufacturing firms. The study employed ‘descriptive research design’ where data was assembled through the use of questionnaires from respondents who were in the position of operations managers or their equivalent in the Steel manufacturing firms. From a total of forty-five questionnaires, thirty-five were completely filled and returned deeming them fit for analysis. The biographic information indicated that the age distribution was well represented in the Steel Manufacturing Firms in Kenya. Based on information on tenure, the results showed that the employees in the Steel Manufacturing Firms had long tenures, thus could provide reliable information on the study questions.

The study’s first objective was to examine the capacity management practices implemented by Steel manufacturing firms in Kenya. From the findings it was established all the four capacity management practices had been implemented in the steel manufacturing firms to a large degree. This suggests that the Steel manufacturing firms can comfortably meet the current and anticipated demand by improving their resource pool. Capacity management practices influence restructuring decisions and prevents

valuable resources from lying idle and ensures existing resources are working on the right priorities.

The second objective was to determine the impact of capacity management practices on operational performance of Kenya Steel Manufacturing Firms. From the outcomes there was a favorable relationship between capacity management practices and operational performance which is shown by quality, cost and flexibility. This result was supported by the favorable coefficient outcomes shown on the coefficient table given for the multiple regression analysis findings. Further, the findings imply that holding capacity management practices (level capacity practices, chase practices, managed demand practices, and mixed practices) at constant, the operational performance of Steel Manufacturing Firms would remain positively related. This implies that the implementation of capacity management practices had a great influence on operational performance. Further, the findings imply that Steel Manufacturing Firms in Kenya can operate at low costs, provided quality standards and offer high flexibility due to implementation of capacity management practices which facilitates operational performance in the long run.

5.3 Conclusion

Capacity management practices provide a balance between capacity and demand in order to prevent the risk of over or under estimation by confirming the percentage of time for which the resources are available before scheduling work. The conclusion made is that a positive association exists between capacity management practices and operational performance. An indication that managers have an opportunity to address the requirements of the business and to efficiently allocate resources. Well-implemented

capacity management practices give Steel Manufacturing Firms the opportunity to mitigate the change and growth risks while maintaining optimum costs of operations in the market.

The findings indicated that steel manufacturing firms studied had implemented capacity management practices to a large degree. Further, the research concluded that all of the four capacity management practices (level capacity practices, chase practices, managed demand practices, and mixed practices) relates positively with operational performance. The study concludes that implementation of capacity management practices had a favorable impact on cost, quality and flexibility, the measures of operational performance.

5.4 Recommendations

From the results, this study gives the recommendation that Steel manufacturing firms should continually implement capacity management practices as they were found to be positively correlated with operational performance. This will thwart unnecessary expenses occasioned by poor planning. Further, more training should be availed to the employees in Kenya Steel Manufacturing Firms to ensure full implementation of capacity management practices, thus improving operational performance. The Steel Manufacturing Firms that have implemented capacity management practices to a moderate extent, through proper resource allocation and training of employees, they are able to fully implement the practices within a short time guaranteeing long term benefits in terms of low costs, high quality and flexibility of operations.

The study also recommends that the government needs to support Steel Manufacturing Firms in their quest of implementing capacity management practices by offering

knowledge on the most effective approaches of implementing these practices. This is because, more to manufacturing steel, these companies create jobs. Thus, by backing the steel firms, the government stands a chance of influencing other sectors to adopt capacity management practices.

5.5 Limitations of the Study

The research was based on Steel Manufacturing Firms in Kenya, this was a narrow focus for a study while other sectors in Kenya such as the health, education, transport and retail sectors have adopted capacity management practice, were excluded in the current study. In addition, the research was limited to assess how capacity management practices influence operational performance. This is while capacity management practices influence other aspects of firms including customer satisfaction and the general firm performance.

5.6 Areas for Further Research

This research sought to examine the capacity management practices and operational performance of Kenya Steel Manufacturing Firms. Moving forward, similar studies need to be conducted on other sectors such as health, education, transport sector and there after comparisons made to see how both sectors compare. In addition, further research to be conducted to deduce the relation between capacity management practices and firm performance as a whole.

