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**DETERMINING THE IMPACT OF LEAN MANUFACTURING
ON NAIROBI BOTTLERS LIMITED'S RESULTS.**

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DETERMINING THE IMPACT OF LEAN MANUFACTURING ON NAIROBI BOTTLERS LIMITED'S RESULTS.

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Abstract

Purpose: The study aimed at determining the impact of lean manufacturing on Nairobi Bottlers Limited's results.

Materials and methods: This study adopted a descriptive survey design. The management staff Nairobi Bottlers Limited were the target population of the study. The population of the study was 308 management staff members. A stratified random sampling procedure was used to pick 93 participants. The area of study was the County of Nairobi. Regression analysis of the data was carried out using statistical package for social sciences (SPSS) computer software.

Results: The study found out that standardization of products, waste reduction procedures, mechanization of the production line and capacity building among staff and system was embraced by NBL.

Recommendations: The study recommends that standardization of, that waste reduction procedures, that mechanization of the production line and capacity building among staff and system should be increased by NBL.

Key words: *Lean Manufacturing, standardization, mechanization, capacity building*

1.0 INTRODUCTION

1.1 Background to the Study

Today, continuous improvement serves a vital function in both local and multi-national organizations. The concept is assistive in the day-to-day strict schedules. Its importance to an organization is owed to the emphasis it lays on the customer, flexibility and quality. These attributes (flexibility, quality, and customer-centered management) help organization to survive competition in both the global and local markets. It also helps the organization to anticipate what will motivate their customers in the future (Craswell & Craswell, 2017).

Proper organization governance and management that focus on achieving goals must put more emphasis on its mission, vision, and objectives. When the organizational performance can be accounted for, both in non-financial and financial terms, the organization must have attained a higher level of performance. The financial performance of a corporation is calculated by calculating the share sales, Return on Investments and Return on Assets Bourne (2015). Additionally, a company's non-financial success is calculated by looking at customer loyalty, new goods, and the effect of the firm's operations on the environment (Sparrow, 2015). However, several academics assert that there are other stronger performance indicators. For instance, Borg and Gall (2003) argued that innovation development in organizations leads to innovative performance. Bourne (2001) notes that performance can be estimated based on the sale figures, stocks of manufactured goods, and on innovation basis.

Since an organization's success and relevance in both the local and the global markets heavily depends on employee productivity, and the employees' productivity depends on their motivation, managers are making every effort to ensure the parameter (productivity) is in good shape. In improving productivity, the workplace environment has come under vigorous scrutiny, particularly motivation. Bourne (2001) emphasizes that a workplace has a dichotomous effect on the employee's productivity – it can either have a positive influence or it can have a negative influence. It touches directly on the morale and the levels of engagement in the organization. This is to imply that employee engagement and morale are affected by the way the workplace environment is designed. Improvement of the productivity needs that the management focuses on facilitating a better employee-organization engagement and morale (Ferrando & Ruggieri, 2018).

Operational performance describes the achievement of a collection of tasks that are calculated against a set of criteria (Hudson & Bourne, 2000). Several performance measurement tools that incorporate aspects in measuring performance have been created. They include things like the balance score card, economic value add, 360-degree assessment, cleaner production, and so on.

The balanced score card proposed by Jürgensen & Curran, (2005) is a framework for measuring organizational performance. The model's assumption is that in order to achieve excellent organizational efficiency, seven components must be mutually aligned and strengthened. The model can be used to define the elements need to be realigned in order to maximize and sustain good results. According to this model, effective strategy execution requires a focus on seven main elements. The model's premise is that a strong organizational framework is required for strategy execution to be effective. This system is made up of is important to the current study because it acts as a tool that guides managers on implementation of strategies in organizations.

