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PERFORMANCE MEASUREMENT AND IMPROVEMENT OF ETHIOPIAN GARMENT INDUSTRIES

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DECLARATION

I hereby declare that the work which is being presented in this thesis entitled, **"PERFORMANCE MEASUREMENT AND IMPROVEMENT OF ETHIOPIAN GARMENT INDUSTRIES"** is original work of my own, has not been presented for a degree of any other university and all the resource of materials used for this thesis have been duly acknowledged.

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ABSTRACT

The Ethiopian economy is dominated by the agricultural sector where in order to strengthen and develop the economy; industries need to develop hence such type of industry that has a significant contribution in country economic growth is garment industry. Though the sector has a huge potential for developing an economy, the Ethiopian garment industries performance is unsatisfactory due to external and internal problems that are hindering the sectors competitiveness [25].

Ethiopian garment industries need to improve their performance in order to be competitive in local as well as international market. The garments need to be of high quality of international standard, low cost and on time delivery simultaneously. Where the thesis aim is to determine the key performance improvement areas, assess the performance measurement and improvement practices and make relevant recommendations and propose a performance measurement and improvement model for the garment industries.

To undertake this research primary and secondary data are collected in thirteen garment industries by using a well structured questionnaire, interviews and personal observation as well as by referring previous research works. From the research it is clear that the garment industries have both internal and external factors that are cause for low performance and competitiveness. Internal factors include poor performance measurement practice, low financial capacity, and low productivity, high cost of production, poor quality garment, poor logistics handling as well as poor customer and supplier relation. The research concludes by proposing a model for the performance measurement and improvement of the garment industries along with the implementation steps for the model.

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ABBREVIATIONS

ADLI- Agricultural Development led Industrialization

AGOA-African Growth Opportunity Act

CAD- Computer Aided Design

CAM- Computer Aided Manufacturing

CMT-Cut-Make-Trim business

COQ- Cost of Quality

CSA- Central Statistics Agency

EBA- Everything but Arms

FDI- Foreign Direct Investment

FOB- Free On Board

GSP- Generalized System of Preferences

ISO- International Standards Organization

LDC- Least Developed Countries

PCDA-Plan-Do-Check-Act

QC-Quality Control

QMS- Quality Management System

SPC- Statistical Process Control

TAI-Textile Apparel Institute

TQM- Total Quality Management

WRAP- Worldwide Responsible Apparel Production Principles

CHAPTER ONE -INTRODUCTION

1.1 Research Background

Garment industry is one of the industries that have a potential in developing an economy such as Ethiopia. History depicts that this industry sector has been a base for many successful industrial developments [3] and hence Ethiopian government has defined a policy where one of the tasks identified is rapid export growth through production of high value agricultural products and increased support to export oriented manufacturing sectors such as textile and garment [15].

Garment making is a very ancient crafts with history almost as old as mankind itself and have always been serving basic need of humans. The industry is labor intensive which makes it more convenient for developing countries due to available low wage labor and since labor cost is more expensive compared to other production costs. Hence the garment industry serves source of employment, income generation and export earnings.

In Ethiopia the sector is playing a major role in the strategy of ADLI, as it is closely linked in backward integration with the agricultural sector in terms of raw material supply (abundant raw material such as cotton and vertically integrated textile industries) and taps into the huge global textiles and garment market (forward integration)[25].

In Ethiopia the first industrialized garment industry dates back to the 1960s, with the establishment of Addis garments. Akaki garment was founded in 1963 followed by the Adey Ababa yarn sh co, Gulele garment and Nazereth garment factory. These garment factories have dominated Ethiopia's garment sub-sector where in the last ten years a number of private garment industries have been established and currently there are around thirty nine garment industries [19]. The garment products made mostly constitute uniforms, work wears, and knit wear products like sportswear, under wears, polo shirts etc.

Due to globalization, its effects in business environment and due to the specific market nature of the garment industry including short product life cycle, high volatility, low predictability, and a high level of impulse purchase, quick response of market industries are facing greatest challenges. Hence Ethiopian garment industries find themselves in difficult position to be competitive even in local

market due to available imported Chinese readymade garments, good quality with variety design at low price.

Moreover due to labor wage increasing in developed countries, the apparel manufacturing has been migrating from the high wage developed world to developing countries due to availability of low wage labor [3]. Following these, different trading means such as CMT and FOB, outsourcing of the production activity, have been formed by developed countries. Hence low wage labor is one of the competitiveness advantages of the industry. Furthermore due to the US and EU customers requirement the Chinese apparel manufacturers are under limited restriction of exporting to these countries which provides more opportunity for other garment manufacturers.

One of the developing countries lead exporters of apparel Bangladesh success is proper utilization of the phase out of the export quota system and the low wage labor existing [29]. In addition, different preferential market accesses have been available to the industry, by US and EU such as AGOA and EBA respectively [24] to developing countries including Ethiopia which allow free of quota export to these countries.

