PROCUREMENT OPTIMIZATION TECHNIQUES ON AND PERFORMANCE OF MANUFACTURING FIRMS IN KENYA

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ABSTRACT

The purpose of the study was to examine the influence of procurement optimization on performance of manufacturing firms in Kenya with an aim of making recommendations. The study aimed at establishing how; triangle approach, and Pareto's approach influence the performance of manufacturing firms in Kenya. To achieve this, the researcher reviewed both theoretical and empirical literature and proposed the research methodology that addressed the gaps identified in literature as well as answer the stipulated research questions. The study employed a descriptive research design, the study prefers this method because it allows an in-depth study of the subject. The 2017 KAM directory has listing of members (firms) by sectors which contains a register of 12 sectors of those in manufacturing firms spread all over the country. The population of the large sized registered members as per the directory is 499. This study used the large sized firms only. This study used Cochran's formula to sample 165 large manufacturing firms from the total population, heads of procurement were the respondents. Semi-structured questionnaires were administered to collect qualitative and quantitative data. Secondary data was collected from firm's reports and websites. The questionnaires were tested for validity and reliability using 10% of the total sample respondents. Quantitative data was analyzed using both descriptive and inferential statistics and with the help of SPSS version 21 while qualitative data was analyzed descriptively. Multiple regression models was used to show the relationship between the dependent variable and the independent variables. The information was presented using tables, charts, frequencies, percentages and graphs. The response rate of the study was 85%. The findings of the study indicated that triangle approach, Pareto's approach have a positive relationship with performance of manufacturing firms in Kenya. Finally, the study recommended that manufacturing firms should embrace procurement optimization so as to improve performance and further researches should to be carried out in other institutions to find out if the same results can be obtained.

Key Words: Procurement Optimization, Triangle Approach, Pareto's Approach, Performance, Manufacturing Firms

Background of the Study

The business environment in which firms compete today is markedly different from that in past decades. Improvements in computational power coupled with the advent of the internet have decreased the coordination costs needed to successfully integrate disparate firms across the globe into a single supply chain (Lysons & Gullingham, 2019).

In the past, firms commonly contracted with a huge number of suppliers and currently there is a significant movement from the traditional adversarial buyer-seller relationships to the use of a few qualified suppliers with close relationships. This trend is attributed to the customers' demand for higher quality, wider range of products, shorter time to market and faster deliveries. This has forced the producing companies to keep up with these demands in order to survive (Karlsson 2021).

One key aspect of managing the complex global supply chain is through strategic sourcing decisions. However, as the concept of strategic sourcing gains momentum many firms seeking to shift to this strategy have found themselves riddled with a supply base that does not support implementation as they have too many suppliers. procurement optimization thus becomes a key to change from transactional to strategic purchasing (Linarelli & Wallace, 2020).

Statement of the Problem

As the clock ticks, so does demand for better quality, faster delivery, and better overall value increase; leading to a few visionary leaders to start to consciously differentiate between the things that create value and those that do not and thus leading to adoption of supply chain best practices such as procurement optimization and value engineering that seek to help firms have a competitive advantage over rivals and position themselves for future success (KPMG, 2022).

procurement optimization is important to any organization since it leads to improved design, quality and cost, which means an improvement in supply chain performance. Kenya's long term development agenda spelt out in the vision 2030, targets an annual growth rate of above 10% with an investment rate of 30%, manufacturing firms are key drivers in this projected growth. Manufacturing firms accounted for 20% of the country's GDP (GoK, 2018). However, manufacturing firms in Kenya have been experiencing a myriad of problems including misappropriation and blatant mismanagement of resources (PPOA, 2020).

The problem of poor productivity among manufacturing firms represents a drain on the economies meager resources and also results into non delivery on intended services. This has a negative implication on the welfare of Kenyan citizens and may also imply that Vision 2030 is not met (UNESCO, 2018). This situation is hampering sustained performance and poor delivery (KNBS, 2019). procurement optimization is not practiced, which is one of the reasons for loss, fraud and gross mismanagement of resources.

A number of studies have been conducted on procurement optimization globally. For instance, Cousins (2019) conducted a survey on 174 firms in the UK and found out that though 92% claimed supply base reduction seemed to have reduced transaction costs. The studies found that the investigated firms looked at negotiating savings instead of focusing on streamlining the inter-organizational processes. This study was however, conducted in a developed country and not in Kenya.

Several studies have been done locally; Rotich (2020) interrogated the manufacturing sector supplier management, while Wanjohi (2022) investigated the challenges facing supplier base management in Kenya and the efforts in progress. These studies however, did not look at procurement optimization and performance among these firms. It is against this back drop that this

study seeks to examine the influence of procurement optimization techniques on performance of manufacturing firms in Kenya.

Objectives of the Study

The study was guided by the following specific objectives;

i. To determine the influence of the triangle approach on performance of manufacturing firms in Kenya.
ii. To assess the influence of Pareto's approach on performance of manufacturing firms in Kenya.

