ADDIS ABABA UNIVERISTY
COLLEGE OF BUSINESS AND ECONOMICS
SCHOOL OF COMMERCE

Assessing the Process Performance Measurement of Lilac Manufacturing

A research project submitted to
The Office of Graduate Studies as a partial fulfillment of
Masters of Business Leadership Program

By: Mohammed Fuad Mohammed

Advisor: Wubshet Bekalu (PhD)

June 2022
Addis Ababa, Ethiopia

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Statement of Declaration

I, Mohammed Fuad, declare that this project work on the topic entitled "Assessing the Process Performance Measurement of Lilac Manufacturing" in partial fulfillment of the requirement for the Degree of Masters in Business Leadership is my original work prepared with the guidance and support of the research advisor Wubshet Bekalu (PhD). All sources of materialsused for the project work have been respectively acknowledged. I further confirm that the study has not been submitted either in part or in full to any other higher learning institution for the purpose of earning any degree.

Mohammed Fuad

Signature_____Date _____

Addis Ababa, Ethiopia

Addis Ababa University

School of Graduate Studies

Statement of Certification

This is to certify that the project work prepared by Mohammed Fuad, entitled: "Assessing the Process Performance Measurement of Lilac Manufacturing" in partial fulfillment of the requirement for the Degree of Masters in Business Leadership complies with the regulations ofthe university and meets the accepted standards with respect to originality and quality.

Signed by the Examining Committee:

Advisor:_____ Signature:_____ Date _____

Internal Examiner:_____ Signature:_____ Date _____

External Examiner:_____ Signature:_____ Date _____

Approval Page

This is to approve that the study made by Mohammed Fuad, entitled: “Assessing the Process Performance Measurement of Lilac Manufacturing” in partial fulfillment of the requirement for the Degree of Masters in Business Leadership complies with the regulations of theuniversity and meets the accepted standards with respect to originality and quality.

Signed by: -

Advisor _____

Signature _____

Date _____

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I would like to express my profound gratitude towards my research advisor Dr. Wubshet Bekalu for always being supportive and sympathetic, and understanding. He has been of immense value in his comments, suggestions and overall support in the completion of this research paper.

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LIST OF ABBREVIATIONS

ABC	Activity Based Costing
CEO	Chief Executive Officer
CPM	Corporate Performance Management
CSF	Critical Success Factor
EFQM	European Foundation for Quality Management
GM	General Manager
JIT	Just-in-Time
KPI	Key Performance Indicator
KSF	Key Success Factor
PI	Performance Indicator
SLA	Service Level Agreement
SPO	Standard Operating Procedures
TQM	Total Quality Management
WCM	World Class Manufacturing

ABSTRACT

Corporate performance management is one of the defining elements of leadership within an organization, particularly in the manufacturing business sector. It deals with the concept of how to measure and manage the activities and performances in an organization and identifies thekey areas which need focus in order to achieve goals set in the strategic planning. This research focuses on one of the perspectives of corporate performance measurement, operational perspective. It deals with identifying the gaps and assessing the current process performance measurement tools set in Lilac Manufacturing. (Wade 2001) expresses that the process architecture (which is one of the three architectures of an organization) must measure five fundamental elements in order to assure the ideal process performance in an organization, these elements are; Cost, Cycle-Time, Quality, Quantity, and Conformance to Standard while setting KPIs and CSFs to maintain those elements level of success.

In conducting this research, the five gap areas of process performance measurement of Lilac Manufacturing was assessed as the main goal was to identify and understand the extent to which manufacturing company has been able to implement corporate performance management and how those metrics are put in place while describing the misalignment that pertains in comparison to the theoretical description of process performance measurement. The gaps were identified in each of those measurement tool which were assess through the quantitative and qualitative data collected and analyzed using questionnaire and interview of employees and management. Using a descriptive approach, the research was able to assess and describe the differences and misalignments that exist between the theories and the practical measurement being used in the company. The research ultimately assessed these gaps and their viable recommendations; Cost measurement can be managed using Activity-Based Costing (ABC), Cycle Time management can be attained using JIT and OPT approach, Quality and Standard Conformance can be better managed using Six Sigma approach (DMAIC), and KPIs and CSFs must focus on those tools while adopting best practices and Balance Score Card alongside a development of a process map.

Keywords: cost, cycle-time, quantity, quality, conformance to standards, KPIs, and CSFs

CHAPTER 1: INTRODUCTION

1.1 Background of the Study

There is a famous management saying that goes, "What is not measured, cannot be managed." Hence, emphasizing the need for leaders and managers to deploymeasurement tools in order to have an accurate and relevant way of measuring a company's performance; be it in regards financial, customer, operations, or organizational perspectives.

Performance measurement tools and indicators and a company or corporate level are mainly based on two forms of indicators; leading and lagging indicators. While lagging (trailing) indicators usually focus on the past results and are regarded as dependent variables of a company, leading indicators focus on the current status and red flags that ultimately put performance at risk for the future are seen as independent variables.

Regardless, performance measurement models will generally give little direction on how business (process) performance indicators can be picked and operationalized (Shah et al. 2012). They are restricted to principally characterizing performance viewpoints, perhaps for certain models or steps to determine performance indicators (Neely et al. 2000), however without offering substantial indicators. While genuinely huge collections of examination exist for both performance models and business processes, no organized writing audit of (process) performance measurement has been completed hitherto. As far as we could possibly know, existing surveys cover some part of performance measurement; for example, audits on measurement models or assessment rules for performance indicators (Heckl and Moormann 2010; Neely 2005; Richard et al. 2009).

As measurements are based on the different perspectives of key performance measures, this particular research focuses on the operational perspective which contains according to (Wade 2001), five main performance measures that are cost-focused, these are; cycle time, cost, conformance to standard, quantity, and quality.

Coming back to the core concept of performance management, it can be viewed as a methodical cycle by which the general performance of an association can be worked on by working on the performance of people inside a group system. It is a method for advancing prevalent performance by conveying assumptions, characterizing jobs inside a necessary ability system and laying out attainable benchmarks. According to (Armstrong and Baron 1998), Performance Management is both a strategic and an integrated approach to delivering successful results in organizations by improving the performance and developing the capabilities of teams and individuals.

According to (Wade 2001), all organizations are composed of three distinct architectures; technology, organizational, and process architectures. The focus of this research inclines towards the process mappings and other physical layout elements that coincide with the five categories of the performance measures.

In general, a performance management process sets the stage for remunerating greatness byadjusting individual employee achievements to the association's central goal and targets and causing the employee and the association to comprehend the significance of a particular job in acknowledging results. By laying out clear performance assumptions which incorporates results, activities and ways of behaving, it helps the employees in grasping what precisely is generally anticipated out of their jobs and setting of norms help in disposing of those jobs which are of no utilization any longer. Through customary input and instructing, it gives a benefit of diagnosing the issues at a beginning phase and making restorative moves.

Background of the Company

Lilac Manufacturing is a pioneering firm that was first established in 1991 by its founder and CEO Mr. Mohammed Yusuf as the first domestic sanitary napkin and baby diaper factory in Ethiopia. After operations were stalled due to various logistical and resource inadequacies, Lilac reopened for business with new state-of-the-art machineries in 2016/17 and rebranded itself as a fierce rival in the market. Located in the industrial zone of Kality, Lilac Manufacturing produces both diapers and sanitary napkins with a much more superior quality than available in the market and follows a cost-focused strategic approach. Cost-focused strategic focus according to (Wade 2001) is a low-cost leader provides a standard product at the lowest cost to its customers. Also, the company provides a standard product at an average price but with the lowest internal production costs. This focus is driven by operational excellence.

Lilac manufacturing has stated that have been able to produce about 1000 units for each product mix (i.e. diapers and sanitary napkins which are known as Makleen diaper and Lotex Sanitary Napkin respectively). The management of the company is currently being led by the CEO and delegation of management below is limited to the level of supervisors and quality control experts. This entails a gap of alignment when it comes to strategic planning and production process management.

Another main area of work for Lilac manufacturing's product mix performance measurement is Total quality management (TQM). According to (Armstrong and Kotler 2016), TQM is an approach in which all of the company's people are involved in constantly improving the quality of products, services, and business processes. For most top companies, customer-driven quality has become a way of doing business. Today, companies are taking a *return-on-quality* approach, viewing quality as an investment and holding quality efforts accountable for bottom-line results alongside the concept of working at a cost-efficient and standardized level.

Thus, this research was furthermore able to analyze and evaluate the KSF (Key Success Factors) which are based on areas such as the use of state-of-the-art technology (i.e. machinery advancement, reliability, low cost provisions, and innovation within the process architecture of the company.

This research will come in handy for the manufacturing sector, particularly in diaper and sanitary napkin, as it is an evolving and dynamic market that needs meticulous assessment and understanding of the kind of product and process performance measurement tools that need to be advanced and maintained for higher level of company effectiveness and efficiency in product mix production processes.

Organizational Structure of Lilac Manufacturing

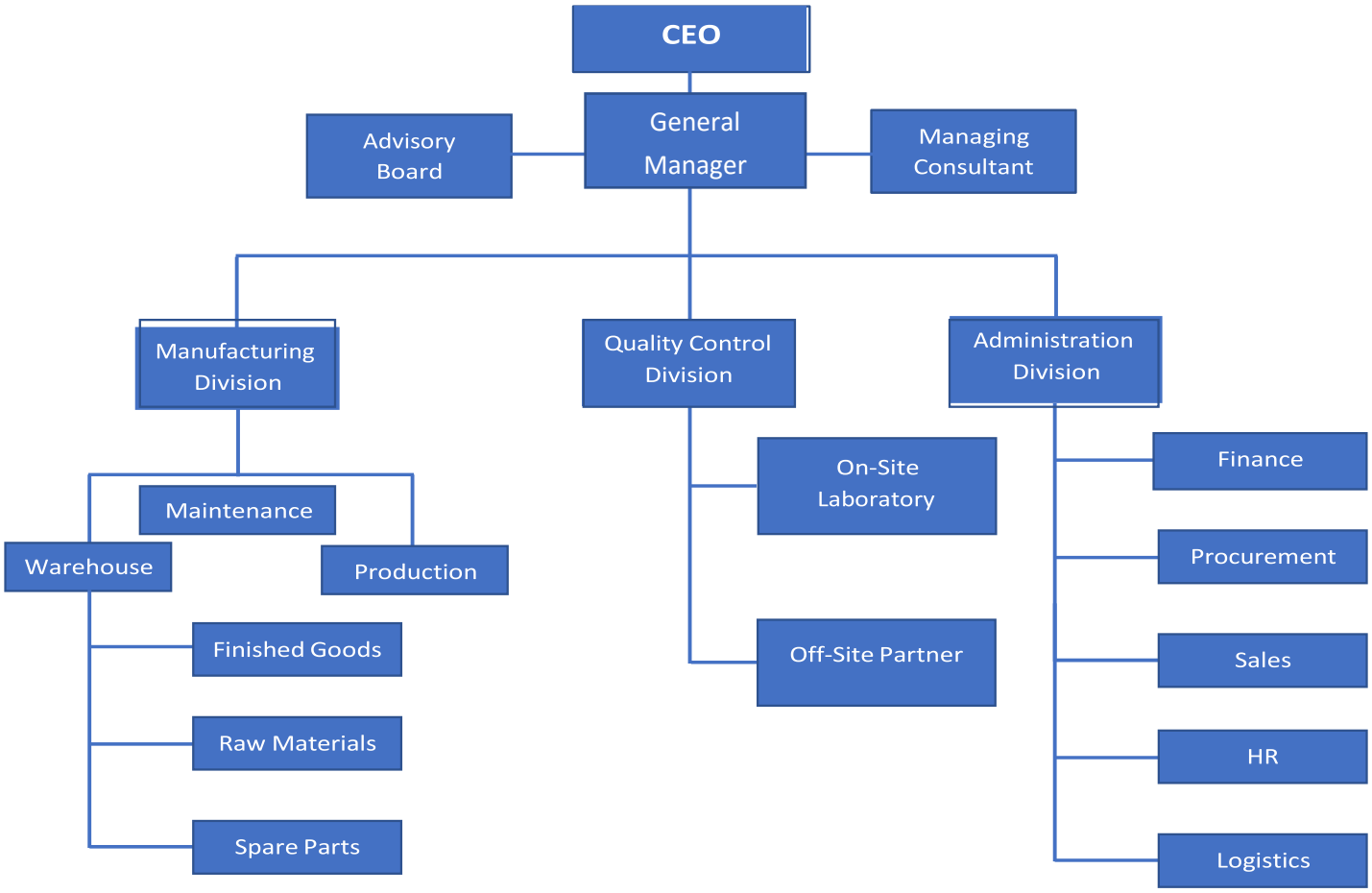

Figure 1.1: Lilac Manufacturing Organizational Structure ***(Source: Company Profile)***