Furthermore it is to be noted that it is impossible to improve performance of an operation and company without measuring it, performance measurement is vital in organizational management and operational system. The industries are characterized by poor performance measurement (evaluation) system mostly, characterized by implementing financial performance measurement including return on investment rather than such as quality measurement, employee performance measurement, customer satisfaction evaluation. Hence this research focuses on the performance measurement and improvement of the Ethiopian garment industries.

1.2 Problem Statement

Ethiopia's industrialization strategy has given top priority to garment industries, since this sector uses natural resources and it is labor intensive. Furthermore it meet the basic principles that are put in the industrial strategies of the country including employing large labor force, using agricultural outputs as inputs and creating the opportunity to be internationally competitive. However, the practice of the country in garment industries has been insignificant.

Ethiopian garment manufacturers did not use the advantage of the available large labor in the sector as well as the preferential market access provided by EU and US such as EBA and AGOA respectively. The reasons for these are manifold, and extend vertically through the supply chain from inadequate raw materials to poor finishing. There are external and internal factors that directly or indirectly affect the performance of Ethiopian garment industries. The internal factors are those within the control of the industries and directly related with the performance activities of the industries while the external factors are those which are beyond the control of the individual garment industry [25].

Even though about twenty five textile industries exist, due to insufficient and poor quality of the local fabrics, competition in market is impossible, in addition limited accessory industries exist for buttons, zippers, lacework and liner cloth etc. thus garment industries are forced to import fabrics and accessories. Where, importing has its own problem since the industries lack financial capacity, foreign purchase skills and don't have proper supplier's evaluation system, good quality with optimum price and minimal delivery time couldn't be achieved.

Another major performance factor is poor quality products and this result due to poor understanding of quality by employees, less management commitment on quality assurance rather on quantity. Furthermore customers are not involved in product development stage and industries don't properly do market research hence a gap exists between customer requirement and garments made, which results in poor performance activities in market and less satisfaction of customers.

Quality control is done by using visual inspection which is not effective and mostly attention is given for detecting defects of the products rather than preventing it during production. Hence no analysis is done by using quality control techniques, which lets the industries, monitor their processes and determine whether they are in or out of control.

The other major performance problem is the low productivity of the garment industries due to lack of skilled labor, poor working conditions and absenteeism etc. Furthermore Ethiopian garment industries have low capacity utilization and high cost of production has made the industries less competitive in market. Moreover most of these industries have a working capital problem for purchasing good quality raw materials, purchase of modern equipments and personnel training that are essential for productivity enhancement and quality control.

Moreover the industries have poor reputation for keeping delivery lead time in which should develop proper scheduling. The level of automation has also an effect for poor performance of the industries. Medium technology equipments, such as medium speed lockstitch and over lock sewing machines exist, hence mostly operations performance depends on the skill of operators. Thus automatic designing, pattern making, cutting machine, as well as computer controlled lock stitch are one of the state of the art garment equipments that should be made available for better performance of the sector. In addition, absence value adding activities such as printing, embroidery, washing and drying facilities further hinders customer satisfaction and competitiveness of the industries.

Moreover high complexity of the supply chain of cotton garment value chain consisting of many interacting links that need networking of inputs (coordination between stakeholders, suppliers, customers) and large investment, new technologies and skilled labor force as well as image problem in European and US markets etc have also resulted in poor performance of the industry. Furthermore due to poor practice of performance measurement system and minimal benchmarking, the industries are unable to determine their performance improvement and eventually couldn't face the demand in quality as well as quantity.

Thus this thesis mainly focuses on determining the key performance improvement areas, assessing the performance measurement and improvement practices and making relevant recommendations and proposing a performance measurement and improvement model for the garment industries.

1.3 Research Objective

The general objective of the research is to formulate a standard performance measurement and improvement model for Ethiopian garment industries.

Specific objectives include;

1. To determine the key performance improvement areas.
2. To assess existing performance improvement and measurement practices.
3. To make relevant recommendations in order to improve the performance of the industries
4. To propose a model for performance measurement and improvement of the garment industries.
5. To describe implementation procedures of the proposed performance measurement and improvement model.

1.4 Scope of the Research

This research is on performance measurement and improvement of the garment industries. The research shows how the garment industry performance would improve and be competitive in a sustainable manner and can contribute to national economic growth, employment generation, foreign exchange earning etc. Even though the research aims on the general country level, due to time and financial limitation, this research focuses on garment industries in Addis Ababa and Oromia region.

This research work makes an assessment on performance related problems in selected 13 Ethiopian garment industries and provides concrete and applicable performance measurement and improvement model so that the overall activities of the industries can be improved and can be competitive in the local as well as international market.

1.5 Significance of the Research

Garment industries have been the starting points for export led industrialization of many countries. In Ethiopia this industry remain to be very important since they have a potential to provide employment and boost economic growth. The research aims to identify performance related problems that hinder the industries' competitiveness and develop a performance measurement and improvement model, which could be taken as guide to the garment industries to improve the performance of the industries.