LITERATURE REVIEW

Theoretical Review

The Lean Theory

Lean is a functional model which basically discounts the value of economies of scale and focuses on how to reduce costs as a result of small, incremental and continuous improvement. Lean supply base has certainly become increasingly significant in supply chain management. Initially organizations involved in manufacturing of products used to involve themselves in lean manufacturing techniques, this has ceased as lean has expanded beyond manufacturing (Fawcett, Gregory & Mathew, 2019).

Lean supply base management seeks to explain how organization should manage its system and needs. It states that supply base can be used as a strategic differentiator by the organization and further goes on to say that not all supply base management is about waste (Finch, 2018). The theory stated that supply base management strategies developed by an organization should support the customer's need and expectations. Supply base management strategies should not be a driver on how much and when a product will be delivered to a customer, rather, the customers' expectations should be understood and supply base management strategies is designed purposely to meet those expectation. Real savings can only be realized through day to day management and optimization of supply base management (Fisher, 2020). This theory is relevant to the study because the triangle approach is a key component in effective and efficient management of procurement optimization in which an entity has vendors with interaction levels ranging from arm's length transaction level, capacity building transaction level and strategic collaboration level.

The Theory of Constraints

Theory of constraints is an approach to the management of operations and it was developed by Goldratt. It provides a supply chain management theory of how organizations should be run especially the rationalization of the supply base. The concept was extended to theory of constraints (TOC) with a publication which views any manageable system as being limited in achieving more of its objectives by a very small number of constraints.

There is always one constraint and the TOC uses a focusing process to identify the constraint and restructure the supply base around it (Kotabe & Murray, 2008) TOC emphasizes on the optimization of performance within a defined set of constraints of the existing process and it provides an action framework which combines the activities of the managers and the visible system elements (Hansen, Schaumburg-Muller & Pottenger, 2008).

TOC views supply bases as systems consisting of resources, which are linked by the processes they perform. The goal of the supply base serves as the primary judge of success. Within that

system, a constraint is defined as anything that limits the supply base from achieving higher performance relative to its purpose (Tummala, Phillips & Johnson, 2018). The pervasiveness of interdependencies within the organization makes the analogy of a chain, or network of chains, very descriptive of a system's processes. Just as the strength of a chain is governed by its single weakest link, the TOC perspective is that the ability of any supply base to achieve its goal is governed by a single, or at most very few, constraints (European Commission, 2020).

The theory of constraints defines a set of tools that change agents can use to manage constraints, thereby increasing profits. Most businesses can be viewed as a linked set of processes that transform inputs into saleable outputs. TOC conceptually models this system as a chain, and advocates the familiar adage that a chain is only as strong as its weakest link (Busi & McIvor, 2008). This theory incorporates the idea that the goal or mission of an organization exists, and organizations can be measured and controlled by variations on three measures having A, B and C class vendors clearly categorized. In the context of this study one of the variables of procurement optimization will show the linkage to one of the measures of success that are used to measure the performances of organizations.

Conceptual Framework

Conceptual framework is a detailed description of the phenomenon under the study accompanied by the graphical or visual depiction of the major variable of the study (Kothari, 2008). According to Dunn (2020) conceptual framework is diagrammatical representation that shows the relationship between dependent variable and independent variables.
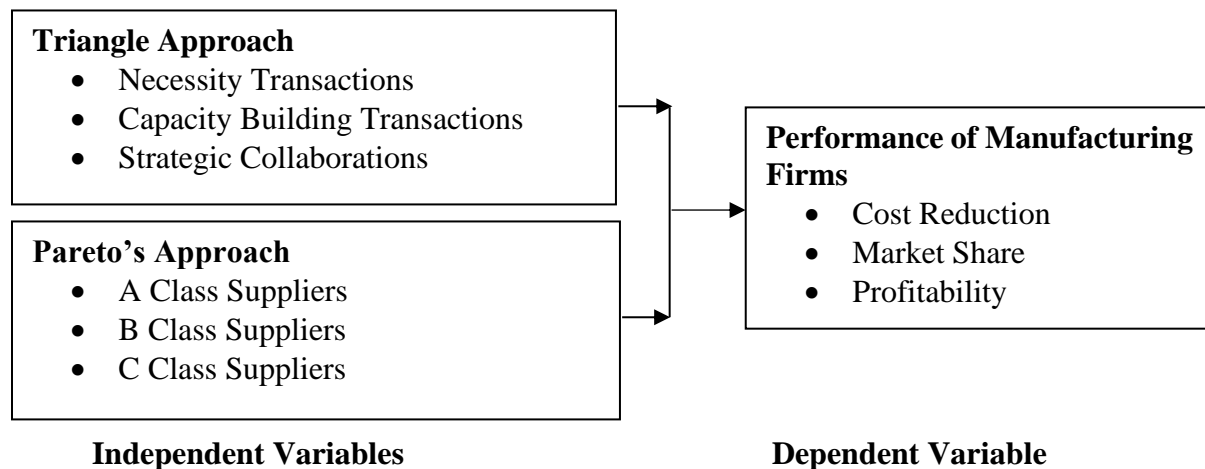
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┌─────────────────────────────────┐
│ Triangle Approach               │
│   • Necessity Transactions      │        ┌────────────────────────────────┐
│   • Capacity Building           │        │ Performance of Manufacturing   │
│     Transactions                │───────▶│ Firms                          │
│   • Strategic Collaborations    │        │   • Cost Reduction             │
└─────────────────────────────────┘        │   • Market Share               │
┌─────────────────────────────────┐        │   • Profitability              │
│ Pareto's Approach               │        └────────────────────────────────┘
│   • A Class Suppliers           │
│   • B Class Suppliers           │───────▶
│   • C Class Suppliers           │
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        Independent Variables   **Dependent Variable**