1.2 Statement of the Problem

A good performance management system makes progress toward the improvement of the generally authoritative performance by dealing with the performances of groups and people for guaranteeing the accomplishment of the by and large hierarchical desires and objectives of an organization. The biggest challenge that resides in Ethiopia, particularly in the manufacturing sector, is the concern how companies can set performance measurement tools to better work in an efficient and effective manner. This in return can save costs of all kinds and ultimately result in a better quality (standardized) and a predictably, higher profits as well.

Manufacturing sectors, and in our case, Lilac diaper and sanitary napkin manufacturing has been growing tremendously in the past few years and thus has brought a fierce market competition among the competing companies alongside the advancement of industrialization itself. As a result of the transformation of this market from a small-scale enterprise towards a much more advanced and corporate form of businesses, it has created a gap, or more of a problem for manufacturing companies (i.e. Lilac Manufacturing).

According to a 2018 data collected from UNICEF, Ethiopia has a population of 16 million that is under the age of 5, which puts the demography of children up to 48 months old consisting a large portion of that number and is expected to have grown much further currently in 2022.

As a nation with the second largest population in Africa, it is clear that such products must be available in mass and in great quality, and ideally produced within one's nation. Most of the diapers and sanitary napkins produced and imported in Ethiopia regarded to be of mediocre quality and not up-to the standard nor are they available in accordance to the demand in the market. To solve all these problems that are aggregate within the Ethiopian context as well as in the manufacturing industry, there needs to be an essential element of leadership within an organization that evolves around performance measurements, and in our case, process performance measurements.

Five Major areas of Problem/Gaps were identified

a. Assessing the Cycle Time

- Cycle time process performance metrics measures the all-out slipped by time to finish a particular process, and a common approach used is called working sample; it is when employees are approached to keep precise records of the time. Cycle time is not a common practice in Ethiopia.

b. Assessing the Cost

- Process costs are calculated by aggregating all costs within a process. These costs include areas such as; labor, machine depreciation, and cost of materials. Cost allocation is an area in which resources can be properly utilized.

c. Assessing the Quantity

- Quantity process performance measures usually count the number of widgets, the number of gadgets (i.e. units of diapers and sanitary napkins produced), and the number of claims processed within a certain amount of time.

d. Assessing the Quality

- Quality is normally measured by how much you meet the client's ideal product attributes, and attributes fluctuate as per the product being delivered. Manufacturers commonly use what is called the Six Sigma Standard to measure product quality compatibility.

e. Assessing the Conformance to Standard

- The establishment and adherence of Service Level Agreement and Standard Operating Procedures (SLA and SPO). These formats explicitly need to be established in writing the objectives, roles, responsibilities, timing, and quality of handoffs within the organization.

In general, process performance measurement is a particularly sensitive area that needs to be developed in a well formulated manner being inclusive of element such as process maps and the five categories of measurement in a diligent and accurate manner which clearly is not adopted coherently within the Ethiopian industries and in this particular organization which is the concern of this research.

1.3 Research Questions

So, the question here that Lilac Manufacturing must ask itself is, "How do we make our company's product adhere to the best practices available when it comes to process performance measurement and their tools?". The research was based on a general strategic planning process model in which, according to (Wade 2001), there are five main types of perspectives, namely; Financial, Customer Satisfaction, Organizational, Growth and Innovation, and Operations. The perspective of interest from which the research questions are developed in from an operational perspective of the company's performance measurement.

Enterprises are promoting several changes in their business systems and processes in order to develop a more integrated and responsive operation (Henry 2006; Chen, 2005). Some of the redesign initiatives are being conducted in the strategic domain, oriented to develop a strategic fit between operations strategy, represented by their decision areas and performance dimensions, and production planning systems (Dı´az Garrido et al., 2007; Olhager and Selldin 2007).

Thus, this research identified the distinctive performance measurement tools by putting under scrutiny the performance measurement tools that currently existed and identifying the level of accuracy that exists among them while simultaneously identifying the areas of gaps that are misaligned with a performance management developed or needed to be developed by the top management. The main research question asked in relevance to this research are as follows;

- In what way does the organization have a working sample and a standard cycle time measurement?
- How does the organization measure its performance in relation to production related costs?
- What criterion have been put in place to measure the performance in regards to quality?
- In what way is quantity performance measurement conducted, and using what guidelines?
- How is the adherence and conformance of product user standard measured as a process performance element?
- What are the factors and indicators regarding as leading, KPIs, and KSFs in the process performance measurement?

1.4 Objective of Study

1.4.1 General Objective

The general objective of this research was to assess the product mix in context of the process performance measurement perspective of a Corporate Performance Management in the case of Lilac Manufacturing for one of its product mixes (diaper). This research assessed those elements particularly found in the process mapping segment of the company's production management.

1.4.2 Specific Objective

Coming to the specific goals to be set, there ought to be a few which mainly include;

- Identifying the working sample and cycle time measurement of production.
- Assessing the cost performance measurement of the organization.
- Assessing the quality metrics used in order to identify related performance measurement.
- Assessing how quantity is used as a measurement tool for performance.
- Comprehending the level and gaps related to conformance with user standards.
- Assessing the factors and indicators that are essential for performance measurement in terms of leading variables, KPIs, and KSFs.

1.5 Significance of the Study

This research played a huge importance overall as it focused on how organizations that offer products or services are, during this time and age, in need of a performance management planning that is based on a strategic focus (i.e. Cost focused, product focused, or customer focused) approach from which ultimately enables the design of a sound (CPM) Corporate Performance management. For this particular research, the significance will be in regards to shedding light on one of the CPM perspectives which is, operations, i.e. process performance management. Such research would provide insight into the current standings of performance measurement tools in the Ethiopian context, and further more identify areas in which there are huge gaps and misalignments with the theoretical and pragmatic principles and procedures set.

This research ought to benefit stakeholders such as: Researchers; in assessing the gaps that pertain to exist in the current context of performance measurement in Ethiopia and manufacturing industries. For organizations; it would help grasp the concept of how to deploy their performance measurement strategies moving forward. For society; this research will benefit in terms of setting benchmark research materials that could be used as reference and also to further understand how the integration of process performance measurement would positively impact change within an organization and the external environment and stakeholders as well.

1.6 Scope of the Study

The research narrowed the scope of study in regards to the area or perspective of the CPM, as this research will be focusing on the operations perspective of performance measurement. More specifically, there are five categories of performance measurement as the basis of this research, which are; Cycle Time, Costs, Quantity, Quality, and Conformance of User Standards.

The research further adhered to the basic approaches that are in relation to process performance measurement. In terms of specific product focus areas, the research conducted the study upon only one of the product mixes; namely Makleen Diaper. The main goal of this research was also based on activities particularly in relation to specific areas within the manufacturing and quality control divisions of the company as illustrated above.

In regards to the personnel that will be indispensable to this research, the research established contact with the top-level management, middle level manager, and functional level manager. The main elements of this research are related to assessing the process that is deployed towards establishing a structured work-flow which can be evaluated and controlled, with the need and assumption that it is based on a strategic plan the revolves around a process mapping that pertains to the performance measurement categories of the operation perspective of the company.

1.7 Limitation of the Study

There were a few challenges that might arose in the process of locating data and resources instrumental to this research, such as, the research being hindered from certain aspects of the work. Some statistical data were limited due be being obsolete and also the ideal amount of cooperation from different stakeholders was not sustained due to the time constraint they might have had towards aiding in this research. This research did not focus on the other four perspectives of CPM, which include; financial, organizational, customer satisfaction, and growth and innovation, as it only focused on the operation perspective i.e. process performance measurement in terms of the one of the product mixes.

1.8 Organization of the Study

This research was organized and compiled in five chapters. The first chapter focused on debriefing the 'Problem and its Approach' and consisted of various sub-topics beneath respectively. The second chapter focused on comprehensive 'Review of Related Literature' materials. Chapter three speaks about with meticulous description of 'Research Design and Methodology'. The fourth chapter focused on illustrating and providing explanation of 'Data Analysis and Presentation'. The fifth and last chapter of this research concluded the research in its entirety by providing 'Summary of Findings', 'Conclusion', and 'Recommendation'.

1.9 Definition of Key Terms

Most of the key terminologies have been simultaneously indicated in the statement of the problem section of this chapter under the subtitle of, *five major gap areas*; remaining are expressed below;

1. **KPIs:** Quantifiable measure of performance over time for a specific objective.
2. **KSFs:** The decisive factors required for a company to compete and accomplish its goals.

CHAPTER 2: REVIEW OF RELATED LITERATURE

2.1 The Meaning and Characteristics/ Nature of Process Performance Measurement

Performance Measurement and Process

Throughout the course of the past few decades, the complex worldwide business climate and expanding business seriousness have showcased the significance of performance measurement. Performance measurement itself is a process: "the process of quantifying the efficiency and effectiveness of action" (Neely, A et al., 1995). The effects of management by process on the requirements of the Performance Management System can be summarized as follows:

- Overall indicators must be constructed. These must be able to measure the effectiveness of the process in accomplishing the primary task of the process itself.
- The performances that measure the attainment of the sub-tasks (converging to ensure that the primary task is achieved) must be identified. They should be evaluated not only in absolute but also in relative terms, i.e. between each other, so as to have the best possible mix with the resources available.
- The single function/unit performances must be defined, measured and evaluated in relation to the process sub-tasks. This is the contribution of the sub-tasks to the single functions or units.
- Finally, the system must be able to identify, according to the customer/supplier chain logic, which performances can be ascribed to one process unit and which instead, though deriving from the activity of the unit itself, depend, above all, on the performance of the preceding unit in the process. This is the function/unit responsibility identification.

Process measures determine result measures (such as the financial indicators) and "are spoken in the language of the land that is being measured" (while financial indicators are the identical in all cases, everywhere), (Meyer 1994).

(Blenkinsop and Burns 1992) further states that process measures must be owned by the group they are measuring, referring to the need for the delegation of performance management to a specific function or department within an organization.