The research will have benefit to overcome the stated performance problems so that the sector can be competitive in the global market. It is hopefully believed that the Ethiopian garment industries will implement the model and have a remarkable improvement. Government bodies such as Ministry of Trade and Industry, Quality and Standard Authority of Ethiopia and other related sectors can also utilize important concepts out of the research.

CHAPTER TWO- LITERATURE REVIEW

2.1. Introduction

In today's competitive world; industries are continuously encountering challenges in the business market. In a regulated environment, organizations can work with inefficiency for sometime but in a competitive environment, inefficient organizations encounter challenges and consequently leading to bankruptcy. Thus, to achieve sustainable business success in the competitive market, a company must continually monitor and improve its organizational performance [1].

Performance is the efficiency with which inputs are converted in to outputs. It is the efficiency and effectiveness of action [14]. Thus to improve the performance of an operation, performance has to be measured, hence performance measurement is fundamental in organizational management. Performance in manufacturing constitutes several aspects including quality, effectiveness, efficiency, productivity and safety etc. In garment industry, performance improvement may include the increase in product quality together with increase in productivity along with the lowering of production costs and lead times etc.

Performance measurement system can be defined as the set of metrics used to quantify both the efficiency and effectiveness of actions. Performance measures quantitatively provide important data and information about the products, services, and the processes that produce them. Following are some reasons for performance measurement in organizations [9].

1. It provides a structured approach for formulation of organizational strategic goals and objectives.
2. It provides feedback on progress and compels organizations to concentrate resources such as time and energy on achievement of objectives.
3. It improves communications internally among employees, and externally between the organization and its customers and stakeholders.
4. It reduces emotionalism and encourages constructive problem solving since it provides concrete data on which to make business decisions.

However performance measurement systems have its draw back during the following conditions;

1. Too much or too little data; too little data may be insufficient in making business decisions. Too much data results in information overload and managers and employees might ignore the data or use it ineffectively.
2. Collecting inconsistent, conflicting, unclear and unnecessary data. All data should lead to some ultimate measure of success for the company.
3. Establishing unrealistic and/or unreasonable measures - Measures must be cost-effective and achievable.
4. Failing to link measures - Measures should be linked to the organization's strategic plan and should cascade down into the organization (horizontal and vertical linkage).
5. Numerical quotas do not fix defective processes - There is also a danger when performance objectives become numerical quotas. The setting of numerical goals and quotas does nothing to accomplish improvements in the process. Identify the challenges and changing the processes is what is needed to improve performance and achieve desired outcomes.

Hence care must be taken when formulating a performance measurement system and also make sure that it links and aligns with strategic objectives and must be flexible along with organizational objectives. Moreover it should have balance between various performance indictor factors and that an improvement of certain factor should not lead to decline of another performance factor.

2.2 Evolution of Performance Measurement Systems

Performance measurement systems go back a long way in their origin and applications. It is thought, for instance that the double entry bookkeeping was first used in Venice around the fourteen century. In modern history, performance measurement have been practiced to evaluate the success of organizations since the start of the twentieth century due to the changing nature of organizations from ownership to enterprise lead by management and so different financial measures were applied so that owners could monitor the performance that managers were achieving [10].

Indeed, in 1903, three Du Pont cousins consolidated their small enterprises with many other small single-unit family firms. They then completely reorganized the American explosives industry and installed an organizational structure that incorporated the "best practice" of the day. The highly

rational managers at Du Pont continued to perfect these techniques, so that by 1910 that company was employing nearly all the basic methods that are currently used in managing big business [10].

Though financial performance measurement methods were widely applied and known to be sufficient, after 1980s these methods were no longer sufficient to manage organizations competing in the current market, due to the changing nature of competition; specific improvement initiatives; national and international quality awards criteria; changing organizational roles; changing external demands; and the advancement of information technology. Hence a new method of performance measurement method has to arise in order to succeed, which considers multiple criteria's of performance.

2.3 Financial Performance Measurement Systems

Financial performance measurement systems focus on profit and revenue of a company. It depends on the income and return of investment. Financial performance measurement includes cost and accounting management and activity based costing.

Financial performance measurement systems have failed to identify and integrate all those factors critical in contributing business excellence. During the last twenty years a number of performance measurement frameworks (multiple dimensional) have been developed in academic and business environments to overcome the drawbacks of these measures.

Numerous researchers have exposed limitations of financial performance measurement approaches. This can be summarized as follows;

- Do not have strategic focus and fail to provide data on important performance improvement factors including quality, productivity, flexibility and lead time
- Are aggregated and distorted for long-term decision -making process;
- Encourage short -term decision making, like delayed capital investment
- Encourage managers to minimize variance from standard than to improve continuously;
- They are internally rather than externally focused, with little regards for competitors or customers;
- Are rarely integrated with one another or aligned to the business process and strategic objectives

- Do not penalize overproduction and often inhibit innovation;
- Performance measures are often poorly defined.

2.4 Multi Criteria Performance Measurement Systems

Following are multi criteria performance measurement method that are mostly used and are described in different performance measurement literatures.