Figure 2. 1: Conceptual Framework

Triangle Approach

These practices involve systematically evaluating the performance of different suppliers and putting it into one of three categories. Marginally performing suppliers or those incapable of meeting purchase performance requirements, now or in the future are targeted for immediate removal from the supply base. The second category, which includes suppliers that do not consistently meet purchase requirements in all areas but have potential for improvement, becomes a target for supplier assistance and development (Handfield, 2019).

The third category on the other hand, includes high-quality, capable suppliers requiring no improvement   assistance, who   become candidates for   more collaborative buyer-seller relationships, which may include offering longer-term contracts in exchange for continuous

improvement, as well as being considered for alliance. Recent work majorly focuses on analytical and decision modeling for supplier selection, as well as on supplier development. Development of sophisticated models for optimal supplier selection strategy for different kind of products requires time, effort, and resources which lead to an increase in inventory control costs and to an increase in total costs too (Obanda, 2021).

In order to decrease inventory control costs, in practice, the first important step is to perform the classification of potential suppliers into classes in compliance with their ability to provide processes or products and services in accordance with specified requirements. Based on the suppliers' classification results, management defines appropriate ways to manage and control specific suppliers and rank them for cooperation and building partner connections. Building partnership should be based on obtaining respect and trust with mutual benefit (Lysons & Gullingham, 2019).

In practice, one of the widely used techniques for classification of different items into classes (applicable to the classification of suppliers, too) is the ABC method which is based on Pareto analysis. This method is easy to understand and use in practice since, in the conventional ABC classification method, inventory items are divided into three classes A, B, and C. The values of deterministic classification criteria are classified into descending row.

As it is known, 5–10% of analyzed inventory items ranked at first place belong to group A, next 15% correspond to group B, and the rest of inventory items correspond to group C. Selection of the classification criterion depends on the kind of problem being considered. The issue of selection of suppliers may be stated as a multicriteria optimization task. In literature, there is a lot of papers that employ different methods for ranking and assessment of suppliers (Linarelli & Wallace, 2020).

Pareto's Twenty/Eighty Approach

The approach is based on the Pareto principle or the 20/80 rule. The rule was formulated by the Italian economist Vilfred Pareto (1848-1923). It is also called the ABC analysis (Handfield, 2019). The proposition of the rule is that in any series of elements to be controlled, a selected small factor in terms of number of elements (20%) almost always accounts for a large factor in terms of effort (80%).

The Pareto principle is very useful tool in supplier base rationalization as it helps leverage the buyer's time, effort and resources for the biggest benefits (CIPS, 2022). The CIPS further posits that the 20/80 rule in sourcing context can be interpreted as 80% of spend, risk, or value resides in 20% of suppliers or supplies. According to Handfield (2019) the rationalization practice identifies those few suppliers (20%) that cause the bulk of spend or cause the most quality problems or risks and are then considered for elimination. Handfield adds that this approach is usually used when firms require a rapid reduction in number of suppliers. The CIPS (2022) is in agreement with Handfield. They argue that the Pareto principle can be used to separate the critical few suppliers that supply important high value items.

The Pareto 80/20 rule is commonly used (and also ignored at considerable cost) in many aspects of organizational and business management. It is helpful in specialized quality management such as six sigma, planning, decision-making, and general performance management. Pareto theory is also an extremely helpful reference or 'check' in business/organizational planning and project management too. Leadership is a lot easier and effective when Pareto principles are kept in mind, and this applies to every form of leadership theory and approach (Schapper & Paul, 2019). The Pareto principle is extremely helpful in bringing swift and easy clarity to complex situations and problems, especially when deciding where to focus effort and resources.

Pareto's Law is dramatically effective when applied to selling and marketing situations - because it encourages a focus of activity and energy that usually produces very fast and substantial

improvements (for example when applied to target audiences, existing customers, product ranges, pricing, etc., and other major 'profit levers'). Really, it's impossible to overstate the effectiveness of the theory in these areas, despite which the use of Pareto theory in sales and marketing is commonly overlooked completely (Wanjohi, 2022).

Performance of Manufacturing Firms

The attributes of performance which will be taken into consideration in this study are: cost reduction, productivity and lead time. Supply chain is a key function of any organization, public or private and in this era of globalization with the advent of entrepreneurial organizations; management of purchasing and supply in private sector has gained more prominence (Baier, Hartman & Moser, 2022). Effective management of the function prevents the possibility of poor performance and when attributed to non-adherence to proper procurement processes and procedures; is an indicator of poor management of the supply chain function (Beth, Burt & Capacino, 2019).