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APPENDIX I: QUESTIONNAIRE

i. This data gathering questionnaire aims to collect information on capacity management practices and operational performance of Steel Manufacturing Firms in Kenyan.

ii. The assembled data will solely be used for academic purposes and will be handled in confidence by the researcher.

SECTION A: RESPONDENTS DEMOGRAPHICS

Please provide your answers to the given spaces and give a tick ([]) to the response box that matches your view to the given questions.

1. Please indicate your age bracket?

a) 20 to 29 years []
b) 30 to 39 years []
c) 40 to 49 years []
d) Over 50 years []

2. For what period have you been working in the current organization?

a) Below one-year
b) 1 to 5 years
c) 6 to 9 years
d) 10 and more

3. Kindly indicate your current job position in the company .....

4. Kindly specify the period you have hold the job position that you indicated above .....

SECTION B: CAPACITY MANAGEMENT PRACTICES IMPLEMENTED

Kindly indicated the degree to which the following capacity management practices been implemented in your firm? Kindly indicate on a scale 0 to 100: Where 0-20= Very small degree, 21-40= Small degree, 41-60= Moderate, 61-80= Large degree, 81-100= Very large degree.

Capacity management practices	Percentage
Level capacity management practice (By adjusting stock level, adjusting delivery time or use of backorders to match fluctuating demand)	
Chase capacity management practice (By Hiring extra staff, hiring part time staff, laying off staff, sub-contracting with other firms or varying number of productive hours)	
Managed demand capacity management practice (By adjusting prices of products, use of alternative products, advertising to increase demand)	
Mixed strategy capacity management practice (A combination of two or all capacity management practices)	

SECTION C: EFFECTS OF CAPACITY MANAGEMENT PRACTICES ON OPERATIONAL PERFORMANCE

On a scale of negative ten (-10) positive ten (+10), (-10 = highly deteriorated and +10 = highly improved), kindly indicate the degree to which capacity management practices have affected the following measures of operational performance.

Measures of Operational Performance	Rating
Quality	
Cost	
Flexibility	

THANK YOU

APPENDIX II: STEEL MANUFACTURING FIRMS IN KENYA REGISTERED WITH KAM

1. Abyssinia Iron & Steel Ltd
2. Alloy Steel Castings Ltd
3. Allied East Africa Ltd
4. Apex Steel Ltd
5. Arvind Engineering Ltd
6. Ashut Engineers Ltd
7. ASL Ltd
8. ASP Company Ltd
9. Athi River Steel Plant Ltd
10. Atlantic Ltd
11. Blue Nile Wire Products
12. Booth Extrusions Ltd
13. Brollo Kenya Ltd
14. Burn Manufacturing USA LLC
15. Canton Alloys Ltd
16. Corrugated Sheets Ltd
17. Crystal Industries
18. Devki Steel Mills Ltd
19. Doshi & Company Hardware Enterprises Ltd
20. Easy Clean Africa Ltd
21. Eco-Steel Africa
22. Heavy Engineering Ltd
23. Herocean Enterprises Kenya Ltd
24. Hind Aluminum Industries Kenya Ltd
25. Insteel Ltd
26. ISL Kenya Ltd
27. Jumbo Steel Mills Ltd
28. Kalu Works Ltd
29. Kens Metal Industries Ltd

30. Kenya General Industries Ltd
31. King Steel
32. Mabati Rolling Mills Ltd
33. Menengai Rolling Mills Ltd
34. Nail & Steel Products Ltd
35. Nampak Kenya Ltd
36. Napro Industries Ltd
37. Patnet Steel Makers Manufacturers Ltd
38. Royal Mabati Factory Ltd
39. Steel Structures Ltd
40. Steelmakers Ltd
41. Steelwool Africa Ltd
42. Tarmal Wire Products
43. Tononoka Steel Ltd
44. Top Steel Kenya Ltd
45. Wire Products Ltd

Kenya Association of Manufacturers: Kenya Manufacturers and Exporters Directory – 2020.