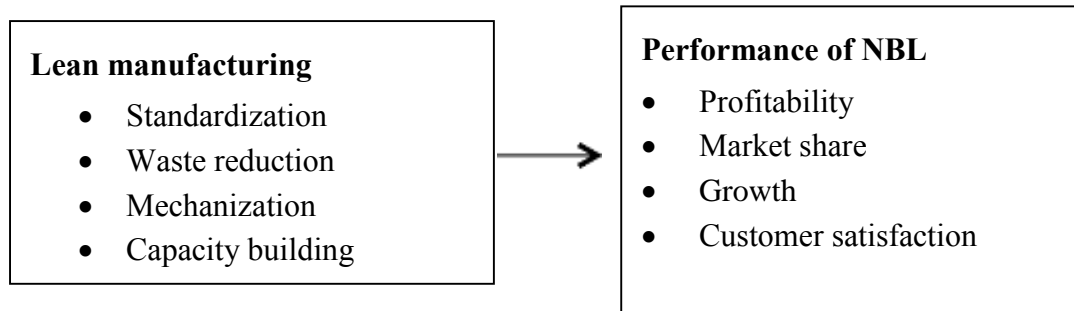
Due to intense competitiveness and multiple market sectors, there has been strict policies and measures to ascertain no re-invention of the wheel (Wang, 2015). Organizations operate in dynamic and complex business environments which are constantly changing, and the level of competition is rising all the time (Bhuiya & Baghel, 2015). Continuous improvement is a quality philosophy that guarantees continuous progress and a workable process that can be tracked for potential improvements as was used by Jurgensen and Curren (2005). All organizations, according to Latnen (2002), need a continuous improvement program known as Rapid Improvement because it aids in the simplification of processes. Organizations with efficient workflows save time and money, resulting in less wasted time and effort. On top of that, they continuously improve their operations. The most effective and competitive companies are motivated by continuous improvement (Bourne, 2018).

Organizations need to strive at meeting difficult objectives; they should have a belief of constantly measuring effectiveness of its process in order to satisfy its customers constitute continuous improvement. Continuous improvement can be considered to strive to better products, services or processes. With that we tend to engage “incremental” improvement thereafter “breakthrough” improvement all at once. Continuous improvement should be an all-round event where all employees suggestions, opinions, and methods that can be finally be implemented for improvements. As much as firms would want to remain competitive continuous improvement attracts cost elements such as training of employees, hiring of expertise and other hidden costs, which might not be easily realized (Bhuiyan & Baghel, 2015).

Since an organization's success and relevance in both the local and the global markets heavily depends on employee productivity, and the employees' productivity depends on their motivation, managers are making every effort to ensure the parameter (productivity) is in good shape. In improving productivity, the workplace environment has come under vigorous scrutiny, particularly motivation. Brown & Jacqueline (2019) emphasizes that a workplace has a dichotomous effect on the employee's productivity – it can either have a positive influence or it can have a negative influence. It touches directly on the morale and the levels of engagement in the organization. This is to imply that employee engagement and morale are affected by the way the workplace environment is designed. Improvement of the productivity needs that the management focuses on facilitating a better employee-organization engagement and morale. It revolves around the company's values, norms, recognition and reward systems, and communication between management and employees.

1.2 Conceptual Framework

The relationship between the dependent variable which was performance of NBL and Independent Variable which was lean manufacturing was depicted in the diagram below:



1.3 Statement of the Problem

In the majority of developing countries, especially in Asia, manufacturing industry is the primary cornerstone economic (Oakland, 2003). In Kenya, manufacturing industry sector enjoyed an average growth rates four percent over the last decade (KAM, 2014). After agriculture, manufacturing In the year 2000, it was the economy's second largest sub-sector (GoK, 2012). As a result, the sector's GDP contribution dropped from 13.6 percent in the early 1990s to 9.2 percent in 2012. (KAM, 2014). Kenya Vision 2030 emphasizes the importance of a sound manufacturing strategy for efficient and long-term operations. However, most manufacturing firms in Kenya operate at about 59 percent technical performance, compared to 74 percent in Malaysia (Barasa et al, 2015), raising questions about the sector's ability to achieve Vision's goals.

According to the (KAM, 2014), the primary challenges affecting the manufacturing sector in Kenya ranges from scarcity of resources due to high energy prices and inadequate power supply Low level technology and a declining trend of product innovaton are two other big challenges. For this reason, manufacturing companies in Kenya are implementing quality management strategies that are beneficial to them in order to improve their performance.