Supply chain encompasses the whole process of acquiring property and/or services. It begins when an agency has identified a need and decided on its procurement requirement. Supply chain continues through the process of risk assessment, seeking and evaluating alternative solutions, contract award, delivery of and payment for property or services and where relevant, the ongoing management of a contract and consideration of options related to the contract (Buhner, 2022). Therefore, effective management of the supply chain function is a precursor to the performance of the system in achieving its intended objectives and that of the organization as a whole.

Performance standards when adopted can provide the decision-makers in the supply chain department with unbiased and objective information regarding the performance of the supply chain function. The evaluation or measurement of supply chain performance has always been a vexing problem for procurement professionals (Chopra & Meindl, 2019). He asserts that traditionally, firms concentrate on analyzing their own internal trends which does not portray the true picture on how they compare well with competitors. Such an approach ignores what the competitors are doing (Christopher & Ryals, 2018).

A firm does not wish to make known to its competitors how or what it is doing for obvious competitive reasons. This has been the case in the public sector where procuring entities have not been making available their procurement data due to the sensitive nature of the data. Christian (2019) underscores these facts and concludes that one of the major setbacks in public supply chain is poor procurement planning and management of the supply chain process which include needs that are not well identified and estimated, unrealistic budgets and inadequacy of skills of supply chain staff responsible for supply chain (Christopher, Lowson & Peck, 2018).

Empirical Review

Triangle Approach and Performance of Manufacturing Firms

The classification of vendors is a major task and considering the quantity of purchased. The supplier selection and evaluation related steps of the Mentzer model (2021) are mainly the steps of screening suppliers and the selection of one as well as negotiating and finalizing an agreement. These steps are quite similar with the steps in the Monczka *et al.,* (2021) model, but they are described on a more general level and do not have any detailed descriptions of how the suppliers should in fact be evaluated. Thus, thinking of the subject and the goal of this thesis, this process model is not suitable for this study.

Weele (2020) divides his purchasing process model into six steps: define specification, select supplier, contract agreement, order, expedite, and evaluate. This purchasing process (Weele, 2020) is a very high level process and aimed rather at operational purchasing than strategic sourcing.

These supplier selection steps describe more traditional evaluation criteria, such as pricing and delivery terms, but sustainability and environmental criteria are neglected. In conclusion, this process model is not a suitable strategic sourcing supplier selection process.

Fogg (2019) introduces a ten step supplier appraisal process. This process begins with planning ten questions that need to be answered. In this process, the steps of supplying market research and targeting, determining the evaluation areas and the importance of each area, and identifying sub areas follow each other. Then the questionnaire is sent to potential suppliers, supplier on-site visits are arranged, and finally a decision on a supplier is made. Fogg's supplier appraisal process model is a more operative than a strategic sourcing related supplier selection model.

It describes an upper level process but it does not contain detailed descriptions of how each step should be performed. The evaluation areas are listed but not described and all vital evaluation criteria. The on-site appraisal aspect consists of two steps but an on-site visit is not always performed in cases when the risk level and spend are low. Nevertheless, there is one key question addressed in the planning step: "Will the benefit of the process be greater than the cost?"

In other words, heavy supplier appraisal process should be performed only with regard to strategic and key requirements and suppliers. Hence this supplier appraisal process does not meet requirements. The supplier search and evaluation process according to Iloranta and Pajunen-Muhonen (2021) consists of five steps; market analysis, ensuring supplier's interest, request for proposal, request for quotation, and negotiation.

Pareto's Approach and Performance of Manufacturing Firms

According to Perzyk (2022) case study in foundry industry by, Pareto chart shows that the foundry staff should concentrate on reducing defects like 'sand inclusions' and 'gas holes', which make up 72% of all defects. Pareto diagrams can therefore be particularly useful in defining the targets. Pareto charts show the most frequently occurring factors and help to make the best use of limited resources by pointing at the most important problems to analyze.

Chandna and Chandra (2019) studied forging operation that produce six cylinder crankshafts used in trucks and buses. With the help of Pareto diagrams critical areas are identified and forging defects of crankshaft have been prioritized by arranging them in decreasing order of importance. Then Cause and Effect Diagram (CED) is applied to explore possible causes of defects through brain storming session and to determine the causes, which have the greatest effect. The corrective measures reduce the rejection rate from 2.43% to 0.21%.

Khekalei *et al.,* (2020) presented another case of wastage reduction in a belt manufacturing industry located in the Virabha, India which produces world class automotive belts and hoses. The main raw material for producing this automotive belt is rubber. Others raw materials are biased fabric and cord. From many years consumption of raw material was not taken seriously as rubber is reusable. But other raw material that is biased fabric and cord consumption was increased drastically which resulted in increased in the production cost of belt and reduced profit margin.

Wastages in the belt manufacturing process are- cord wastages, fabric wastages, in-process wastages. Cord and fabric wastages occurred during drum building process while in-process wastages occurred during cutting operation. Mohiuddin and Ahmad (2021) works for minimization of defects in lamp production process by application of Pareto analysis and Cause and Effect Diagram. They worked for zero waste and zero defect aim. They studied all lamp production process with its production data.