Performance Measurement and Product

Performance measurement is a theme which is frequently discussed but not often defined. In a real sense it is the most common way of quantifying action, where measurement is the course of quantification and action prompts performance. As indicated by the marketing perspective, organizations accomplish their objectives, that is they perform, by satisfying their customers with more prominent efficiency and adequacy than their rivals (Kotler 2016). The terms efficiency and adequacy are utilized unequivocally in this unique situation. Adequacy alludes to the degree to which customer necessities are met, while efficiency is a measure of how financially the company's assets are used when giving a given degree of customer satisfaction.

Many measurement tools can be applied for evaluating factory productivity. (Leachman and Hodges 1996) evaluated semiconductor wafer fabrication plants around the world to quantify manufacturing performance and to establish comparative benchmarks in manufacturing technology, factory operations, organization, and management. The major technical metrics they used to measure manufacturing performance are cycle time per wafer layer, line yield, die yield, stepper productivity, direct labor productivity, total labor productivity and on-time delivery. The same way, (Wade 2001) identifies five similar metrics from such an operation company and perspective; Cost, Cycle-Time, Quality, Quantity, and Conformance to Standard.

According to (Kotler 2016), a product mix is the total number of product lines and individual products or services offered by a company. Additionally referred to as productassortment or product portfolio. Product mixes vary from company to company. Some havemultiple product lines with lots of products in each line. But others are much more limited. U.S. and Japanese manufacturing managers assert that product mix flexibility is the most critical manufacturing capability (DeMeyer et al., 1986). Product mix flexibility is the ability to produce a wide range of products, to accommodate modifications to existing products, and to assimilate new products, all with minimal degradation of performance (Slack, 1984).

Process Performance Measurement Tools

Measurement is an indispensable phenomenon for each company, particularly manufacturing companies. (Wade 2001) mentions that managers need to measure how well their companies' processes are actually working. Company leaders have eliminated many layers of management over the past decades and given ownership of all processes to those running them. These leaders have mapped every key process and incorporated performance measures covering cost, cycle time, conformance to customer standards, quantity, and quality into each activity.

Cycle Time

Cycle Time has been described as both a source of competitive advantage and the fundamental measure of manufacturing performance (Drucker 1990). Under the just-intime (JIT) manufacturing philosophy the production or delivery of goods just too early or just too late is seen as waste. Similarly, one of the objectives of optimized as explained by (Goldratt 1986), is that production technology (OPT) is the minimization of throughput times. (Galloway and Waldron 1988) have developed a time-based costing system known as throughput accounting.It is based on the following three assumptions:

1. Manufacturing units are an integrated whole whose operating costs in the short term are largely predetermined. It is more useful and infinitely simpler to consider the entire cost, excluding material, as fixed and to call the cost the "total factory cost".
2. For all businesses, profit is a function of the time taken to respond to the needs of the market. This in turn means that profitability is inversely proportional to the level of inventory in the system, since the response time is itself a function of all inventory.
3. It is the rate at which a product contributes money that determines relative product profitability. And it is the rate at which a product contributes money compared to the rate at which the factory spends it that determines absolute profitability.

Cost

A new approach to cost accounting, known as activity-based costing (ABC), was developed by (Kaplan 1987) in the late 1980s as an attempt to resolve some of the fundamental inadequacies of traditional cost accounting. ABC is concerned with the cost of activities within a company and their relationships to the manufacture of specific products rather than to basic functional areas (Hill

1995). The basic technique of ABC is to analyze the indirect costs within a company and to discover the activities that cause those costs. Such activities are called "cost drivers" and can be used to apply overheads to specific products. In this way, it is believed that ABC results in a more accurate identification of costs than traditional cost allocation. According to (Maskell 1991), several example cases indicate that ABC can be of practical value for product pricing, production decision making, overhead cost reduction and continuous improvement. However, there are researchers who claim that the argument that ABC provides more accurate product costs has never been proved (Neely et al., 1997). More importantly, an improved cost accounting system will not entirely solve the problem with financial measures – other measures than cost are needed to adequately gauge manufacturing performance relative to a competitive strategy (White 1996). This is why many researchers have focused on developing more complex performance measurement systems during the last decade. These systems include both cost and non-cost performance objectives, and are argued to be more suitable for the business environment of today.

Quantity and Quality

The decisions made at different levels of the organization vary in nature, but they should all strive towards the same overall strategy. Increased focus on quality and quantity in the fact that strategic priorities might vary between products, and between stages of a product's often short life-cycle, sometimes make it hard to link measures to strategies. Performance measures may even hurt a company's corporate strategy due to mismatch between goals on different levels (Caplice and Sheffi 1995).

Furthermore, (Lynch and Cross 1991) considered that qualitative and non-financial manufacturing performance measures can help organizations to link operations to strategic goals on all hierarchical levels, since they are easier to derive from the qualifying and order-winning criteria and easier to put into effect, but it is still necessary to link corporate, business and manufacturing strategies.

Conformance to Standard

Consistence of quality delivery for both product and service, according to (Al-Refaie et al., 2012), is what distinguishes World Class Manufacturing (WCM) companies from the rest. The

result will be global competitiveness through satisfied customers and overall business excellence. Consistent quality products can be a deliverable from an organization that has a robust quality management system. This will mean that the company will aspire to consistently manufacture products at the right cost, and the manufacturing processes are controlled through a set of specifications, procedures and tests for checking the capability of the process.

2.2 Importance of Performance Measurement and their Indicators

Performance indicators (PI`s) are tools used within the performance measurement systems to assess the performance of various processes. According to (Mbugua et al., 1999), performance Indicators (PI`s) were defined as the quantifiable measures of Critical success factors (CSF`s). Performance Indicators (PI`s) are the measurable evidence necessary to prove that a planned effort has achieved desired results, which is expressed in (Kaufman, 1988).

Why Performance Measurement?

(Cable and Davis 2004) suggest that the identification of KPIs and the execution of performance measurement of a portfolio of buildings focuses on assessment of overall performance toward an organization's mission. Furthermore, performance measurement addresses issues related to the buildings or facilities owned, their current condition, additional facilities required for achieving organization goals, issues to be addressed, and the results of investment or no-investment decisions. (Barret and Baldry 2003) further elaborate that when the facility management unit lacks reliable and comparable data on building performance and costs, its ability to make its most basic decisions is impaired, as well as its ability to make a convincing case for its recommendations. (Lebas 1995) further strengthens the argument by stating that looking into the past, the present and the future to drive performance improvement decision-making strategies is one prime reason why one should execute performance measurement.

What to Measure?

The selection of performance measures also depends upon the type of users, since different users like managers, supervisors and customers, require different measures for different purposes (Lebas 1995). Furthermore, (Baldwin et al., 2000) state that customers and providers select metrics

that reflect their respective expectations and goals. Customer-related metrics tend to converge upon output, while provider-related metrics emphasize the processes implemented.

(Amaratunga et al., 2000) argue that performance measurement cannot be executed solely on the basis of one indicator and suggest that the Balanced Scorecard approach provides holistic metrics of KPIs that include indicators relating to customers, internal processes, financial aspects, and innovation. (Cable and Davis 2004) and (Cripps 1998) add that facilities should be surveyed for their alignment with an organization's goals and mission to perceive how well a facility assists the organization with meeting its goals and satisfy its mission.

European foundation for quality management excellence model

The EFQM business excellence model was developed in 1989 by 14 multi-nationals grouped in the EFQM to improve the quality of management in western Europe. It is used to measure and improve the overall quality of an organization. This illustrates a performance measurement framework that is a complete set of performance measures and indicators derived in a consistent manner according to a forward set of rules or guidelines (Brown and Devlin 1997).

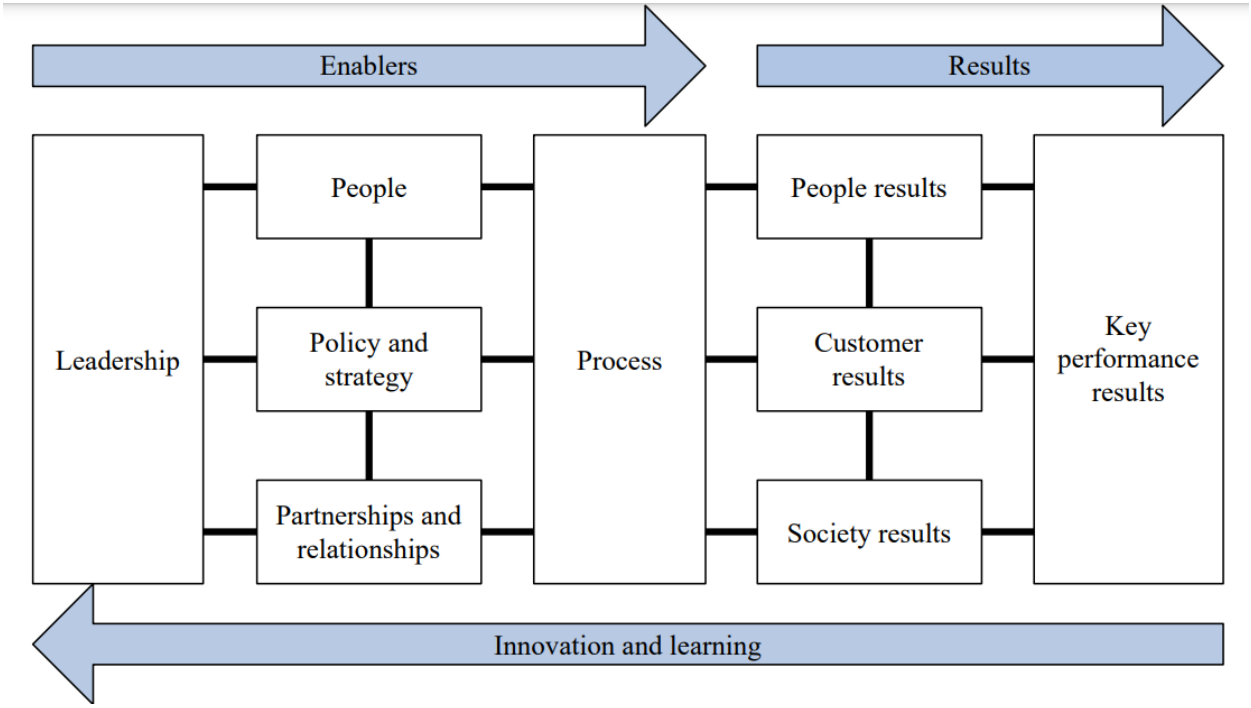

Figure 2.1: The EFQM excellence model ***(Source: Moeller et al., 2000)***

Importance of KSFs/CSFs and KPIs

Critical success factors (CSFs) are also used to assess performance of an organization. (Boynton and Zmud 1984) state that CSFs involve factors that relate to the most vital issues of an organization, its operation and future success. Moreover, these factors reflect areas that need to be taken care of for managerial or organizational success (Leidecker and Bruno 1984).

(Boynton and Zmud 1984) further argue that in spite of a few weaknesses (e.g. difficulty, validity, and applicability,) the CSF method is easily understood and supported by senior management. (Chua et al., 1999) elaborates further and states that, CSFs incorporate issues that to some extent govern the success and failure of an organization and thus are vital for the assessment of that organization.

(Atkin and Brooks 2000) describe that for performance assessment, it is important to identify factors that are crucial to the success of the organization. Furthermore, these factors (CSFs), indicate the required efforts necessary to meet organizational goals and could consist of one or more KPIs that help management grasp, evaluate, and govern the progress made by the organization.

(Varcoe 1996) states that understanding organizational goals is vital for the measurement of performance as these could relate to respective objectives. Such objectives could be transformed into measures of performance evaluation that could provide essential performance metrics to assess a facility. Moreover, developing performance metrics facilitates the identification ofadditional indicators that could emerge as a result of change in the organization's strategies as wellas in its objectives.