Wachuka (2013) investigated supply chain management best practices in Kenya's large private commercial banks, finding that lean businesses face problems such as inadequate supplier monitoring and control. According to Currie (2009), an entity should depend on its unique resources during the production process since they are valuable input which can be categorized in various ways such as physical capita, organization capital, and human capital. From the following descriptions, capability can be viewed as technically capacitating methods that enable organizations to perform a task by utilizing its unique resources. In the modern times, hyper-competitive firms are considered to have capabilities that make it possible for them to manage and generate resources. The end result of such management by unique capabilities is massive profit generation. This shows that various aspects of an organizational operations and performance characteristics are greatly influenced by the unique capabilities they possess and not by the industry's structural characteristics. Another study carried out by Opondo (2010) on the influence of technology on organizational performance indicated that firms are faced by quite a number of challenges when trying to adopt lean operational practices.

Some of the challenges included; resistance from employees, non-commitment by management to support lean practices, inadequate technology to support lean operational practices and inadequate resources allocated to support continuous improvements. However, these studies did not concentrate on continuous improvement and operational execution. The study's results indicate that manufacturing firms in Kenya are doing well. The study focused on various industries, ignoring Kenya's large-scale manufacturing firms. The aim of this study was to see how lean manufacturing affects the success of large manufacturing companies located Kenya in focus on NBL.

1.4 Specific Objective

To determine the impact of lean manufacturing on Nairobi Bottlers Limited's results.

2.0 LITERATURE REVIEW

2.1 Theoretical principles

2.1.1 Resource Based Theory

According to Prahalad, Hamel and Barney (1990), resource-based view (RBV) is an approach to identify core competencies that are critical for a business to achieve a competitive advantage. The proponents of this viewpoint contend that organizations should scrutinize their internal resources that yield competitive advantage instead of concentrating on competitive environment.

Continuous improvement and RBV have commonality in this manner that organizations exist within resources and capabilities that are both limited, as a result, organizations that are surviving will prefer to use these resources in a cost-effective manner. This will be achieved by maintaining optimum levels, which will in turn create competitive advantage. Ultimately, for organization to have distinct competitive advantage, they need to have capabilities, which are rare can produce value, imitable and can be exploited by the organisation (Attaran & Attaran, 2004).

For a company to be considered superior, its success should be the product of the accumulation of unique, important, and large resources and capabilities (Barney, 1991). This argument was made based on the Resource-Based View. Continuous improvement therefore is a fundamental philosophy focusing on resources that are heterogeneous in nature and that employees can use resources more efficiently and effectively. It provides tailored solutions in resolving specific organizational problems that are perfectly mobile and can sustain a firm above average returns (Valiris, 2004).

In this research, the resource-based view means that industrial institutions can gain aggressive supremacy by utilizing & optimizing capital internal to them such as human resource, assets, patents, customer data and technology to create more value for their customers. A firm owns resources that can assist to achieve distinctive advantage or superior long-term performance. A firm will achieve competitive advantage by engaging its activities which will in turn increase efficiency or the effectiveness and that are not being adopted by its rivals. It is also worth noting that sustainable competitive advantage occurs when a company's competitors are unable to duplicate its strategy.

The resource-based view hypothesis presupposes like not all assets be strategically significant, but that unique, non-quantifiable, valuable, and non-substitutable resources can provide a long-term competitive advantage. For example, each transportation and logistics firm have data that is non-quantifiable. (Barney, 1991).

2.1.2 Systems Theory

Systems theory offers frameworks to describe and analyze groups of objects. The theory emphasizes that real systems are accessible to and communicate with their environment, meaning that they can obtain qualitatively new products and property through emergence, whose output is in constant evolution, as proposed by Bologst Ludwg Von Bertalanffy in 1928. Therefore, even though departments may appear different, seemingly function differently, they should all operate in unity for the common good of the overall organization to obtain the optimal goal hence continuous improvement should be aligned to organization system influenced by variables in the environment which in this case are factors like management commitment, people involvement training, resources and infrastructure and other moderating variables (Oakland, 2003).