They also work for data collection of all steps involved for lamp production with month wise rejection in group production system. The author applies Pareto analysis to all defects and finds

major and minor contributors. So finally author applies cause and effect diagrams to each defect and find out main factor. So they suggest cause and effect diagram is very use full in indicating the appearance of abnormalities of process in the form of excessive variations of process parameters.

RESEARCH METHODOLOGY

This study adopted a descriptive design. Descriptive was used because it sets out to describe weather procurement optimization has an influence on performance of manufacturing firms in Kenya. Lavrakas (2008) argues that a descriptive survey research design is a systematic research method for collecting data from a representative sample of individuals using instruments composed of closed-ended and/or open-ended questions, observations, and interviews. The population of the large sized registered members as per the directory is 499. This study used Cochran's formula to sample 165 large manufacturing firms from the total population.

The unit of analysis was the individual manufacturing firms while the unit of observation which defines the independent elements in a population were the heads of procurement within each of the selected manufacturing firms. The unit of observation is selected because they are the ones involved in execution of the firms' supply chain management practices and thus stands high chances of providing reliable information on influence of procurement optimization on performance of manufacturing firms in Kenya.

To ensure adequate coverage of the population of the manufacturers in Kenya and ease of access, the sample frame consisted of all the 12 sectors. The list is available from the KAM directory. Additionally, the register provides details of the geographical location of each firm. Stratified sampling was then used to identify the firms that were studied. The firms were stratified according to categories (sub sectors) which are 12. Using the Cochran's formula, this gave a sample of 165. This research utilized a structured questionnaire to collect data

The questionnaire was pilot tested on 10% of the members of the sampling frame who did not comprise the final sample. These were 17 manufacturing firms. The responses obtained from this pilot study was used to determine the discrimination, validity, reliability and multicollinearity of the questionnaire after which the relevant amendments were made to the questionnaire. According to Kothari (2018), discrimination of a questionnaire means that people with different scores on a questionnaire, should differ in the construct of interest to the study.

This study adopted a descriptive data analysis and inferential data analysis. Inferential statistics facilitate inferences from sample data to population conditions (Mugenda & Mugenda, 2018). The study used SPSS version 21 and MS Excel to facilitate the analysis of data. SPSS is used to undertake calculations on the data. The study utilized SPSS to develop a multiple regression model to make inferences on the effect of each of the independent variables on the dependent variable

DATA ANALYSIS AND PRESENTATION

A total of 165 questionnares were distributed to employees. Out of the population covered, 140 were responsive respresenting a response rate of 85%. This was above the 50% which is considered adequate in descriptive statistics according to (Dunn, 2020).

Descriptive Statistics

The study set out to establish the influence of procurement optimization on performance of manufacturing firms in Kenya. To this end, four variables were conceptualized as components of procurement optimization on performance of manufacturing firms in Kenya. These include; triangle approach, Pareto's approach.

Triangle Approach

The first objective of the study was to assess the influence of triangle approach on performance of manufacturing firms in Kenya. The respondents were asked to indicate to what extent did triangle approach influence performance of manufacturing firms. Results indicated that majority of the respondents 25% agreed that it was to a very great extent, 27% said that it was to a great extent, 35% said it was moderate, while little extent and not all were at 5 and 8% respectively.
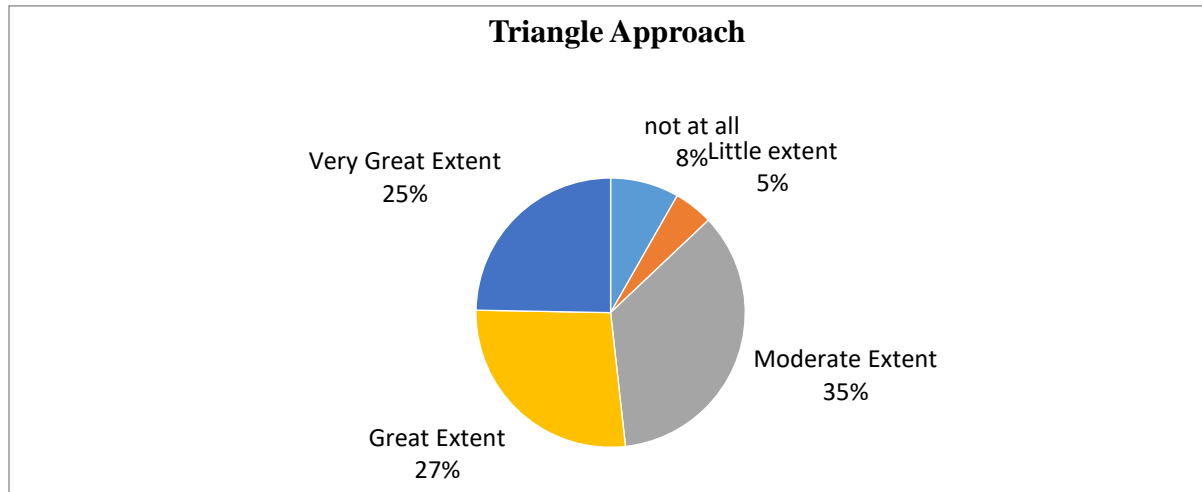

Figure 1: Triangle Approach

The respondents were also asked to comment on statements regarding triangle approach influence on performance of manufacturing firms in Kenya. The responses were rated on a likert scale and the results presented in Table 4.6 below. It was rated on a 5 point Likert scale ranging from; 1 = strongly disagree to 5 = strongly agree. The scores of 'strongly disagree' and 'disagree' have been taken to represent a statement not agreed upon, equivalent to mean score of 0 to 2.5. The score of 'neutral' has been taken to represent a statement agreed upon, equivalent to a mean score of 2.6 to 3.4. The score of 'agree' and 'strongly agree' have been taken to represent a statement highly agreed upon equivalent to a mean score of 3.5 to 5.