2.3 The Process and Components of Performance Measurement

Among the processes that can be distinguished in a manufacturing organization, three can be considered fundamental: product development; manufacturing (material processing); logistics (material handling). The organizational variables include the number of people and organizational units involved in each process, as well as the frequency with which each organizational unit is involved in the process activities.

The performance measurement variables include the most critical performance dimension (T = time performance, C = cost performance, Q = quality performance), the number of objects to be measured and the costs and frequency of measuring. The differences in the performances to be measured and in the corresponding indicators can be seen as deriving first from the product development phase in relation to the product development process.

The phases are respectively: concept generation and product planning; product design and product engineering; process engineering, piloting and production ramp-up. Time-to-market is defined as the time interval between the product concept generation and the market introduction. The overlapping degree or simultaneity ratio can be defined as:

$$\sum_{i=1}^{n} \frac{t_i}{\mathrm{DT}}$$

Where: DT is the development time, *ti* is the *i*-activity duration, n is the number of activities of the product development (Clark and Fujimoro 1991). The carry-over index is the number of old product parts included in the parts of a new product which is described by (Juran 1974).

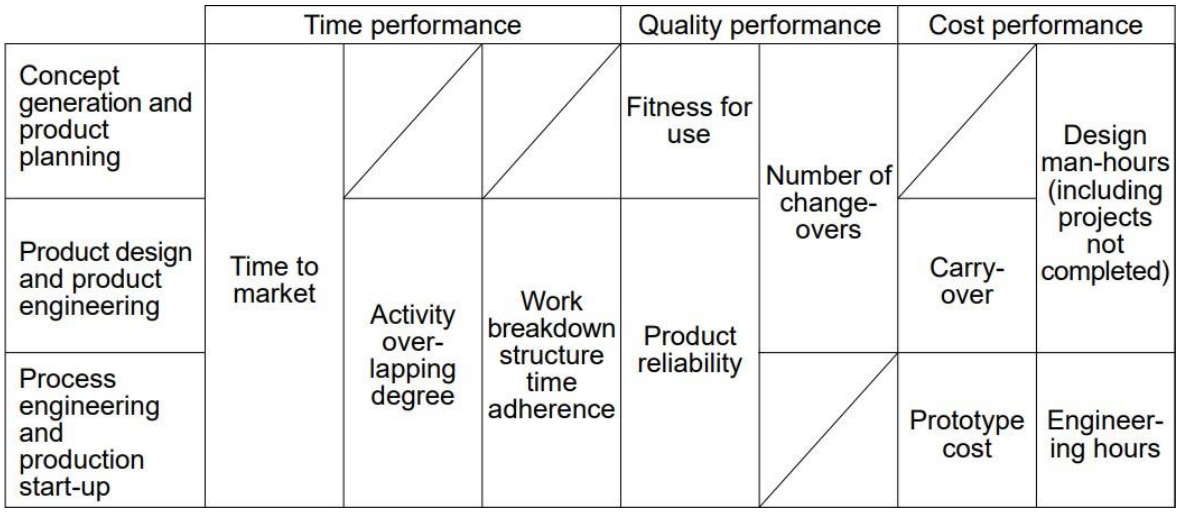

Figure 2.2: Performance indicators; the product development process *(Source: Juran 1974)*

The differences in the performances to be measured and in the corresponding indicator can be derived from the complexity of the product and the type of production for the manufacturing process. The complexity of the product is considered in relation to the extent of the bill of materials. The type of production considered is intermittent (job-shop) and repetitive production mix. (Davenport and Short 1990) further expands that the difference between the two depends on whether the time interval between the entry of the product and its exit from the production system is long or short. Depending on the product complexity and the type of production we can identify: special parts; standard parts; engineering products; standard products.

The Three Basic Approaches to Developing Process Performance Measurement

1. Process Mapping

(Wade 2001) explains that process maps are an excellent source of performance measures. Managers are advised to take the next steps and use process maps to help them develop performance measures. Unfortunately, many of the process maps do not provide the necessary depth and breadth of information that managers need to make good business decisions. Most are drawn on one page for convenience, but suffer from too much detail. Thus, the name "spaghetti charts" is often applied to this mishmash of inter-tangled information. Process maps are made more intelligible and more useful, for both productivity improvement and performance measures, by following some simple mapping rules.

Steps for Process Mapping

- Identify process starts and stops
- Identify activities (tasks) and boundary crossings
- Identify hand-offs and bottlenecks
- Estimate the cost of each activity (task)
- Standardize performance measures

2. Activity Charts

Activity charts (also called function charts, entity charts, or relationship charts) are described as (Wade 2001) being able to show the relationship between each activity performed in a process and its relationship between the people, systems, or organizations within the company.

3. Task Analyses

Task analysis provides a comprehensive list of task-level detail and presents a graphic illustration of how work flows across a process. But task analysis doesn't add any additional information about the process itself. Furthermore, (Wade 2001) states that there are standard task symbols promoted by many associations and consulting firms. Feel free to use them. Many companies end up developing their own set of symbols. Many presentation and flowcharting software packages have a set of symbols that can be easily adapted. The important thing is to standardize these symbols across the company.

2.4 Review of Empirical Studies

Roth (2007) has defined the term "empirical" as "the systematic process of deriving and analyzing data from direct or indirect observation." Over the years, many authors (Kuhn, 1970; Gupta et al., 2006) have accentuated the value of developing, exploring and validating empirical research.

Kagioglou et al. (2001) developed a performance management process framework based on the balanced scorecard to be adopted by construction organizations and added two important perspectives: project and supplier, to the construction industry. Bassioni et al. (2005) also suggested a conceptual framework using balance scorecard and business excellence model to measure business performance of construction organizations.

The framework was divided into performance driving factors (leadership, strategic management, resource management, risk management, work culture, capital management, etc.) and performance results factors (people, customer and society results, partnership and supplier.

Wong (2004) developed a logistic regression model for predicting contractor's performance during contractor selection and evaluation process. Such prediction model makes the selection process easy during tender evaluation by identification and classification of contractor's performance. Singh and Tiong (2006) also developed a prediction model for predicting contractor's performance during contractor selection but used computer interactive multi-criteria decision system for model development. The experience of the contractor on similar work, qualification and experience of project managers, technical staffs and management staffs, type of project completed in last three years, liquidity, working capital, and demerit point in past projects were considered critical for assessing the performance of the company.

Skibniewski and Ghosh (2009) identified two types of KPIs namely, project performance indicators (manufacturing cost, time, predictability of cost and time and product conformance) and company performance indicators (safety, profitability and productivity) to measure the performance of manufacturing companies across the United States of America (USA) using questionnaire survey and face to face interviews.

2.5 Conceptual Framework of the Study

The conceptual framework of the study focuses on the five independent factors; Cycle time, Cost, Quality, Quantity, and Conformance to Standard determining and directly impacting the operational process performance measurement of the company.

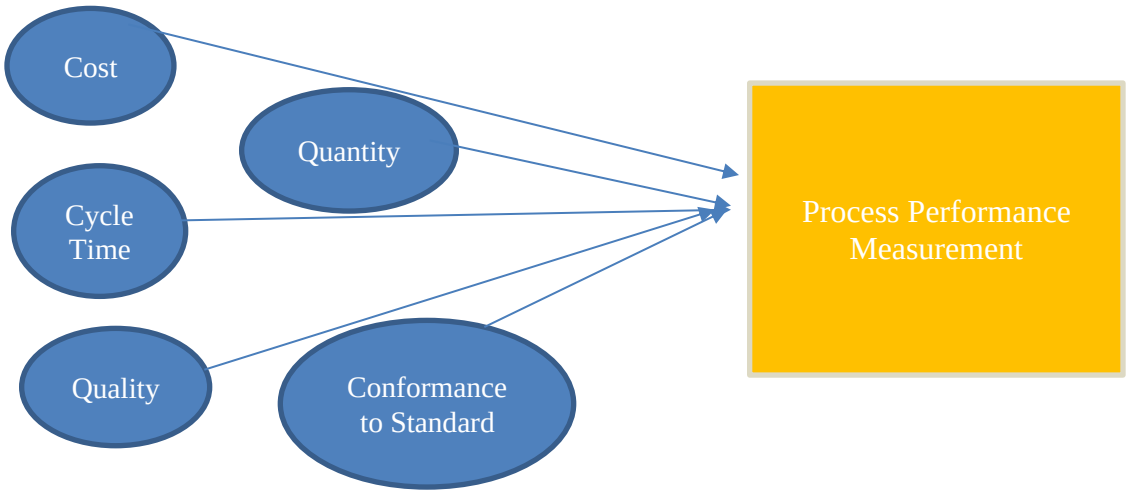

Figure 2.3 Operation Performance Measurement Framework (Wade, 2001)

CHAPTER 3: RESEARCH METHODOLOGIES

The research methodology will describe the following elements ingrained in the research which include; research design, description of study variables, description of study area and target population, sampling technique/methods and sample size, data collection and analysis methods, tools, and instruments, and reliability and validity analysis as well.

3.1 Research Design

For this research, the design that was put in place is the descriptive research design. It thoroughly assessed questions characterized as, 'who', 'what', 'when', 'where', and 'how', in relation to the aspects of the process performance management of the product mix and related strategies of Lilac Manufacturing. In the end, pragmatic inferences were derived and diagnostic conclusions for Lilac Manufacturing to deploy soundly in its planning under the context of performance management were suggested.

As a research approach, it was ideal to make use of both qualitative and quantitative approaches for this particular research as it consists of both quantitative and qualitative elements. Both qualitative and quantitative data were invaluable for the research, because the qualitative data were collected from management and other personnel at managerial positions, while quantitative data would be gathered in relation to the performance of the company and its employees in particular.

3.2 Description of Study Area and Target Population

This research was able to study the process architecture area of performance measurement particularly in the case of one product mix of the manufacturing enterprise. The study further specialized in the operations perspective of the performance measurement which mainly targeted the production department alongside a target population of the workers at the operational level and the management/leadership at the strategic level of the organization.

Lilac manufacturing has a population of 40 employees that conduct work per labor hour in the production facilities and has additional 10-14 personnel at different managerial positions within the organization.

3.3 Sampling Technique and Sample Size

When coming to defining the population and sample, this research targeted Lilac Manufacturing as a whole in terms of the population, and relevant stakeholders within the company were selectively taken as the sample elements.

The population of the workers at the production unit is quite sufficient not to use any sampling technique, hence the data collection on all the 40 production workers as a whole using a census survey. As for the sampling procedure or method to be followed strictly for the management and leadership of the organization; a non-probability method particularly purposive or judgement method was placed for conducting interviews with the relevant managerial personnel of the company.

3.4 Data Collection

3.4.1 Sources of Data

The primary data was collected through providing self-administered questionnaires to the workers that the production floor via paper dissemination which is maintained 100% respondents (40) as a census survey, and a semi-structure interview was conducted with the relevant management personnel related to the company's strategic leadership and performancemanagement which focused on three managers based on their level of management. Secondary data was limited to the company profile offered by the company that dated back to 2016.