2.1.3 Stakeholder Theory

A stakeholder is a person or a group of people who are involved in an organization and whose actions influence or are influenced by the achievement of the organization's objectives, according to Freeman (1984). Modern companies suit more open and responsible for them to fulfill new, collaborative, & sensitive partnerships in stockholders chain.

The Theory emphasizes the significance of innovation, entrepreneurship, application of technology, and knowledge acquisition by both the organizations and the individual workers. It treats knowledge as a necessary asset for personal growth by the workforce. The experience is considered to be a growth propellant that is not subject to such restrictions as diminishing returns and such assets as capital. Key stakeholders are categorized in CI based on their participation and interaction with the mechanism that needs to be changed. As a consequence, the larger the activities, a sizeable of essential collaborators are involved.

Persistent dissatisfaction among principal stockholders will drive the company into a crisis, causing it to collapse (Clarkson, 1995). Building a trust relationship, on the other hand, can significantly reduce costs and, as a result, have an impact on efficiency. The theory ensures that the organizations in question are serving the functions for which they were established through the evaluations. Clarkson's argument ignores the moral foundations of the stockholder theory and the practice of farness. The theory does not mean that all stockholders should have a fair say in decision-making (Donaldson et al., 1995). Organizations can enhance these capabilities by formulating the right strategies that are aligned to its vision, mission and goals. In organizations whose main goal is to make profits, these capabilities should be aligned within the operational cost so as to minimize on cost implications which are unnecessary to the organization. As a result, the theory aids in the development of a framework for defining relationship between the various needs of crucial collaborators within the CI undertaking.

2.2 Empirical Literature

2.2.1 Lean Manufacturing and Organizational Performance

Wachuka (2013) conducted a report on the Kazen sustainability and operational efficiency of manufacturing firms in Mombasa County. A total of 15 manufacturing firms from various sectors formed the study population. Her findings revealed that continuous improvement and organizational culture go hand in hand as they strive for excellence by reduction of cost, in turn increase productivity, employees' retention as a result of doing the right thing.

Kathaara (2014) inspected the absolute quality organization activities and organizational efficiency of Kenyan business banks. Assessments of all the 43 business banks were taken in this study. The study used data which was assembled through a composed survey to assemble the destinations of the study via Likert scale of five points. The review questions focused on absolute quality administration practices, utilization, and operational execution of the Kenyan business banks. The questionnaire was both open ended and close ended. The results revealed that quality organization practices were earnestly related to an operational execution of business banks in Kenya. The study further established that lean operations enhanced firm performance and profitability. This is dependable with the theory of this study which predicts a positive connection between TQM programs and budgetary execution of banking firms in Kenya.

Oprime, et al. (2012) did a survey on the important elements that must be present for quality improvement activities to be effective. The findings showed that leadership, employee involvement, lean operations (efficiency), reward and support motivation, problem solution models and skills cooperation and integration are among the critical success factors necessary for continuous improvement activities. This study differs from present study since it analyzed success factors in continuous improvement implementation where as the most recent research establishes a connection between quality improvement and organizational efficiency.

Fryer, et al. (2007) investigated the crucial performance factors of public sector continuous improvement. Management communication, customer management, lean operations, supplier management, communication, training, and employee empowerment. This study just like Oprime et al. (2012) differ from present study since it analyzed success factors in continuous improvement implementation whereas the current study establishes a link between continuous improvement and operational efficiency. The research focused on the public sector, but the current study is in the manufacturing sector.

3.0 RESEARCH METHODOLOGY

This study adopted a descriptive survey design. This analysis will use a detailed research design to assess the influence of quality improvement on Nairobi Bottlers Limited's organizational efficiency. This design is important in the determination of such answers relating to social demographics (Mugenda & Mugenda 2003). The design helps in giving outcomes to the questions in the research. Cooper and Schindler (2017) assert that the design is suited to social scientists. The members of a group that share the same traits are known as the target population (Barasa et al, 2015). According to NBL Human Resources office (2018), there are 308 management staff in its headquarters in Nairobi. As a result, the study's target population included top, middle, and

lower-level management personnel from around the firm's divisions. As a result, the target population was total 308.