The respondents were asked to indicate their descriptive responses for triangle approach. The result revealed that majority of the respondent with a mean of (4.3) agreed with the statement that Having vendors whom you transact at the necessity level plays a significant role in cost reductions. The measure of dispersion around the mean of the statements was 1 indicating the responses were varied. The result revealed that majority of the respondent with a mean of (3.6) agreed with the statement that Having vendors whom you transact at capacity building level plays a significant role in cost reductions. The measure of dispersion around the mean of the statements was 1.4 indicating the responses were varied. The result revealed that majority of the respondent with a mean of (3.8) agreed with the statement that Having vendors whom you transact at strategic collaboration level plays a significant role in cost reductions. The measure of dispersion around the mean of the statements was 1.3 indicating the responses were varied.

The result revealed that majority of the respondent with a mean of (3.0) agreed with the statement that Having vendors whom you transact at necessity level plays a significant role in improving market share. The measure of dispersion around the mean of the statements was 1.4 indicating the responses were varied. The result in table 4.5.1 revealed that majority of the respondent with a mean of (4.2) agreed with the statement that Having vendors whom you transact at capacity building level plays a significant role in improving market share. The measure of dispersion around the mean of the statements was 1 indicating the responses were varied. The result revealed that majority of the respondent with a mean of (3.7) agreed with the

statement that Having vendors whom you transact at strategic collaboration level plays a significant role in improving market share. The measure of dispersion around the mean of the statements was 1 indicating the responses were varied.

The result revealed that majority of the respondent with a mean of (3.4) agreed with the statement that Having vendors whom you transact at necessity level plays a significant role in increasing profitability. The measure of dispersion around the mean of the statements was 1.3 indicating the responses were varied. The result revealed that majority of the respondent with a mean of (3.8) agreed with the statement that Having vendors whom you transact at capacity building level plays a significant role in increasing profitability. The measure of dispersion around the mean of the statements was 1.2 indicating the responses were varied. The result revealed that majority of the respondent with a mean of (3.8) agreed with the statement that Having vendors whom you transact at strategic collaboration level plays a significant role in increasing profitability. The measure of dispersion around the mean of the statements was 1.2 indicating the responses were varied. However the variations in the responses were varied as shown by an average standard deviation of 1.5 and an average mean of 3.8. These findings imply that triangle approach were at the heart of the organizations. The findings agree with Knudsen (2019) that using triangle approach when rationalizing the supply base is a smart move and can reduce expenses significantly.

Table 1: Triangle Approach

Statements	Mean	Std. Dev.
Having vendors whom you transact at the necessity level plays a significant role in cost reductions	4.3	1.0
Having vendors whom you transact at capacity building level plays a significant role in cost reductions	3.6	1.4
Having vendors whom you transact at strategic collaboration level plays a significant role in cost reductions	3.8	1.3
Having vendors whom you transact at necessity level plays a significant role in improving market share	3.0	1.4
Having vendors whom you transact at capacity building level plays a significant role in improving market share	4.2	1.0
Having vendors whom you transact at strategic collaboration level plays a significant role in improving market share	3.7	0.5
Having vendors whom you transact at necessity level plays a significant role in increasing profitability	3.4	1.3
Having vendors whom you transact at capacity building level plays a significant role in increasing profitability	4.1	4.3
Having vendors whom you transact at strategic collaboration level plays a significant role in increasing profitability	3.8	1.2
Average	**3.8**	**1.5**