2.4.2 Instruments for Data Collection

The researcher used two main types of instruments in the attaining the necessary data for the study. These are questionnaires, which is self-administered questionnaire (for the production workers) and the semi-structured interview questions (for the leadership and management personnel). The questionnaire comprised of items using a 3–point–Likert scale. The reason for use of 3 point Likert scale is in order to know whether the employees agree, disagree, or are neutral to the activities in the product-line. (Matell and Jacoby 1971) argued that three points are good enough and furthermore, (Preston and Colman 2000) mention that the 5-point scale take more time to answer, 2 and 3 point scale format are completed faster than multi-category (5,7,11) answer formats. The semi- structured interview was carried out to collect information from the leaders which supplemented and further expanded on responses acquired from the questionnaire.

The questionnaire consisted of a series of closed-ended questions in the form of Likert scale that assessed the workers performance and perception in the work place and identify gaps in the process mapping and the variables such as cycle-time, quantity, and so forth. Management personnel were purposively selected for semi-structured interviews based on their engagement level in the organization and their proximity towards the leadership of the performance measurement of the company and its product mix.: The semi-structured interview addressed the leaders' previous strategic planning methods and also their performance measurement tools and mechanisms.

3.5 Data Analysis

3.5.1 Questionnaire Analysis

The questionnaire data was collected and analyzed by the use of Statistical Package for Social Sciences (SPSS) and Microsoft Excel. The researcher analyzed the questionnaire data by the three-point Likert scale as 1= Disagree, 2= Neutral, and 3= Agree and extraction of each item's mean values, and standard deviation, and coefficients for analysis and interpretation. This use of the software extracts by categorizing and tabulating the responses to elaborate the presentation of data.

3.5.2 Interview Analysis

The semi-structured interview focused on obtaining answers towards the qualitative elements of the management’s leadership in relation to the performance measurement and management of the employee and the product mix and was coincided with the responses of the personnel with the findings from the questionnaires.

3.6 Reliability and Validity Analysis

The analysis of performance measurement focused on the five areas was developed based on the indicated performance measurement metrics set by (Wade 2001) in which five components were of focus: cost, cycle time, quality and quantity, standard conformity, KPIs and CSFs. The validity of the questionnaire was based on a pilot conducted with 10 employees of the company and the guideline designed by David Wade in CPM analysis.

The components were included into five sections which had good internal reliability. (Kothari 2004) states that a measuring instrument is reliable if it provides consistent results.

$$r_{11} = \left[\frac{k}{(k-1)}\right]\left[1 - \frac{\sum \sigma_b^2}{\sigma_t^2}\right]$$

Category	Cronbach's Alpha	No of Items
Cycle-time	0.756	4
Cost	0.741	4
Quality	0.711	4
Quantity	0.796	4
KPIs/CSFs	0.766	4

Table 3.6.1 Reliability Statistics (Cronbach's Alpha)

3.7 Ethical Considerations

The researcher has addressed ethical considerations; the respondents' confidentiality and privacy and data were solely used for this research. The researcher guarantees to the respondents that their names and responses to the questions will be used toward this academic endeavor and will not be publicized in any form. Maintaining research's ethical standard, responses from both research tools; the questionnaire and the interview remain anonymous and remain confidential. All the necessary ethical adherence has been followed to assure that the research was conducted with moral standings.

CHAPTER 4: DATA ANALYSIS AND INTERPRETATION

This chapter focuses on the interpretation of the interview data collected from the three levels of management in the organization in regards to the process-performance measurement of the company. It discusses thoroughly the challenges gaps that exists in each of the five elements; cycle-time, cost, quality, quantity, and conformance to standard from each perspective of the management of the organization. The points raised at the interview is analyzed and interpreted in a clear manner to indicate the core matter of the study, which is, performance measurement of the product mix.

4.1. Data Analysis of the Questionnaire

A total of 40 questionnaires were disseminated to the employees of the company. The questionnaires were administered by the researcher and was conducted upon the entire population as a census survey. 100% of the respondents were available and answered the questions posed in the questionnaire. In order to illustrate the analysis in an organized manner, the demographic analysis and organization profile was presented.

4.1.1 Demographic and organization composition of the Respondents

The demographic composition of the respondents and their response were analyzed and tabulated in five categories as follows;

As observed in Table 4.1.1 below, the respondents' current area is 40.0 percent assembly, 20.0 percent quality control, and 40.0 percent packaging.

When it comes to age, 70.0 percent of the respondents were 18-25 years of age. 10.0 percent were from the age of 26-30. 7.5 percent from the age of 31-35, 5.0 percent from the age of 36-40. The remaining 7.5 percent are from the age of 41-45. 80.0 percent of the respondents were males, and the remaining 20.0 percent were females.

Based on the below Table, the organization's employees are a majority of young females, which between 18-25 and clearly has stated that it focuses on empowering women and training them to develop basic skills that this factory requires at its production line. A major of the employees are located at the assembly and packaging line of production as well with about 20% focusing on product mix testing and quality control activities.

Variables	Category	Frequency	Percent (%)
Work Area	Assembly	16	40.0
	Quality Control	8	20.0
	Packaging	16	40.0
	Other leadership positions	0	0
Age of respondent	18-25	28	70.0
	26-30	4	10.0
	31-35	3	7.5
	36-40	2	5.0
	41-45	3	7.5
	46-50	0	0
	Above 50	0	0
Gender of respondents	Female	32	80.0
	Male	8	20.0
Educational status	Primary Education (Grade 1-8)	18	45.0
	Secondary Education (Grade 8-12)	14	35.0
	College/ university first degree	8	20.0
Year of service in the organization	Below one year	6	15
	1-3 years	5	12.5
	3-6 years	19	47.5
	Above 6 years	10	25.0

Table 4.1. General Demographic Data of the Questionnaire Respondents

In the same table (4.1.), the respondents' educational status provided as; 45.0 percent had primary education, 35.0 percent had secondary education, and 20.0 university degrees. When it came to the organization's years of service, 15.0 percent have worked for less than a year, 12.5 percent from 1 to 3 years, 47.5 percent from 3 to 6 years, and the remaining 25.0 percent worked above 6 years.

This indicates that a majority of the employees do not have a university degree as the work on the production line mostly can be developed as a skill, the degree holders work in the quality control section as that is an exception when it comes to the employees' requiring degree and certification from a University. A total of 72.5 percent of the employees have at least 3 years of experience which indicates that they have a thorough understanding of the performance management and measurement of the organization for quite some time.

4.1.2 Performance Measurement Tool Questionnaire Analysis

a. Cost: Labor Cost

One of the performance measurement areas which was under question is the amount of cost that is being incurred on the product mix production; respondents were asked various questions in that aspect, one of which questioned the labor force efficiency and compatibility.

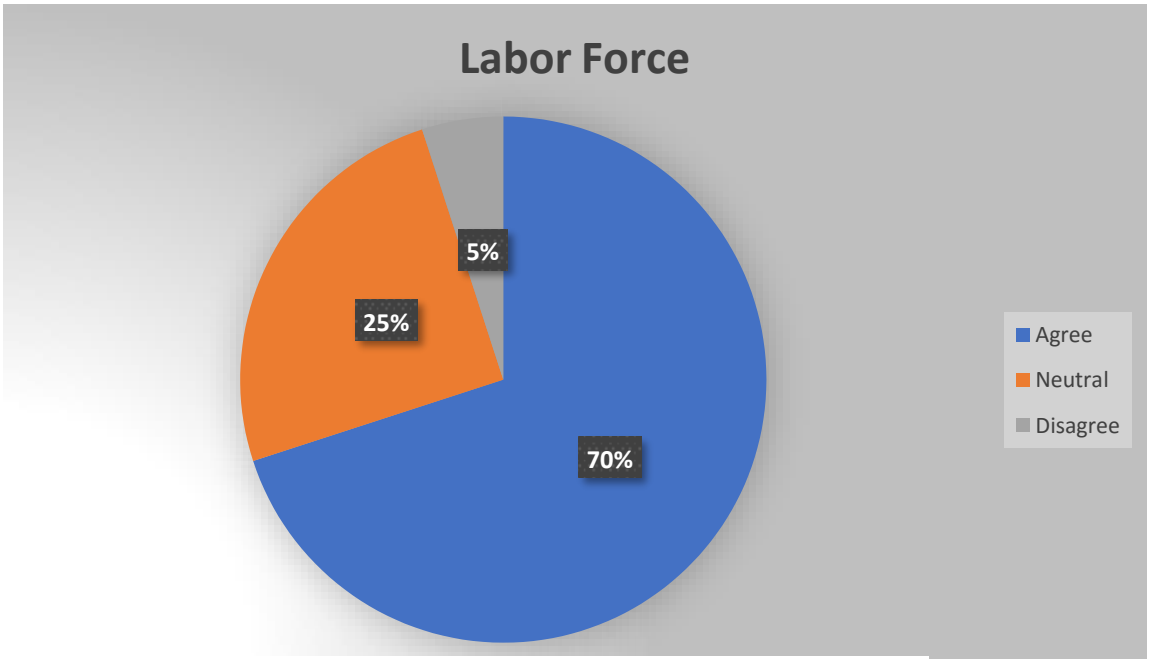

Figure 4.1 Number of work force in the production Line

The above figure (4.1) showed 70 percent (28 employees) of the factory believe that there is a surplus of employees at the production line, which would clearly suggest that the labor force is underutilized and exceeds the require amount under current job activities. 25.0 percent of the employees are undecided on the matter while 5.0 percent disagree regarding the underutilization of employees at the workforce production line. Labor cost, as one of the major elements of the cost performance measurement, based on the data clearly is indicated as one of the areas in which there is a gap that needs to be resolved.

b. Cycle-Time: Working Sample

The second major tool of performance measurement is cycle-time which focuses on the amount of time it takes at each line or segment of production within the factory. The cycle-time needs to always be short, consistent, and registered routinely particularly in a factory plant's production line alongside the respective product mix. One of the responses received from the questionnaire respondents is regarding whether there is a working sample cycle time developed by management that is put in place and is being followed.

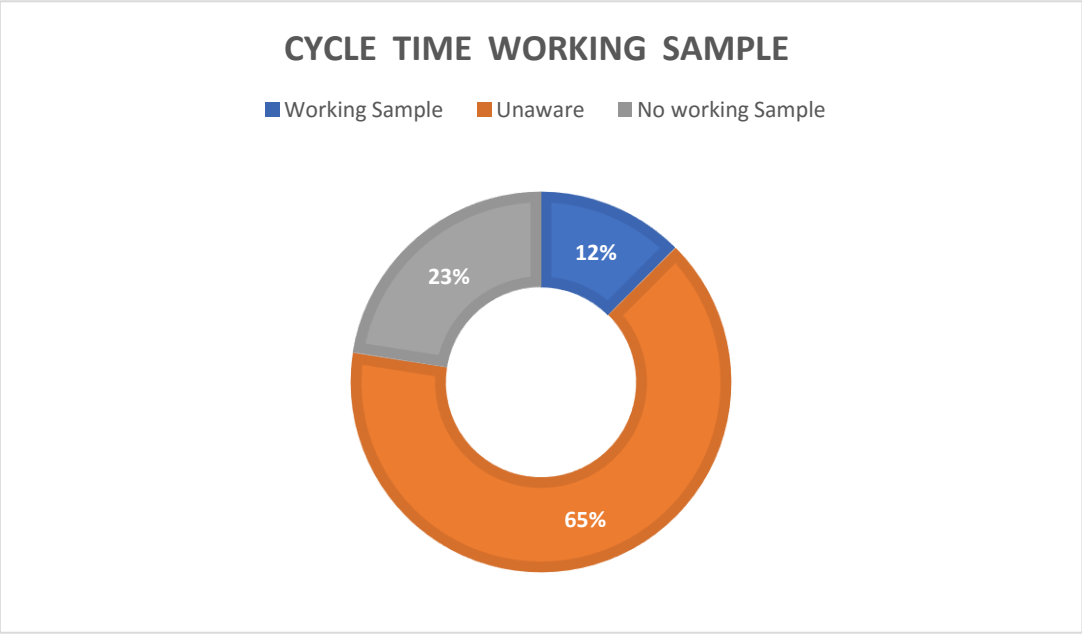

Figure 4.2 Working Sample Cycle-Time

As shown from the above figure 4.2; 65.0 percent of the employees had no awareness of any working sample used to base the cycle time of production for the product mix and hence did not base there labor and activities on any working sample metric, and 12.5 percent of the labor force stated that they are well acquainted with the working sample and affirmed that the organization does have a working sample, the remainder of the workforce, in resemblance of the 65% stated that there is no working sample in place from which their performance is measured at all. As mentioned in chapter one, working sample according to (Wade 2001) is an approach in which cycle time process performance metrics measures the all-out slipped by time to finish a particular process.