Table 3.1: Target Population

Level of Management	Target Population
Top management	6
Middle level management	87
Lower level management	215
Total	308

Source: NBL (2020)

The study used stratified random sampling techniques to construct a sample. A survey of 20-30% of a population is sufficient, according to Mugenda and Mugenda (2003). Therefore the study selected 30% of each stratum to form a sample size of 108 respondents who were even spread across the three levels of management as presented below;

Table 3.2: Sample Size

Level of Management	Target Population	%	Sample Size
Top management	6	30	2
Middle level management	87	30	26
Lower level management	215	30	65
Total	308	30	93

Source: Researcher (2020)

The study used both structured and unstructured questionnaires in collecting data for the study. According to Creswell, Kaushal, and Singh (2017), a questionnaire is a method used to collect data needed to address research questions. The questionnaire was used to gather primary statistics that are qualitative and quantitative. Structured and unstructured questionnaires was used to obtain the information. The questionnaire in the mail was administered in advance to the respondents and obtained later. The questionnaire was designed as both closed-ended and open-ended (Kapadia, Shah, Murro&Park, 2016).

Quantitative data was obtained. To view quantitative data, descriptive and inferential statistics was used. Quantitative data collected was presented through means, percentages, range and correlation coefficients, standard deviations, and frequencies. This was done by tallying up responses and applying SPSS (Version 23.0) to for the computations.

The following regression model was helpful in determination of the effect of lean manufacturing on performance:

$$Y = \beta_0 + \beta_1 X_1 + \varepsilon$$

Where: - Y = Organizational Performance of NBL

X₁ = Lean manufacturing

β₀ = Intercept,

β₁, = Beta coefficient

ε = error term.

4.0 RESULTS AND FINDINGS

4.1 Response Rate

The number of questionnaires that were administered was 108. A total of 108 questionnaires were properly filled and returned. This represented an overall successful response rate of 100% as shown on Table 4.1. According to Mugenda and Mugenda, (2003) and also Kothari, (2004) a response rate of 50% is adequate for a descriptive study. Babbie, (2004) also asserted that return rates of 50% are acceptable to analyze and publish, 60% is good and 70% is very good. Based on these assertions from renowned scholars 80 % response rate is adequate for the study.

4.3 Demographic Characteristics

This section presents the descriptions of the respondents in terms of their gender, age, the number of years they have worked at NBL, position held at NBL and level of education.

4.3.1 Gender

The respondents were asked to indicate their gender. Majority of the respondents were male who represented 55% of the sample while 45% was female as shown in figure 4.1 below. This implies that there are more male than female employees at top management level at NBL.

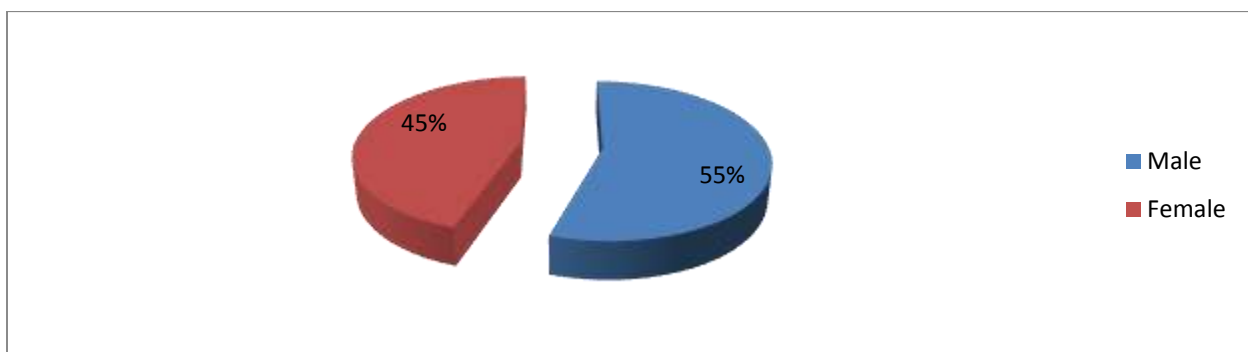


Figure 4.1: Gender of Respondents

4.3.2 Age

The respondents were asked to indicate their age. Majority of the respondents were between 26-35 years as represented by 65.3%, 23.5% were between 18-25 years, 10% were between 36-45 years, while 5% were 46 years and above as shown in figure 4.2 below. This implies that the top management of NBL comprises of young people.