Pareto's Approach

The second objective of the study was to investigate the influence of pareto's approach on performance of manufacturing firms in Kenya. The respondents were asked to indicate to what extent did pareto approach influenced performance of manufacturing firms in Kenya. Results indicated that majority of the respondents 31% agreed that it was to a very great extent, 36% said that it was to a great extent, 23% said it was moderate, while little extent and not all tied at 5%.
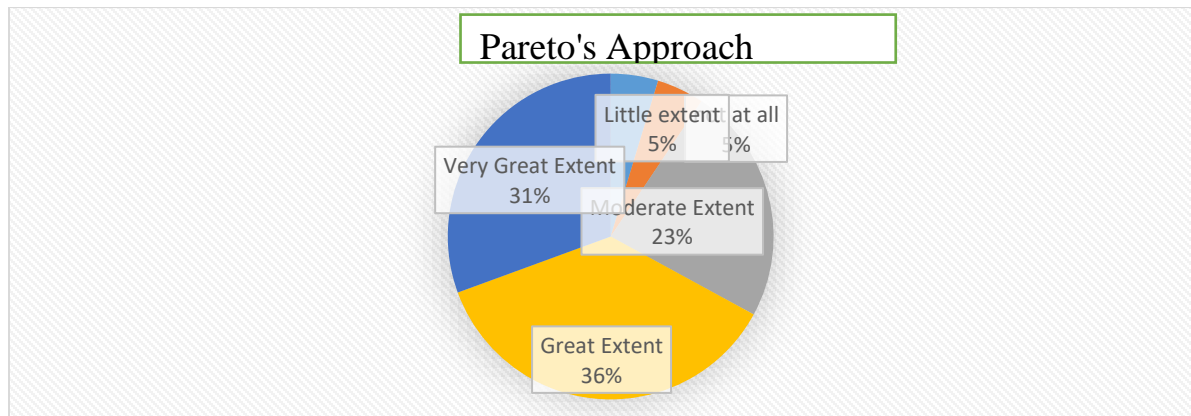
Figure 2: Pareto's Approach

The respondents were also asked to comment on statements regarding Pareto's approach influence on performance of manufacturing firms in Kenya. The respondents were asked to indicate descriptive responses for Pareto's approach. The result revealed that majority of the respondents as indicated by a mean of (3.8) indicated that they agreed with the statement that Having a category of A class suppliers plays a significant role in cost reductions. The responses were varied as measured by standard deviation of 1.1. The result revealed that majority of the respondents as indicated by a mean of (3.6) indicated that they agreed with the statement that Having a category of B class suppliers plays a significant role in cost reductions. The responses were varied as measured by standard deviation of 1.1. The result revealed that majority of the respondents as indicated by a mean of (3.7) indicated that they agreed with the statement that Having a category of C class suppliers plays a significant role in cost reductions. The responses were varied as measured by standard deviation of 1.1

The result revealed that majority of the respondents as indicated by a mean of (3.6) indicated that they agreed with the statement that Having a category of A class suppliers plays a significant role in improving market share. The responses were varied as measured by standard deviation of 1.2. The result revealed that majority of the respondents as indicated by a mean of (3.6) indicated that they agreed with the statement that Having a category of B class suppliers plays a significant role in improving market share. The responses were varied as measured by standard deviation of 1.2. The result revealed that majority of the respondents as indicated by a mean of (3.5) indicated that they agreed with the statement that Having a category of C class suppliers plays a significant role in improving market share. The responses were varied as measured by standard deviation of 1.4.

The result revealed that majority of the respondents as indicated by a mean of (3.5) indicated that they agreed with the statement that Having a category of A class suppliers plays a significant role in increasing profitability. The responses were varied as measured by standard deviation of 1.4. The result revealed that majority of the respondents as indicated by a mean of (3.3) indicated that they agreed with the statement that Having a category of B class suppliers plays a significant role in increasing profitability. The responses were varied as measured by standard deviation of 1.5. The result revealed that majority of the respondents as indicated by a mean of (3.6) indicated that they agreed with the statement that Having a category of C class suppliers plays a significant role in increasing profitability. The responses were varied as measured by standard deviation of 0.5. However the variations in the responses were varied as shown by an average standard deviation of 1.2 and an average mean of 3.6. This means that Pareto's approach is an important aspect among manufacturing firms. These findings imply that Pareto's approach was at the heart of the organizations. They agree with Lysons (2019) that organizations must look

toward their Pareto's approach. The opportunities for cost savings and operational improvements can be enormous as the impact on profitability is considerable.

Table 2: Pareto's Approach

Statements	Mean	Std. Deviation
Having a category of A class suppliers plays a significant role in cost reductions	3.8	1.1
Having a category of B class suppliers plays a significant role in cost reductions	3.6	1.1
Having a category of C class suppliers plays a significant role in cost reductions	3.7	1.1
Having a category of A class suppliers plays a significant role in improving market share	3.5	1.2
Having a category of B class suppliers plays a significant role in improving market share	3.8	1.2
Having a category of C class suppliers plays a significant role in improving market share	3.5	1.4
Having a category of A class suppliers plays a significant role in increasing profitability	3.5	1.4
Having a category of B class suppliers plays a significant role in increasing profitability	3.3	1.5
Having a category of C class suppliers plays a significant role in increasing profitability	3.6	0.5
Average	**3.6**	**1.2**

Correlation Analysis

Correlation analysis was used to determine both the significance and degree of association of the variables and also predict the level of variation in the dependent variable caused by the independent variables in table 3.

Table 3: Summary of Pearson's Correlations

Correlations		Triangle Approach	Pareto's Approach	Performance
Triangle Approach	Pearson Correlation	1		
	Sig. (2-Tailed)			
Pareto's Approach	Pearson Correlation	.372**	1	
	Sig. (2-Tailed)	0		
Performance of Manufacturing Firms	Pearson Correlation	.556**	.662**	1
	Sig. (2-Tailed)	0	0	

** Correlation is Significant at the 0.05 Level (2-Tailed).

The correlation summary shown in Table 4.10 indicated that the associations between each of the independent variables and the dependent variable were all significant at the 95% confidence level. The correlation analysis to determine the relationship between the triangle approach and

performance of manufacturing firms in Kenya, Pearson correlation coefficient computed and tested at 5% significance level. The results indicate that there was a positive relationship (r=0.556) between the triangle approach and performance of manufacturing firms in Kenya. In addition, the researcher found the relationship to be statistically significant at 5% level (p=0.000, <0.05).