c. Quality: Product Mix Material

The third tool of the operation's perspective performance measurement is quality which focuses on the management of the standard of product mix rather than merely focusing on the amount and time of production, Hence, the concept of quality is an integral part of operations management and is concerned regarding the attributes of the product and how it meets the need of clients. Quality in particular to the context of this product mix evolve around;

- Overall preference
- Leakage protection
- Skin dryness
- Skin friendliness
- Handling (putting diaper on and taking it off)
- Fastening system
- Softness

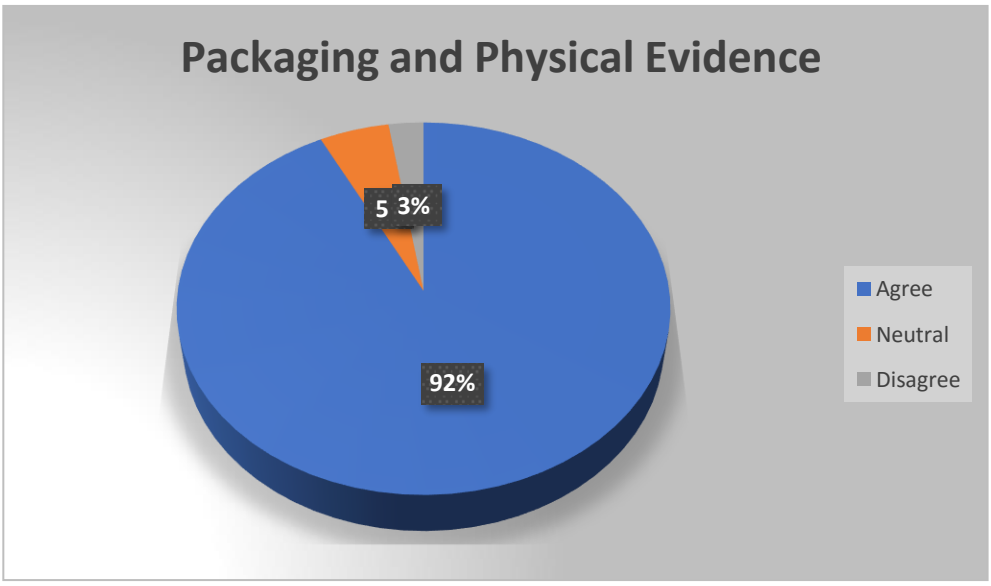

Figure 4.3 Product Mix Quality (Packaging and Physical Evidence)

The above figure 4.3 indicates; 92.5 percent of employees the agree that the product is, in terms of quality operational perspective, good indicating to areas such as the advanced leakage protection, skin protection and other amenities and attributes of the product. 5 percent of them did not have an opinion on the matter and prompted to stay neutral or undecided, 2.5 percent disagreed with the notion that the product has good quality and features for usage by consumers. The data overwhelming shows and suggests that the majority of the workers, who have first-hand exposure in manufacturing, believe that the product mix has good quality features and attributes and implies that only a very small gap if any exists when it come to the operational perspective of quality performance measurement.

d. Quantity: Production and Packaging

Another main tool for performance measurement is Quantity, it focuses on the economies of scale (EOS) when it comes to producing a large amount in a short span of time. The biggest challenge when it comes to EOS is having the right technology (advanced) which would enable the mass production of company's product mix while maintaining the right amount of quality that is required; this would enable the company to relatively reduce its variable cost and leverage its fixed cost.

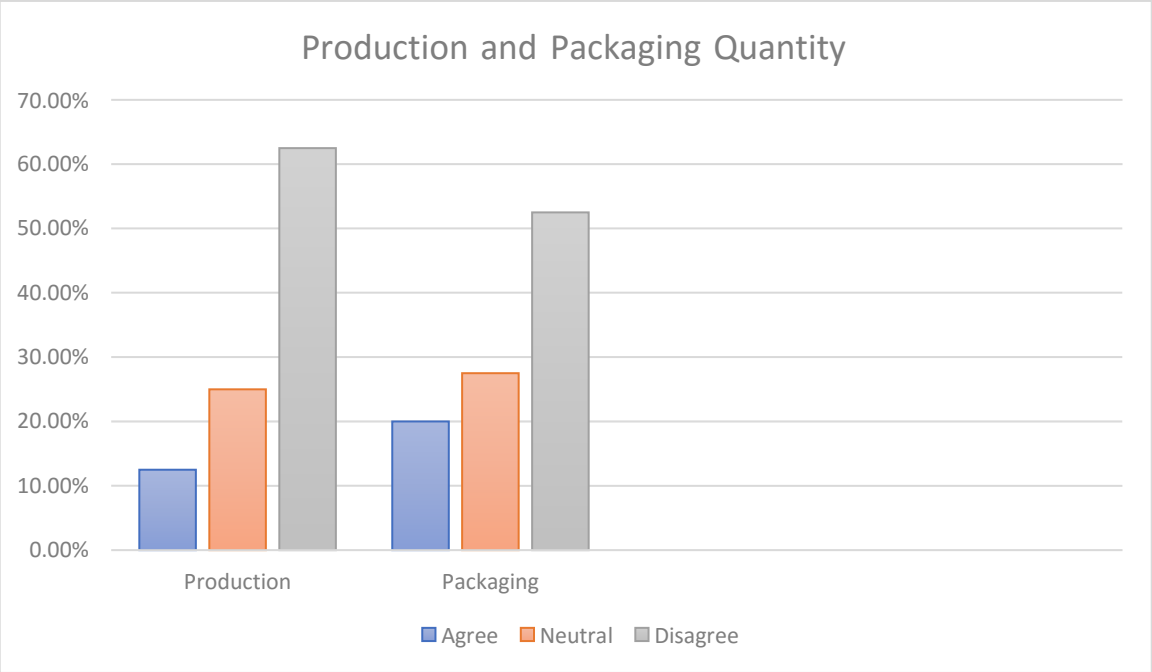

Figure 4.4 Production and Packaging Quantity

As shown from the above figure 4.4; 12.5 percent of the employees agree that the factory is producing and they are working at an optimum level of production every day, 25.0 percent of them did not have an opinion on the matter and prompted to stay neutral or undecided, 62.5 percent disagreed and claimed that the factory is not producing at its optimum level. The data overwhelming shows and suggests that the majority of the employees express that they do see the factory being capable of producing larger amount of units per day which would expand on the EOS of the factory and increase revenue amongst other benefits including reaching larger groupsof customers and utilization of production line labor.

In the second segment of the figure 4.4; 20.0 percent of the employees agree that the current amount of quantity per each package is suitable the market and production, while 27.5 percent of the employees remain neutral and are undecided on whether the amount of quantity is suitable. But 52.5 percent of the employees, a majority, express that an increase in quantity per package is suitable for production and effectively for the market as well. This, as a result, indicates towards higher quantity and production necessity.

e. KPIs and CSFs/KSFs

The other indispensable part of process performance management is the KPIs and CSFs/KSFs of an organization. Each have a profound significance in dictating the performance, the direction and diagnosis of the performance, and the ultimate success of the company in its respective sector of business. Areas such as machinery advancement, reliability, low-cost provisions, and innovation are some of the KSFs that factories usually possess. When it comes to KPIs, indicators such as manufacturing cost, time, predictability of cost and time and product conformance is vital for any manufacturing company.

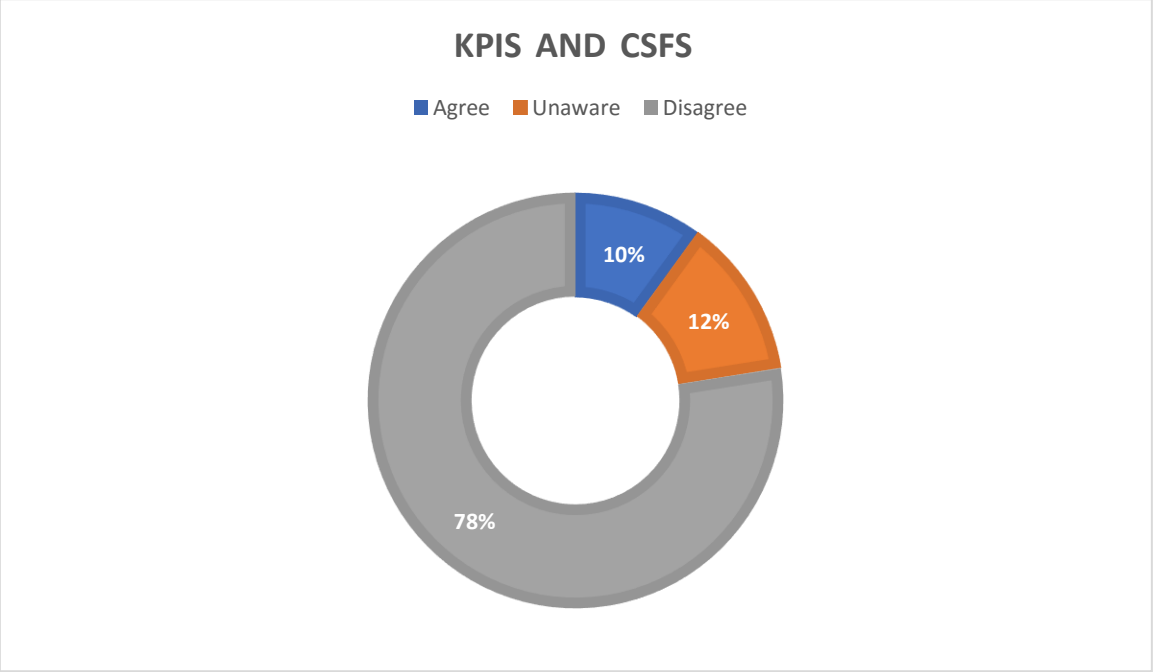

Figure 4.5 Key Performance Indicators existence in the company

The above figure 4.4 shows the statistics in regards to the workforce awareness of any KPIs and CSFs in place within the organization. 10.0 percent of the employees agree that know at least one KPI/CSF, 12.5 percent of them are unaware of any indicators or success factors that exist within

the factory, and 77.5 percent disagree that there are any indicators put in place by the company to measure performance. Overall, the data shows that 90% of the workforce is basically uninformed and unaware of any KPIs and CSFs they must follow in order to meet the performance objectives of the organization and its product mix production, management, and measurement capabilities.