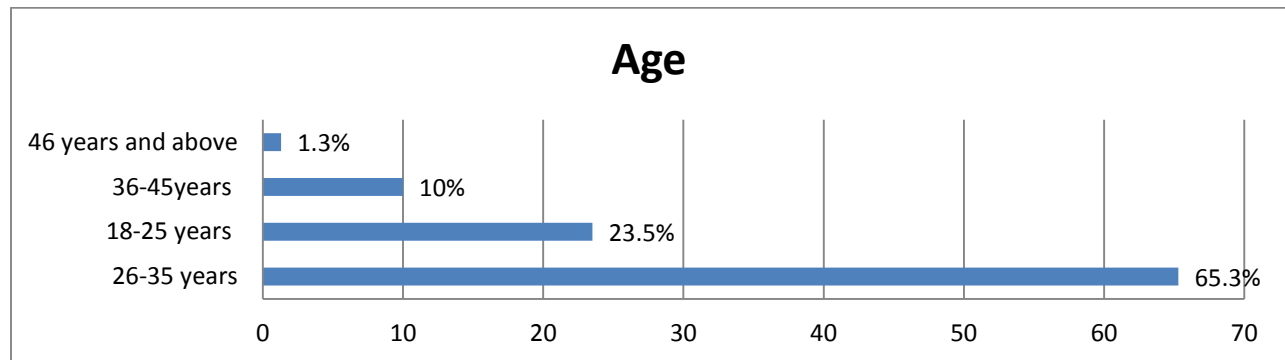


Figure 4.2: Age of Respondents

4.3.3 Years worked at NBL

The respondents were asked to indicate the years they have worked at NBL. Majority of the respondents had over 10 years working experience at NBL as represented by 41.9%, 37% had had 6 years to 10 years working experience at NBL, 18.8% had 2 years to 5 years working experience at NBL, while only 2.3% had less than 1 year working experience at NBL as shown in figure 4.3 below. This indicates that NBL employs managers who have worked for more than 10 years with the company.

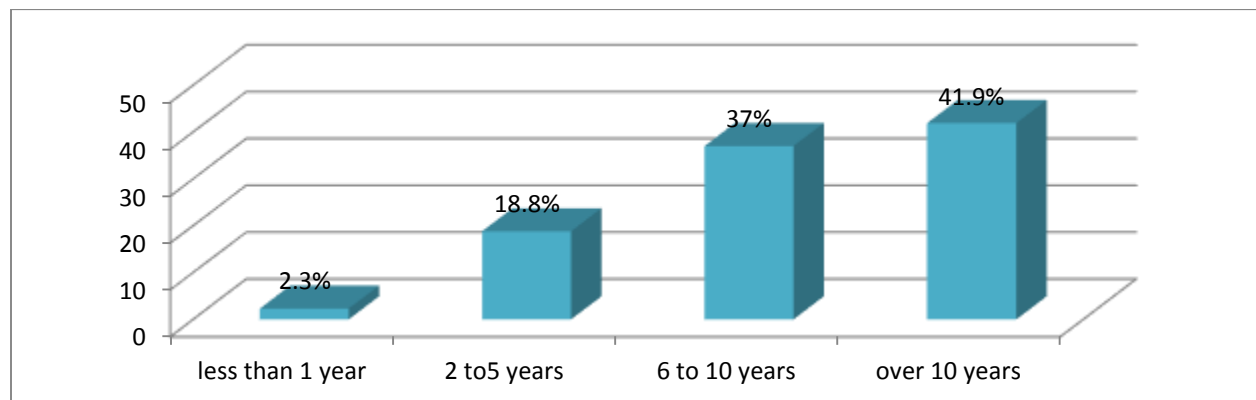


Figure 4.3: Years worked at NBL

4.3.4 Position Held

The respondents were asked to indicate the position they held at NBL. Majority of the respondents held top management positions at NBL as represented by 50.8%, 20.7% held lower-level management positions at NBL, 15.1 % middle-level management positions at NBL, while 13.4% were general staff at NBL as shown in figure 4.4 below. This implies that majority of the respondents were of top management therefore more accurate information.