The correlation analysis to determine the relationship between the Pareto's approach and performance of manufacturing firms in Kenya, Pearson correlation coefficient computed and tested at 5% significance level. The results indicated that there was a positive relationship (r=0.662) between the Pareto's approach and performance of manufacturing firms in Kenya. In addition, the researcher found the relationship to be statistically significant at 5% level (p=0.000, <0.05).

Regression Analysis

In this study multivariate regression analysis was used to determine the significance of the relationship between the dependent variable and all the independent variables pooled together. Table 4 presented the regression coefficient of independent variables against dependent variable. The independent variables reported R value of 0.846 indicating that there was perfect relationship between dependent variable and independent variables. R square value of 0.715 means that 71.5% of the corresponding variation in performance of manufacturing firms in Kenya can be explained or predicted by (triangle approach, Pareto's approach) which indicated that the model fitted the study data. The results of regression analysis revealed that there was a significant positive relationship between dependent variable and independent variable at ($\beta = 0.715$), p=0.000 <0.05).

Table 4: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	. 846[a]	. 715	. 703	.14869

a) Predictors: (Constant), Triangle Approach, Pareto's Approach
b) Dependent Variable: Performance of Manufacturing Firms

Table 5: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5.002	4	1.251	83.40	.000[b]
	Residual	1.990	135	0.015		
	Total	6.992	139			

a) Predictors: (Constant), Triangle Approach, Pareto's Approach
b) Dependent Variable: Performance of Manufacturing Firms

The significance value is 0.000 which is less than 0.05 thus the model is statistically significance in predicting triangle approach, Pareto's approach, influence performance of manufacturing firms in Kenya. The F critical at 5% level of significance was 28.61. Since F calculated which can be noted from the ANOVA table above is 83.40 which is greater than the F critical (value= 28.61), this shows that the overall model was significant. The study therefore establishes that; triangle approach, Pareto's approach were all important procurement optimization practices influencing performance of manufacturing firms. These results agree with Odhiambo and Kamau (2019) results which indicated a positive and significant influence of procurement optimization on performance of manufacturing firms.

Table 6: Coefficients of Determination

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	2.07	0.193		10.725	0.000
Triangle Approach	0.166	0.041	0.255	4.048	0.000
Pareto's Approach	0.138	0.053	0.235	2.603	0.001

Dependent Variable: Performance of Manufacturing Firms

The regression equation was;

$Y = 2.07 + 0.166X_1 + 0.138X_2$

The regression equation above has established that taking all factors into account (triangle approach, Pareto's approach) constant at zero, performance of manufacturing firms in Kenya will be an index of 2.07. The findings presented also shows that taking all other independent variables at zero, a unit increase in triangle approach will lead to a 0.166 increase in performance of manufacturing firms.The P-value was 0.000 which is less 0.05 and thus the relationship was significant. The study also found that a unit increase in Pareto's approach will lead to a 0.138 increase in performance of manufacturing firms in Kenya. The P-value was 0.00 and thus the relationship was significant.

Conclusion of the Study

First, in regard to triangle approach, the regression coefficients of the study show that it has a significant influence on performance of manufacturing firms. This implies that increasing levels of triangle approach by a unit would increase the levels of performance of manufacturing firms. This shows that triangle approach has a positive influence on performance of manufacturing firms.

Second in regard to Pareto's approach, the regression coefficients of the study show that it has a significant influence on performance of manufacturing firms. This implies that increasing levels of Pareto's approach by a unit would increase the levels of performance of manufacturing firms. This shows that Pareto's approach has a positive influence on performance of manufacturing firms.

Recommendations of the Study

To ensure that manufacturing firms have better performance they should focus more on using their strategic collaborations so as to ascertain vendors provide supplies as and when its needed, ensure that there is consistency of quality in goods supplied. In the same regard, they should involve suppliers early, build their capacities to enable them to meet demand appropriately.

With regard to the second objective, it would be constructive for manufacturing firms to invest more in classifying their suppliers to reduce the cost of procurement through unnecessary reworks and ensure professional suppliers get it right the first time. This should be done consistently with financial capacity ascertainment and supplier quality indexing.

Areas for Further Research

The study is a milestone for further research in the field of performance of manufacturing firms in Africa and particularly in Kenya. The findings demonstrated the important procurement optimization strategies to the performance of manufacturing firms to include; triangle approach, Pareto's approach. The current study obtained an R^2 of 71.5% and should therefore be expanded further in future in order to include other procurement optimization strategies that may as well have a positive significance to performance of manufacturing firms. Existing literature indicates

that as a future avenue of research, there is need to undertake similar research in other institutions and organizations in Kenya and other countries in order to establish whether the explored procurement optimization strategies herein can be generalized to affect performance in other institutions.

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