2.4.1 Customer Relationship Management

Customer relationship management enables businesses to improve performance by measuring customer satisfaction. They help focus company on the value of its customers since measuring business activities and outcomes regarding customers are becoming increasingly complex and increasingly important to the successful execution of a firm's strategy. Several frameworks for the measurement of customer satisfaction have evolved over the years. One illustrative framework decomposes the customer problem down to major three top-level areas.

1. Value equity -refers to the customers' perceptions of value
2. Brand equity- refers to the customers' subjective appraisal of the brand
3. Retention equity- refers to the firm building relationships with customers and encouraging repeat-purchasing

2.4.2 Balanced Scorecard Method

The balanced scorecard performance measurement method enables organizations to translate their strategic objectives in to implementation by working from four perspectives: financial, customer, internal business process, and an innovation and learning perspective.

The various perspectives of these measurement method captures both leading and lagging performance measures, thereby providing a more balanced view of company performance. Leading indicators include customer satisfaction, new product development, on-time delivery, employee competency development, etc; lagging indicators include financial measures, such as revenue growth and profitability.

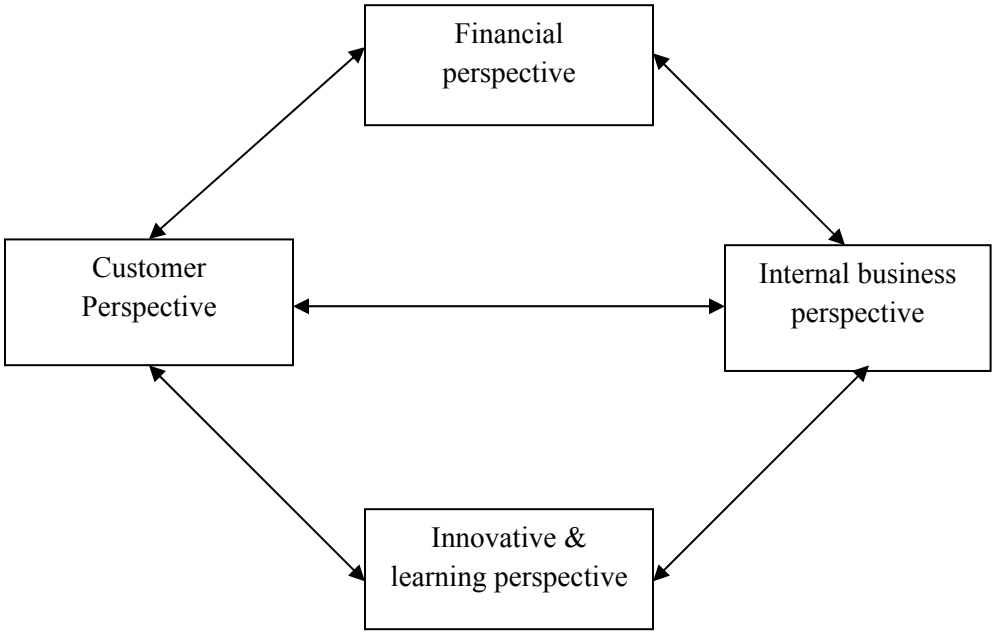


Figure 1- Balanced Score Card Diagram

Financial perspective includes analyzing financial performance of the company. It includes measures such as return on investment, cash flow, project profitability, profit forecast reliability and Sales backlog etc.

Customer perspective includes determining customer satisfaction as well as market share etc. hence if customers are not satisfied, they will eventually find other suppliers that will meet their needs. Poor performance from this perspective is thus a leading indicator of future decline, even though the current financial performance may satisfactory. Measures included in these are customer ranking survey, customer satisfaction index and market share.

Internal Business Process perspective - Metrics based on this perspective allow managers to know how well their business is running, and whether its products and services conform to customer requirements (the mission). Measures included in these are rework amount, safety incident index, project performance index and project closeout cycle etc.

Innovation and Learning perspective - includes employee training and corporate cultural attitudes related to both individual and corporate self-improvement. In a knowledge-worker organization, employees are the main resource. In the current climate of rapid technological change, it is becoming

necessary for workers to be in a continuous learning mode. Measures included in these are percentage of revenue from new services, rate of improvement index, staff attitude survey, and revenue per employee etc.

2.4.3 Performance Prism

Performance prism proposes that a performance measurement system should be organized around five distinct but linked perspectives of performance, which are stakeholder satisfaction, strategies, processes, capabilities and stakeholder contribution.

- Stakeholder satisfaction – determining the stakeholders want and need.
- Strategies –focuses on what strategies to put in place to satisfy the stakeholders.
- Processes – determining critical processes that are required to execute the strategies.
- Capabilities –determining capabilities that are needed to operate and enhance these processes.
- Stakeholder contribution – it focuses on the contributions that are required from stakeholders in order to maintain and develop these capabilities.