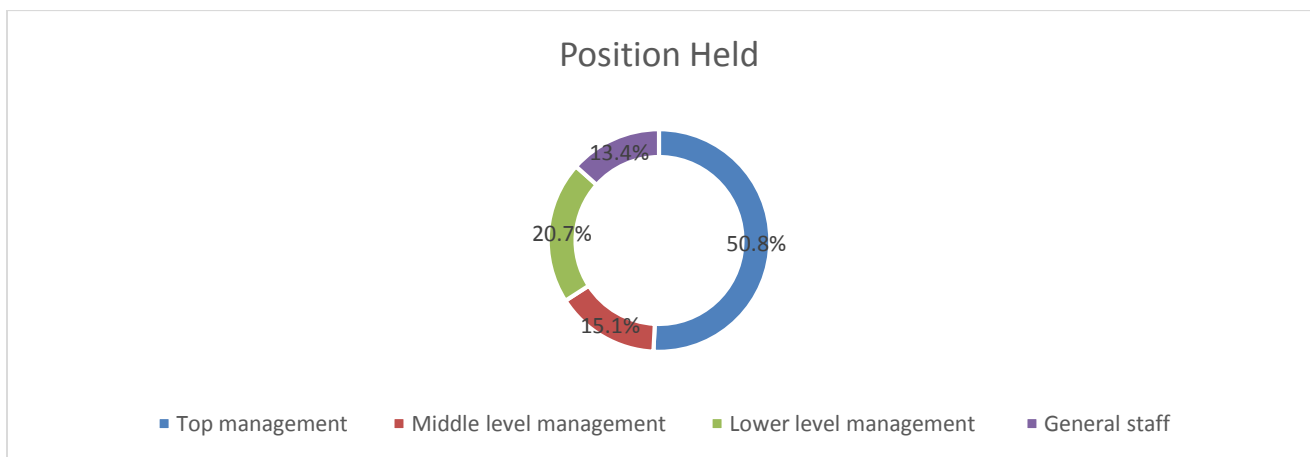


Figure 4.4: Position Held

4.3.5 Level of Education

The respondents were asked to indicate their level of education. Majority of the respondents had acquired up to post graduate degree level of education as represented by 41.8%, 33.5% had undergraduate level of education, 19.5% had Diploma level of education, while only 5.3% had certificate level of education as shown in figure 4.5 below. This implies that NBL employs postgraduates at management level.