4.2 Discussion of the Performance Tools based on the Employees' Response

The results obtained from the questionnaire have been further discussed using various statistical data analysis tools such as mean and standard deviations. Accordingly, detail of the analysis is presented below as follows:

Cost	Minimum	Maximum	Mean	Std. Deviation
MD	1	3	1.4	0.949
RM	1	3	1.725	1.396
LC	1	3	2.65	2.168
VC	1	3	2.375	1.962
Cycle Time				
WS	1	3	1.9	1.432
CTR	1	3	2.6	2.156
CTF	1	3	2.575	2.168
PCT	2	3	2.85	2.324

Table 4.2.1 Arithmetic mean of Cost and Cycle-Time of Employees

As we have seen from Table 4.2.1, regarding the first performance measurement tool, cost, the MD (Machine depreciation) mean value is 1.4 with a standard deviation of 0.949. The mean value of the RM (Raw material wastage) is 1.725 with a standard deviation of 1.396. The mean value of the LC (Labor wastage) is 2.65 with a standard deviation of 2.168. The mean value of the VC (variable cost reduction) is 2.375 with a standard deviation of 1.962. The second metrics used was cycle-time in which the mean value of the WS (availability of working sample cycle-time) is 1.9, with a standard deviation of 1.432. The mean value of the CTR (Cycle Time reduction) is 2.6, with a standard deviation of 2.156. The mean value of the CTF (Cycle Time fluctuation) is 2.575 with

a standard deviation of 2.168. The mean value of the PCT (Precise Cycle-time necessity) is 2.85 with a standard deviation of 2.324.

Quality	Minimum	Maximum	Mean	Std. Deviation
LPS	1	3	2.55	2.109
PH	1	3	2.7	2.213
MSSF	1	3	2.63	2.156
PPE	1	3	2.9	2.376
Quantity				
ODP	1	3	1.5	1.118
QPP	1	3	1.68	1.322
QI	1	3	1.7	1.322
CS	1	3	1.38	0.948
KPIs and CSFs				
KPIs	1	3	1.33	0.921
CSFs/KSFs	1	3	1.33	0.921
M&E	1	3	1.8	1.449
KPI/CSF Importance	1	3	1.48	1.024

Table 4.2.2 Arithmetic mean of Quality, Quantity and KPIs/CSFs of Employees

As can be seen from Table 4.2.2, regarding the quality performance measurement tool, the LPS (Leakage protection) mean value is 2.55 with a standard deviation of 2.109. The mean value of the PH (product handling) is 2.7 with a standard deviation of 2.213. The mean value of the MSSF (Material soften and skin friendliness) is 2.63 with a standard deviation of 2.156. The mean value of the PPE (Packaging and Physical Evidence) is 2.9 with a standard deviation of 2.376. Another major metrics used was quantity in which the mean value of the ODP (Optimum daily production) is 1.5, with a standard deviation of 1.118.

The mean value of the QPP (Quantity Per Package) is 1.68, with a standard deviation of 1.322. The mean value of the QI (Quantity Increase) is 1.7 with a standard deviation of 1.322. The mean value of the CS (Conformance to Standard) is 1.38 with a standard deviation of 0.948. The final performance measurement tool focused on KPIs and CSFs, the KPIs (Key Performance Indicators awareness) mean value is 1.33 with a standard deviation of 0.921 which is identical to the CSFs

(Critical Success Factors awareness) mean value of 1.33 with a standard deviation of 0.921. The mean value of M&E (Monitoring and Evaluation role of leadership) is 1.8 with a standard deviation of 1.449. The mean value of the KPIs/CSFs importance is 1.48 with a standard deviation of 1.024.

The majority of the data indicates that the employees have varying view in the different metrics while there are clearly areas in which they hold relatively common views and agreement to a certain extent.

4.3. Analysis and Discussion of the Interview Results

Interview sessions were held with the three managers of the firms based on their hierarchy in the management level of the organization and their respective strategy development capabilities. The first interviewee was the top-level manager, the Chief Executive Officer (CEO) of company; the second interviewee was the (GM) General Manager of the factory who it positioned as a middle-level manager, and lastly a lower/frontline manager, the production/manufacturing Manager was an interviewee as well. All the managers were male. The range of their work experience in the industry is between 6-30 years. The General Manager had been recently (over a year) been promoted from Manufacturing manager, hence has profound expertise regarding the manufacturing division as well.

The semi-structured interview that included mainly twenty-one questions was conducted to understand and assess the current role of leadership in the organization when it comes to how to manages and measures its performance as to offer a better product mix. The focus of the interview evolved around the five operation perspectives, which namely are; cost, cycle-time, quality, quantity, and conformance to standard, alongside questions in relation to performance indicators and success factors (KPIs and CSFs) that the company adopted to the production of its product mix. The researcher followed these respective procedures to conduct the interviews and to create a rapport; the researcher communicated with interviewees in advance, particularly with the CEO.

There was a request to view the interview manuscript beforehand by the CEO, who eventually offered a particular time and date in which the interview was conducted inside the factory compound face-to-face with each interviewee.

The interview guide (see appendix 2), which was adopted from and identified the problem areas in (Wade 2001) which expresses the operational perspective alongside the performance measurement tools that include the five gap areas. The interview as mentioned mainly consists of twenty-one questions directed to the strategic, tactical, and operational leaders of the organization. The first section (five questions) focused on the cycle-time management of the organization and how it manages its time, what philosophies or benchmark approach it follows and other questions in that area of cycle-time.

Questions 6-9 revolve around the cost performance and management of the company in relation to labor, depreciation, carry over, and other costs that could hinder performance. The third segment focused on questions in relation to how the company evaluates and measures the quantity of production for the product mix and also the level and type of quality that goes along with that. Questions 13-15 focused on identifying and assessing the methods and metrics used by the company to assure that the product mix are up to acceptable and safe standards set nationally and internationally, and also understand where that fits within their performance measurement.

The last batch of question pertain towards assessing the flagging method of the organization, whether they have KPIs and CSFs, and how they put them into place in order to forecast and diagnose the performance of the company when it comes to its operational perspective activities and the product mix.

INTERVIEW SECTIONS	CONSOLIDATED INTERVIEW RESPONSES
Cycle-Time Performance Tool	• Takes 1 minute to produce 1 diaper • Takes 3-5 minutes to package a diaper • Benchmark company: BuBu Bear (Chinese factory) • Initial working sample of company includes 1 diaper/sec • Company does not have a specific cycle-time philosophy or approach

Table 4.3.1 Interview Summary Cycle Time

INTERVIEW SECTIONS	CONSOLIDATED INTERVIEW RESPONSES
Cost Performance Tool	• Variable cost relatively high per diaper; materials such as SAP, pulp, and packaging becoming high in price • Factory open only 8 hours a day, no shifts. Employees work on both product mix, no division • Depreciation calculated based on useful life of machineries, all machines are first-hand with useful life of at least 40 yrs. • Carry over cost minimal as factory has its own warehouse plants and defect seldom occurs which is covered easily.

Table 4.3.2 Interview Summary Cost

INTERVIEW SECTIONS	CONSOLIDATED INTERVIEW RESPONSES
Quantity and Quality Performance Tool	• Quantity being produced not at the optimum level and does not meet demand in the market • The package comes in two types and four sizes • The quality of the diaper is strictly tested and maintained by the quality control division that assures quality conformance

Table 4.3.3 Interview Summary Quantity and Quality

INTERVIEW SECTIONS	CONSOLIDATED INTERVIEW RESPONSES
KPIs and CSFs Performance Tool	• Main KPIs established are time per diaper (cycle-time) and amount produced (Quantity) • No distinctive factors but the CSF of the company focuses on quality maintenance and conformance. • The factory does not use a Balanced Score card but rather focuses on set guidelines and checklists. • No process mapping used to illustrate workflow and activities

Table 4.3.4 Interview Summary KPIs and CSFs

Top Level Management

All leaders describe the significance of corporate performance management and its impact in the manufacturing industry. The CEO express how this company has been in the making for the past 30 plus years since 1991, when they had started out with Italian machinery and reformed the company in 2016 with modern American standard state-of-the-art machineries. When asked about the operations perspective of the company from the top level (strategic management and leadership);

Our main focus is on minimizing cost and maintaining quality. We previously focused on bring raw materials such as pulp and SAP from Japan which is of very high quality not even available with other big competitors. That was spiking our cost and was not ideal for a cost-sensitive [cost-focused] company. While maintaining standards set by ECAE [Ethiopian Conformity Assessment Enterprise] and ESA [Ethiopian Standard Agency], we have found cost efficient suppliers from China.

When asked about the quantity of production and the cycle-time management, the CEO admitted that there is a gap in those aspects of performance and stated, “it’s a work in progress” and emphasized the need for a calculated and measured workplan that aids in cutting the cycle-time in results in larger scale of economies.

Middle Level Management

The General Manager in involved in making decisions at the tactical level of the organization. Its main focus is overseeing the divisions below like production management and others. It assures that monthly goals are met, in manufacturing, sales, marketing, and so forth. When it comes to performance measurement in the manufacturing division, the General Manager indicated that KPIs are important;

We do have Key performance indicators such as time per unit [cycle-time] and quantity, we regard those as the key indicators of the performance of the production department. Our main success factor would also rely on the level of conformity to quality standards in place.

The GM expressed that they do not have tools such as Balance Scorecard, process mapping, and similar performance measurement tools but rather use guidelines and company policies to measure and maintain performance.

Functional/Lower-level Manager

The production manager is in charge of the production division and oversees the workers at the production plant as well as supervising day-to-day operational activities regarding product mix assembly, quality control, and packaging.

The production manager expressed that there was an initial working sample that was introduced for the cycle-time, the workers at the plant with a mean of 1.9, mostly are unaware of any working sample that exists. The PM express that;

The cycle-time at the quality control and packaging is stable and efficient for us and we want to decrease the amount of time spent at assembly. One diaper/second could be a huge challenge, realistically we plan of 30 seconds [per diaper].

The PM reiterated that the biggest challenge lies in cycle-time and cost efficiency which can affect quantity as well. The quality is always assured efficiently by the quality control section workers, with one diaper being capable of carrying up to 850 ml of liquid during a test illustrated.

To summarize, the employees have with a mean of 2.6, agreed that there can be better cycle-time management and performance, and the manager has expressed the need for a process mapping tool and a Balanced Scorecard which would change the performance of the manufacturing plant and the product mix.

CHAPTER FIVE
SUMMARY, CONCLUSION AND RECOMMENDATION

This chapter summarizes the significant findings, conclusions inferred from analysis and discussion of the analysis from the previous chapter, and the recommendations.

5.1 Summary of the findings and discussions of the results

The concept of Corporate Performance Measurement, or process performance measurement to be specific is something has not yet been adopted to an advanced level in the Ethiopian context. Despite that, it is necessary assess the current standing of performance measurement in the manufacturing sector in particular. Based on this research which focused on the operation's perspective of corporate performance measurement, the key areas in question focused on; the cost performance measurement (labor, machine, variable cost…), the cycle-time performance measurement which was concerned with the working sample and amount of time spent in production for a product mix, the quantity and quality performance measurement, the conformance to standard and KPIs and CSFs performance measurement as well. The performance measurement ability and activities of this particular manufacturing company was assessed both qualitatively and quantitatively via the production line workers and also the management at each level of the organization, and the following significant findings were reached:

- This study sets out to assess the gap areas of the performance measurement tools of the organization starting with the cycle-time; the product line workers express 2.58 mean, that the cycle-time is 1 minute but fluctuates and that it is not consistent. The production manager has admittedto having an unrealistic working sample for the cycle-time which was not communicated to the employees to a larger extent (87.5%).
- The cost performance measurement as expressed by the CEO is a challenge as they are in the process of reducing raw material cost from suppliers, on the other hand labor force is

underutilized and as a result incurs unnecessary cost this is further indicated with a mean of 2.65.