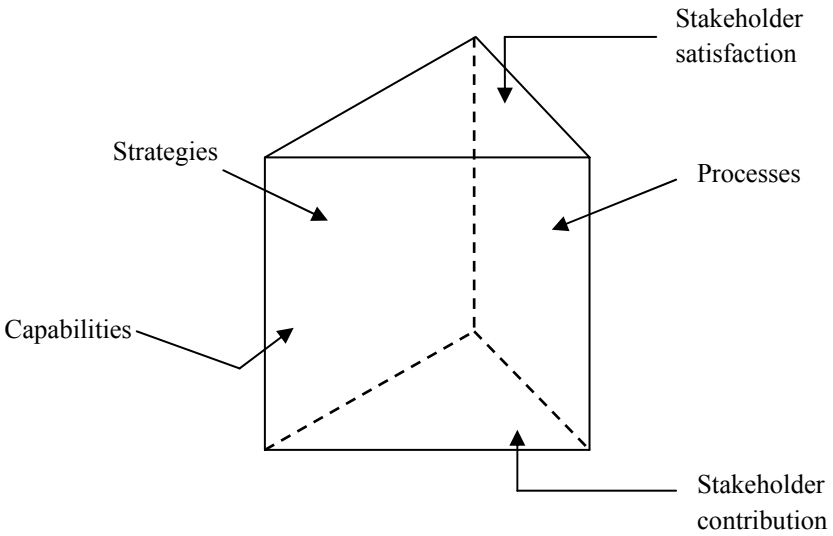


Figure 2 -Performance Prism Diagram

The strength of this performance improvement framework is that it first questions the company's existing strategy before the process of selecting measures is started. In this way, the framework ensures that the performance measures have a strong foundation. The performance prism also

considers new stakeholders (such as employees, suppliers, alliance partners or intermediaries) that are usually neglected when forming performance measures. However, it offers little about how the performance measures are going to be realized. Another weakness is that little or no consideration is given to the existing performance measurement systems that industries may have in place.

2.5 Performance Measures

Performance measure is a metric used to quantify the efficiency and effectiveness of an action. It is composed of a number and a unit of measure. Performance measures can be represented by single dimensional units or multi dimensional measure units. The number gives us a magnitude and the unit gives the number a meaning [14].

Single dimensional units include; hours, meters, nanoseconds, dollars, number of reports. They show the variation in a process or deviation from design specifications. They represent basic and fundamental measures of process or product. Multidimensional units of measure are expressed as ratios of two or more fundamental units and are more often applied than single dimensional measures since almost always convey more information. These may be units like miles per gallon (a performance measure of fuel economy), number of accidents per million hours worked (a performance measure for safety), or number of on-time deliveries per total number of deliveries.

Performance measures must be linked to companies' objectives and goals and must support the mission assignment(s) from the highest organizational level downward to the performance level. Therefore, the measurements that are used must reflect the assigned work at that level. Performance measures should be expressed in units of measure that are the most meaningful to those who must use or make decisions based on those measures.

The following reflect the attributes of an ideal unit of measure:

- Reflects the customer's and the companies needs
- Is precise in interpreting the results and provides an agreed upon basis for decision making
- Is compatible with existing sensors (a way to measure it exists)
- Is economical and applies broadly

2.5.1 Sample Performance Measures

Management performance measures may include the following;

- Percent increase in output per employee
- Percent error in planning estimates
- Percent variation from budget
- Increased percent of market
- Percent personnel turnover rate
- Percent absenteeism
- Return on investment

Manufacturing performance measures may include the following;

- Percent of products that meets customers' orders and engineering specifications
- Percent of jobs that meet schedule
- Percent of manufacturing time lost due to incompatible layouts
- Labor utilization index
- Percent unplanned overtime
- Percent of jobs that meet cost
- Percentage of scrap and rework cost
- Performance against best practices
- Defects during warranty period
- Accidents per month

Quality assurance performance measures may include the following;

- Number of errors detected during design and process reviews
- Percent of product that meets customer expectations
- Improvement in customer satisfaction survey
- Cost of poor quality
- Time to answer customer complaints
- Number of off-specifications approved
- Percent product cost related to appraisal scrap and rework
- Time required processing a request for corrective action

- Number of problems identified in-process
- Percent of products defective at final test

Product development performance measures may include the following;

- Percent of error-free designs
- Percent of errors in cost estimates
- Number of off-specifications approved
- Field performance of product
- Percent of repeat problems corrected
- Time required making an engineering change
- Number of unsuccessful pre-analyses
- Number of days for the release cycle
- Customer cost per life of output delivered

Procurement performance measures may include the following;

- Percent of supplies delivered on schedule
- Purchase order cycle time
- Average time to replace rejected lots with good parts
- Time to answer customer complaints
- Percent of purchase orders returned due to errors or incomplete description
- Supplier parts scrapped due to engineering changes
- Actual purchased materials cost per budgeted cost
- Percent of error in purchase requests
- Time required to process equipment purchase orders

Maintenance plan performance measures may include the following;

- Percent of equipment maintained on schedule
- Maintenance cost/equipment cost
- Hours lost due to equipment downtime
- Number of unscheduled maintenance calls
- Number of hours used on scheduled maintenance
- Scrap and rework due to equipments calibration errors

2.6 Performance Improvement Factors

In order to improve performance effectively, organizations must identify factors of performance that should be particularly monitored, which are either key to success or identify under-performance. Depending on the type of the industry there are different key performance factors, where it is impractical to review all possible measures of performance in this chapter since it is a broad topic. Thus important key performance factors that are associated to garment industry are considered; these are cost, time, productivity, flexibility and quality.