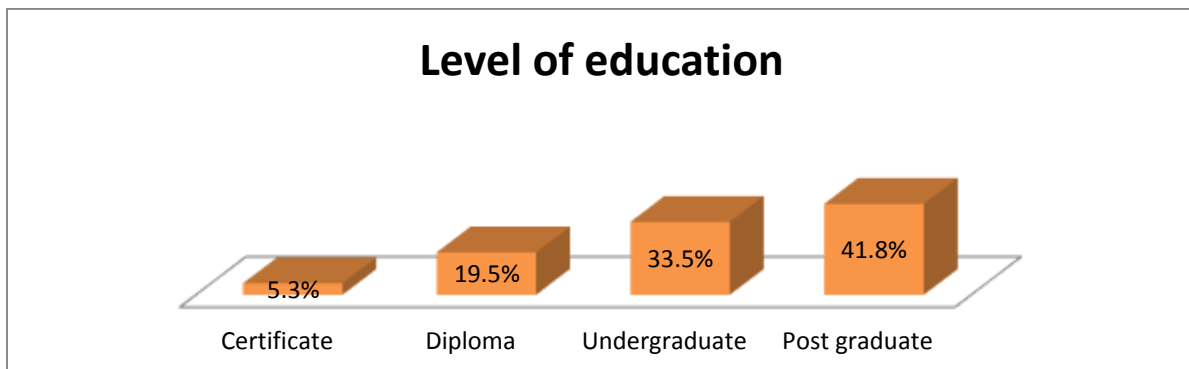


Figure 4.5: Level of Education

4.4 Impact of Lean Manufacturing

4.4.1 Lean Manufacturing

To determine the lean manufacturing factors at Nairobi Bottlers Limited respondents were asked to rate the factors on a likert scale of 1 to 5; (1; strongly agree, 2; agree, 3; neutral, 4; disagree, 5; strongly disagree). Majority (90.6%) of the respondents agreed that standardization of products was used by Nairobi Bottlers Limited and supported by a mean of 4.09, 85.8% of the respondents agreed that waste reduction procedures was embraced by NBL and supported by a mean of 4.07, 62% of the respondents agreed mechanization of the production line was used by NBL and supported by a mean of 3.56 and 54.3% of the respondents agreed that capacity building among staff and system was embraced by NBL and supported by a mean of 3.42 as indicated in the table 4.1 below.

Table 4.1: Lean Manufacturing

Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Mean	Std. Dev
Standardization of products	23.3	67.3	4.5	5		4.09	0.686
Waste reduction procedures	27.3	58.5	8	6.3		4.07	0.774
Mechanization of the production line	14	48	18	20		3.56	0.964
Capacity building among staff and system	13.3	41	20.5	25.3		3.42	1.008

Lean manufacturing explained 73.6% of the performance at NBL. This is supported by coefficient of determination also known as the R square of 73.6%.

The analysis of the variance (ANOVA) results indicate that the overall model was statistically significant as supported by a p value of 0.000 which is less than the critical p value of 0.05. The $F_{cal}=26.479 > F_{critical}=2.4599$ at $\alpha 0.05$ which imply that lean manufacturing is a good predictor of the performance at NBL.

Table 4.2: Regression of Coefficients for the Overall Model

	β	Std. Error	t	Sig.
(Constant)	7.128	19.652	0.214	0.002
Lean manufacturing	3.675	3.763	4.123	0

Regression of coefficients shows that there is a positive and significant relationship between lean manufacturing and performance at NBL as supported by beta coefficient 3.675. This was also supported by the t values whereby $T_{cal}=4.123 > T_{critical}=1.96$ at a 95 percent confidence level which depicts that lean manufacturing explains performance at NBL.

This implies that an increase in lean manufacturing by one unit would increase the performance at NBL by 3.675 units.

$$\text{Performance at NBL} = 7.128 + 3.675 \text{Lean manufacturing}$$

5.0 SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary

Majority (90.6%) of the respondents agreed standardization of products was used by Nairobi Bottlers Limited and supported by a mean of 4.09, 85.8% of the respondents agreed that waste reduction procedures was embraced by NBL and supported by a mean of 4.07, 62% of the respondents agreed mechanization of the production line was used by NBL and supported by a mean of 3.56 and 54.3% of the respondents agreed that capacity building among staff and system was embraced by NBL and supported by a mean of 3.42.

The analysis of the variance (ANOVA). The results indicate that the overall model was statistically significant as supported by a p value of 0.000 which is less than the critical p value of 0.05. The $F_{cal}=26.479 > F_{critical}=2.4599$ at $\alpha 0.05$ which imply that lean manufacturing is a good predictor of the performance at NBL.

This implies that an increase in lean manufacturing by one unit would increase the performance at NBL by 3.675 units.

$$\text{Performance at NBL} = 7.128 + 3.675 \text{Lean manufacturing}$$

5.2 Conclusions

In line with the above findings the study concluded that lean manufacturing is a good predictor of the performance at NBL.

5.3 Recommendations of the study

Based on the above findings the study recommends that standardization of products should be sustained by Nairobi Bottlers Limited. The study recommends that waste reduction procedures should be improved by NBL. The study recommends that mechanization of the production line should be increased by NBL. The study recommends capacity building among staff and system should be increased by NBL.

5.4 Suggestions for Further Study

Future studies should address the continuous improvement practices and performance of Nairobi Bottlers Limited, Kenya as well as strategic solutions to the poor performance at Nairobi Bottlers Limited, Kenya.

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