- Quantity performance measurement, as expressed by the GM, is one of the main or key performance indicators but there resides a gap in optimum production which can result from cycle-time and cost factors; the employees have indicated with a mean of 1.5 that optimum production is not attained daily and quantity per package is regarded as being unsuitable as well.
- Quality performance measurement by far has the lowest gap with management expressing strict control of adhering to national and international standards (USA) as well as a majority of employees expressing the quality aspect and measurement as being sufficient with a mean of 2.9 for product and packaging quality.
- KPIs and CSFs as well as process mapping measurement were areas which had the biggest void as both the management and the workforce expressed huge lack of aware and knowledge when it came to adopting such measurement tools. With a mean of 1.32, the workforce was overwhelmingly unacquainted to such measurement tools and the management admitted to focusing more on company guideline and policies rather than conducting an audit and developing a such significant measurement metrics and tools.

5.2. Conclusion

Corporate performance measurement is an integral part of any organization and performance measurement is an essence when it comes to manufacturing companies which cannot be managed if not measured, hence particularly in an organization that is cost-focused, measurement of cost, cycle-time, quality, quantity, conformance to standard, KPIs and CSFs are relevant to a huge magnitude.

The performance measurement and management of Lilac Manufacturing in those aspects have shown significant gaps;

- When it comes to cost, areas such as material, labor, and variable costs are still "work-in-progress" for the company but clearly show huge void in which labor utilization and economies of scale can be established. One the other hand, carry over cost and machine depreciation are management to a sufficient extent.

- Cycle-time is one of the key performance indicators for any organization particularly for a manufacturing company. There is no viable working sample which needs to amended alongside the lack of process mapping. Cycle-time of diaper production and assembly is where is lies a hugeconcern of time management and efficiency, the management intends on reducing time by 30 sec.
- Quality of the product is the one performance measurement, alongside standard conformance,that the organization excels at with strict adherence to the quality guidelines of not only Ethiopia but the management has indicated that the standard is based in US guidelines and the quality control measurement taken clearly prove that as being the case.
- Quantity performance measurement is related to the cycle-time as the less time it takes to producea diaper or any of the product mix the more time there is to increase amount of output/quantity. The amount of quantity per package can also be expanded to meet demand. In general, quantity clearly seems to be an end rather than a means.
- KPIs and CSFs are part of the performance measurement metrics which enable an organization tofocus and be goal-oriented towards a few elements in order to succeed. The biggest challenge in this regard is the lack of development of such measurement tools by the management and as a result the lack of awareness from the workforce. Such measurement tools are not adoptedindependently. There must be a development in relation to Balanced Score Cards and process mapping.

5.3 Recommendations

These are the suggested recommendations relying on the study's findings and conclusions.

- The cost performance measurement of the has been indicated as being one of the areas where there is a gap, this is mainly due to a lack of costing approach or mechanism; this has resulted in underutilization of workforce, material cost, and other variable costs. It is

recommended that the organization forego this traditional method of cost accounting adopted the ABC approach for instance; Activity-Based Costing is the basic technique of ABC is to analyze the indirect costs within a company and to discover the activities that cause those costs. Such activities are called “cost drivers” and can be used to apply overheads to specific products. In this way, it is believed that ABC results in a more accurate identification of costs than traditional cost allocation.

- Cycle-time has been described as both a source of competitive advantage and the fundamental measure of manufacturing performance (Drucker 1990). There evidently exists a gap when it comes to the cycle-time measurement and management for the product mix in the production line. It is recommended that the management first develops a working sample based on an ideal benchmark company and continue to follow an approach such as JIT (Just-in-time) or OPT (Optimized Production Technology) which in particular based on the identification and the removal of bottle necks, origin of useless elements, in the production line.

- Quality and Conformance to Standard performance measurement areas have been much more solid and both management and workforce attest to the adherence of good quality control and measurement. It is recommended that the organization could further adopt quality management to a higher level using the Six Sigma Standard (Define, Measure, Analyze, Improve, Control) and conformity to standards can better be solidified via establishment and adherence of SLA and SPO means.

- Quantity is another performance measurement tool that is a key indicator but also has been describes as an end rather than a means; which is to say, cycle-time plays a role in the amount of quantity that can be further produced. The quantity per package needs to be evaluated from an external perspective as well so as to determine the ideal amount of quantity per package based on best practice and market leaders/competitors.

- KPIs and CSFs lack substantially within the organization which is a huge concern in both in the short-term and long-term performance of the company. Developing a process map

based on the EFQM business excellence model, establishing a Balanced Scorecard and process mapping, and following best practice approach is recommended by which KPIs can be established within the organization evolving around specific CSFs from other successful companies as benchmark.

5.4 Suggestions for future research

This study is conducted only on one of the five perspectives of Corporate Performance Measurement in relation to process performance measurement which was based on a company that has a strategic focus in relation to cost. Hence, in accordance to (Wade 2001) operation perspective of corporate performance measurement includes five major elements; cost, cycle-time, quantity, quality, and conformance to standard while also involving elements such as KPIs and CSFs, and process mapping activities. The research was also focused on a manufacturing sector company and only on one of the product mixes.

Corporate Performance Management is a vast concept which encompasses numerous topics and disciplines, hence the ideal suggestion for future research activities would be to expand the scope of such studies so as to include perspectives such financial, organizational, customer, and growth and innovation perspectives so as to get an overall picture of the entire corporate performance management at all three levels of performance measures which are organization, process, and job.

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APPENDIXES

Appendix 1

SURVEY QUESTIONNAIRE

AAU College of Business and Economics School of Commerce

Business Leadership Program

Dear respondent,

The objective of this questionnaire is to gather firsthand information that will help to assess the product mix process performance measurement elements in Lilac Manufacturing. This study is undertaken as a partial requirement for the completion of Masters of Business Leadership Program (MBL). The entire data and information that will be gathered through this questionnaire will be used for the sole purpose of the research and will remain confidential. Therefore, you are kindly requested to respond to the questions with utmost honesty, freely and to the best of your knowledge and ability. This questionnaire is self-administered by the researcher. **Thank you for your cooperation.**

Section I General Profile (Please put √ or X on that best represent you in the selected box)

1. As a blue-collar worker on the factory floor, in which segment do you focus more?
   - ☐ Assembly
   - ☐ Quality Control
   - ☐ Packaging
   - ☐ Other area _____
2. Age
   - ☐ 18-25
   - ☐ 26-30
   - ☐ 31-35
   - ☐ 36-40
   - ☐ 41-45
   - ☐ 46-50
   - ☐ Above 50
3. Sex
   - ☐ Female
   - ☐Male
4. Educational Status
   - ☐ Primary Education (Grade1-8)
   - ☐ Secondary Education (Grade 8-12)

☐ College/ University First Degree

☐ University Second Degree

☐ Other_____

5. How long have you been serving your organization?

☐ Below 1 year ☐ 3-6 years

☐ 1-3 years ☐ Above 6 years

Section II. Main Section

Likert Scale Questions						
The Five Gaps of Process Performance Measurement						
			Example	**1**	**2**	**3**
Rate based on the following scale. Choose the alternative which best describe you.						**X**
1	Disagree					
2	Neutral/Undecided					
3	Agree					
Performance Measurement Tools						
Cost						
				1	**2**	**3**
1	The machineries are depreciating at a constant and rapid rate					
2	Raw materials and other product mix resources are being wasted and not used efficiently and effectively					
3	There is a surplus amount of labor force operating on the factory floor					
4	Material cost or variable cost of the product mix can be reduced substantially					

Cycle-Time						
				1	**2**	**3**
5	There is a working sample cycle time developed by management					
6	The cycle time for the product mix can be significantly reduced from its current state					
7	Cycle-time of production fluctuates daily or routinely					
8	A precise cycle-time is necessary and will positively aid your performance in production					
Quality						
				1	**2**	**3**
9	The product had a great leakage protection system					
10	The handling (attaching and detaching) on the product is intuitive					
11	The materials used on the product is soft and skin friendly					
12	The packaging and physical evidence of the product (feel and look) is of good quality					
Quantity and Conformance Standard						
				1	**2**	**3**
13	The daily amount of product mix production is at an optimum rate					
14	The current amount of quantity per package is suitable and the ideal amount					
15	Increase in quantity can have an adverse impact on the quality					
16	Conformance to standard is strictly supervised and appraised constantly					
KPIs and CSFs				**1**	**2**	**3**
17	There are KPIs in our production process that we know of					
18	There are CSFs/KSFs in our production process we are aware of					
19	Managers play a leadership role by monitoring and evaluating performance					
20	KPIs and CSFs are important in production of the product mix					

Appendix 2

INTERVIEW QUESTIONNAIRE

ADDIS ABABA UNIVERSITY COLLEGE OF BUSINESS AND ECONOMICS
SCHOOL OF COMMERCE
GRADUATE STUDIES PROGRAM
Department of Business Leadership

I would like to express my great gratitude in advance for your willingness to spend your time to provide answers for this academic research. The main purpose of this study is to assess the product mix process performance measurement and understand the gap areas within this research topic. As this study is meant only for academic purpose, the provided information from this interview shall remain confidential at all times. I kindly request your cooperation in the following questions ask for utmost honesty for the accuracy of our research.

The Interview Questions and Guides

A. Preliminary Questions

1. What is your name and position in the company?
2. How about your history in the company (previous titles, roles and responsibilities, how many years in each role)?
3. Which department do you currently represent and what are the main activities of your section/division?

B. Cycle Time Measurement Tool (PM)

1. Does your [department] have a cycle time management, if so, can you explain how it works?
2. What cycle time philosophy does your organization/division follow (example JIT/Just-in-time)?
3. Does your organization have a benchmark cycle-time (best practice it follows), and if so, which similar organization is its benchmark and what is their commonalities?
4. Has your organization/division developed a working sample of its own, and if so, what were the gaps and conclusions?
5. Do both product mixes have a similar cycle-time or are there variances, if so please elaborate?

C. Cost Measurement Tool (GM)

1. How does your [division] calculate its production cost/manufacturing cost in terms of variable and fixed costs per unit of production?
2. How is the labor or working hours of the factory workers divided and utilized based on the product mix types and work shifts?
3. Does the organization forecast and predict its depreciation and repair/maintenance cost of machineries prior and how does that fit into the cost measurement metrics of the organization?

4. How does the organization handle carry over cost and potential defects throughout the process mapping?

D. Quantity and Quality (CEO)

1. How many units is the optimum level the organization can produce and how many units is it producing in comparison to that?
2. What are the package types for each product mix in terms of quantity and models?
3. How is the quality of your products measured in terms of raw materials used and features of each product mix?

E. Conformance to User Standard (PM)

1. How does the organization determine the product mix's fitness for use, what are the metrics?
2. What are the measures in place identified to assess product reliability?
3. What are the specifications and procedures followed in order to conform with user standards for each product mix in context to international performance measurements?

F. CSF's and KPI's (GM)

1. What are the KPIs established by the organization as performance measurement tool?
2. What are the CSFs that are established by the organization and how were they regarded as CSFs?
3. Does the organization have a Balance Scorecard, if so, expand on its development?
4. Does the organization/division have a process map and how does it align with the organization's strategic leadership in performance measurement?
5. Does the organization have an activity chart it deploys in each division, if so, what elements does it consider?
6. Does the organization have a task analysis/work flow map or illustration of its performance processes?

Thank you for your time