2.6.1 Quality

In order to improve competitiveness of a garment industry and build better reputation amongst consumers and competitors it is important to maintain level of quality of the garments. Quality refers to the degree to which a product meets customers' perceptions on a variety of characteristics of the delivered products. Quality affects all aspects of the organization and has dramatic cost implications. The most obvious consequence occurs when poor quality creates dissatisfied customers and eventually leads to loss of business.

Effective quality improvements should result in a future stream of benefits, such as: reduced failure costs, lower appraisal costs, increased market share, increased customer base and more productive workforce. Improved quality increases productivity, hence, many world class industries use quality as a powerful competitive tool.

There are many aspects of quality in garment operations including; quality of garment design, quality of production, quality of inspections, and quality of sales as well as quality of marketing of the final product which is as important as the quality of the garment itself. In garment industry, quality control should be practiced from the initial stage of sourcing of raw materials to the stage of finished garment.

Quality Measures

Quality measures are generally classified in to four types including; internal quality (produced quality and quality costs) and an external quality (perceived quality and in-bound quality).

I. **Perceived quality** regards customer satisfaction and the technical assistance service performance.

II. **In-bound quality** includes the results of controls on certified and non- certified purchasing, and the supplier quality rating.

III. **Produced quality** includes items on the measures of the statistical process control and the number of defective goods returned during the warranty period.

IV. **Cost of quality** includes cost of doing a quality job, conducting quality improvements. It includes quality system costs such as statistical process controls costs, total quality implementation costs. Crosby demonstrated what a powerful tool cost of quality could be to raise awareness of the importance of quality. He referred to the measure as the "Price of Non-conformance".

Quality-related activities that will incur costs may be split into prevention costs, appraisal and failure costs.

- **Prevention costs** are all costs incurred in the process of preventing poor quality from occurring. They include quality planning costs, such as the costs of developing and implementing a quality plan. Also included are the costs of product and process design, from collecting customer information to designing processes that achieve conformance to specifications as well as setting specifications for incoming materials, processes, and finished products/services.

- **Appraisal costs** are incurred in the process of uncovering defects. They include the cost of quality inspections, product testing, and performing audits to make sure that quality standards are being met against agreed specifications.

- **Internal failure costs** occur when the results of work fail to reach designed quality standards and are associated with discovering poor product quality before the product reaches the customer site. Other types of internal failure costs are rework, waste and scrap; which are the cost of correcting the defective item and of doing unnecessary work.

- **External failure costs** are associated with quality problems that occur at the customer site. These costs can be particularly damaging because customer faith and loyalty can be difficult to regain. They include everything from customer complaints, product returns, and repairs, to warranty claims, recalls. A final component of this cost is lost sales and lost customers.

2.6.2 Productivity

Productivity is defined as the effective and efficient utilization of all organizational resources, including capital, labor, materials, machineries, energy, land, information and time. Productivity is an output generated and input provided ratio of a production system. Thus main indicator of improving productivity is decreasing the ratio of output to input at constant or improved quality.

$$productivity = \frac{Output}{Input}$$

Productivity implies a company's production ability. There are many different examples of productivity measurements used in industries and organizations including single dimensional and multidimensional measures. These measurements are both used for monitoring and development of the daily operation as well as for long-term strategic considerations of the business.

- Total productivity
- Direct labor productivity
- Indirect labor productivity
- Fixed capital productivity
- Working capital productivity
- Value-added productivity

2.6.3 Cost

In manufacturing production cost mainly includes labor cost, material cost, overhead cost. Overhead costs include all the costs except material and labor costs. Labor cost accounts for a large portion of the total cost of garments and since garment industry is labor intensive. Hence to calculate labor cost, each individual operation in the production of a garment should be defined and total time of operations should be calculated.

Material costs include fabric and accessory costs. Fabric is the most costly material hence, an accurate calculation for the required amount of fabric per garment is essential. All other direct materials such as trim, thread, buttons, zippers, labels, shoulder pads and poly bags, quantities per garment are measured in units, sets or meters.

2.6.4 Flexibility

In today's business marketplace customers are placing greater value on flexibility of garment designs. Flexibility deals with how a company reacts to changing demands of customers and changing factors. The ability to be flexible in garment depends on number of factors which includes, the advancement in product development, implemented material handling system, skill of workers etc. And due to the garment nature, fashion styles etc, has put tremendous pressure on product development of industries. Hence skill of designers, pattern makers, pattern graders and marker makers should excel as well as other production departments including cutting and sewing.

2.6.5 Time

In today's business marketplace customers are placing greater value on delivery time. In competitive industries, short lead time will differentiate a company from its competitors, leading to increase sales. Lead-time begins with the first receipt of a customer order and ends with customer receipt of the product or service. Total lead-time includes four main components; order lead times (i.e., the time it takes to process an order), supply lead times (i.e., the time it takes to purchase item), manufacturing lead time (i.e. this refers to the time span from material availability at the first processing operation to completion at the last operation) and delivery lead time (i.e. this refers to the time taken to final receipt to the customer).

CHAPTER THREE - RESEARCH METHODOLOGY

To accomplish the objective of the thesis, the researcher has applied the following methodologies. Complete literature surveys have been conducted regarding the concept of performance; performance measurement systems, performance improvement indicative factors and overview about Ethiopian garment manufacturing industries. Following literature survey, in order to assess the performance measurement and improvement of the Ethiopian garment industries, data collection has been carried out, both primary and secondary data were collected using a well structured questionnaire, face to face interviews and telephone conversations, personal observations and review of previous research works.

The researcher has designed the survey questionnaires for assessing the performance improvement and measurement practices of the selected garment industries. This questionnaire was distributed to research co-advisor, colleagues, work mates for comments and suggestions before finalizing it. The questionnaire was finalized taking into account the above suggestions under the guidance of the advisor.

Hence sample sizes of 13 garment industries are selected out of a total 39 garment industries in the country. The sample size and the specific garment industries are chosen considering required acceptance sampling number, industries profile regarding the year of establishment, type of products and market performance. Due to geographical distribution of the garment industries and survey cost selected garment industries are chosen from Addis Ababa and Oromia region.

The distributions of the 39 garment industries in Ethiopia are as follows; one factory in Tigray region, three factory in Oromiya region, thirty four factory in Addis Ababa region and one factory in Dire Dawa region [19]. Therefore Addis Ababa and Oromia regions are where the majority (95%) of the Ethiopian garment industries are located, thus the selected sample industries can be considered to be sufficient indicatives of the garment industries in Ethiopia as a whole.

Secondary data includes referring documented files and research studies of including UNIDO garment research data, Central Statistics Agency annual manufacturing industry survey report 2009, Ministry of Trade and Industry documented files, Engineering capacity building program (ecbp) garment research report and Ethiopian Garment Association.

3.1 Survey Questionnaire

The questionnaire is developed in order to gain vital information regarding the performance improvement and performance measurement practices of the Ethiopian garment industries. The questionnaire is developed aiming for responders' of educational level of Diploma and above.

In general the objectives of conducting the questionnaires are to determine whether performance improvement and measurement is practiced in Ethiopian garment industries and to asses' attitudes, tendency and commitment of workers towards performance improvement. The survey questions contain 92 questions requiring types of answers including;

- Brief answer for subjective questions
- Nominal scale such as Yes or No
- Scales including
    - No, minor, moderate, major, very severe
    - Extremely Low , Low , Middle, High, Extremely High
    - Weekly, Monthly, Quarterly ,Twice a Year, Yearly
    - Never, Rarely, Sometimes, Frequently, Always
    - Very Highly, Highly, Moderately, Lowly, Very Lowly.

Furthermore the questionnaire is sub divided (categorized) as the critical performance factors described in chapter 2 as described below;

- Organizational information
- Financial performance
- Productivity
- Quality practice
- Quality of work life (Ergonomics)
- Inventory management
- Product development and Innovation
- Performance evaluation practice

A total of 56 questionnaires was planned to be distributed for 14 garment industries but only around 35 questionnaires for 13 garment industries were able to be distributed, Even though personal visits as well as phone calls were used to increase response rate.

The composition of the persons who were participated in the response of the questionnaire includes: general managers, production and technical managers, quality control head, administrative head, shift leaders, and supervisors.

The reasons for pre rejection to the questionnaires are firstly, most of the garment officials believe that it is waste of their time and has no benefit; hence most are unwilling and secondly limited professional staff above diploma level to understand the questions presented in the questionnaire.

Following are list of the garment industries that were contacted for the research survey.

1. Addis Garment (Augusta)
2. Adey Ababa Yarn sh.co
3. Akaki Garment
4. Concept International Ethiopia
5. Feleke Garment
6. GMM Garment
7. Garment Evolution
8. Haile Garment
9. Nova star Garment
10. Mulat Garment
11. Wossi Garment
12. Unis Garment
13. Oasis Abyssinia plc

3.2 Structured Interviews

The design of the interviews was based on the research objectives. Most of the interview questions conducted is similar to the questions in the questionnaire. The interviews were used to cross check the reliability of the response to the questionnaire. The interviewees were top and senior management level officers similar to that of the survey respondents.

In general the objectives of conducting the interviews are to determine whether performance improvement and measurement is practiced in Ethiopian garment industries and to asses attitudes, tendency and commitment of workers towards performance improvement

3.3 Direct Observation

The researcher has also used this method for collecting the required data and information from the respective industries. In this research direct observation is used as a means to assess the techniques used in documentation and production processes as well as the existing facilities of the industries. Important documents of the respective industries such as annual reports, company profile brochure, and inspection data have been also used to perform quantitative analysis.

Moreover, the infrastructure and facilities of the industries has been observed. The important documents of the respective industries such as annual reports, audit reports, company profile brochures and training materials have been also used for the assessment.

3.4 Data Analysis and Interpretation

The collected data through the means of interviews, questionnaires, direct observation and using documents are analyzed & interpreted. The results of the statistical analysis are presented in chapter five. A total of 35 questionnaires were distributed out of which 28 were collected which implies 80% were completed by the respondents. The reasons for non-responsiveness were low educational level, tight working schedule and unwillingness and poor understanding of the research. The researcher believed that the current situation of the garment industries towards performance measurement and improvement has exactly reflected in these questionnaires and interviews responses.

CHAPTER FOUR - OVERVIEW OF THE ETHIOPIAN GARMENT SECTOR

4.1 Introduction

In Ethiopia traditional garment making “Habesha Dress” has a long history, made from cotton seed and for long it has been a cottage industry and has satisfied the demand of the people for centuries. But through the evolution of human being, the fabric type, style, quantity has varied and the garment nature has advanced and the industry has evolved from cottage to vast manufacturing industries.

The first industrialized garment factory was established in the 1960s, with the establishment of Addis garments (Augusta) in 1958, by an Italian investors. Shortly following Akaki garment factory, were founded by Ethiopian government in 1963. Later, Gulele garment factory and Nazereth garment factory were founded in 1983 and 1992 respectively.

The distribution of garment industries around Ethiopia are as indicated in figure 4 which indicates that, there are 39 garment factories where most of the factories are located in the capital, Addis Ababa, where ownership structure of the industries is a mixture of diversified ownerships, including public (currently under privatization) share company, private limited company, partnerships and individual ownership [19].

The Ethiopian garment industries produce different kinds of products including uniforms and work wears (army and police uniforms, different work wears), knit wear products like sportswear, under wears, polo shirts, clothing products, suits, hospital products, home textiles like bed sets, curtains, table cloths, etc.

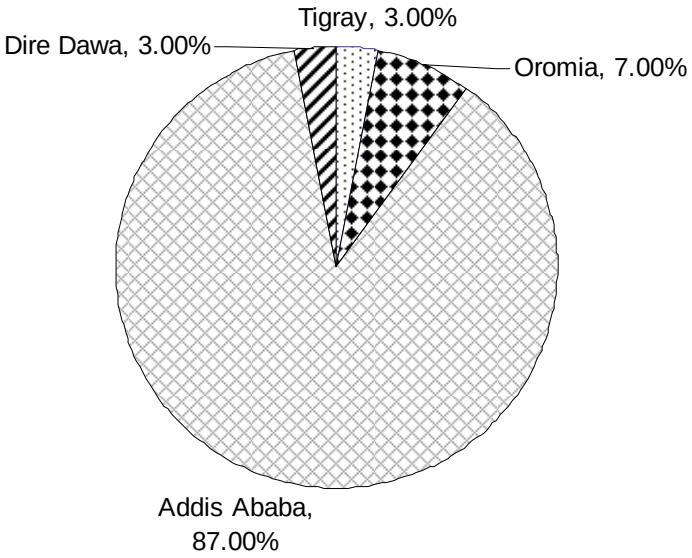


Figure 3 - Distribution of Garment Industries by Regional State 2007

According to the data from the central statistics authority, in 2007, apparel in Ethiopia employed 7,604 people (Refer fig 4). The graph indicates that the employment level has increased by more than 46%, which is good for economic development.

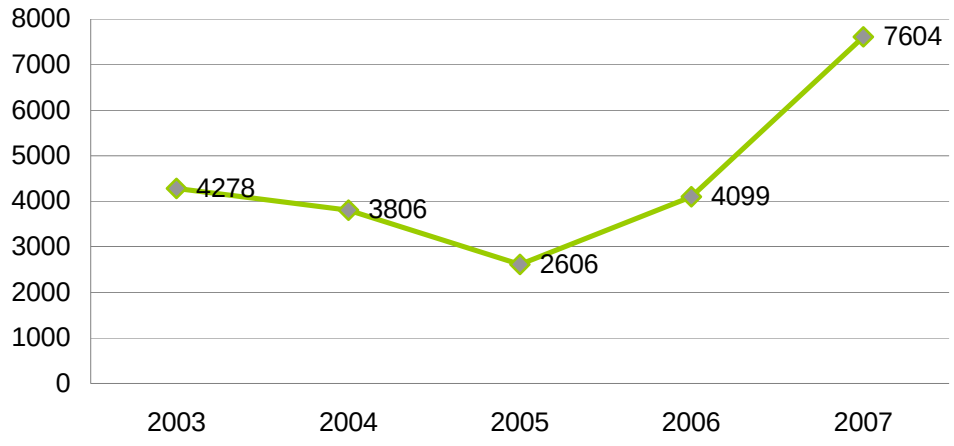


Figure 4 - Trend of Labor Employed In the Ethiopian Garment Industries

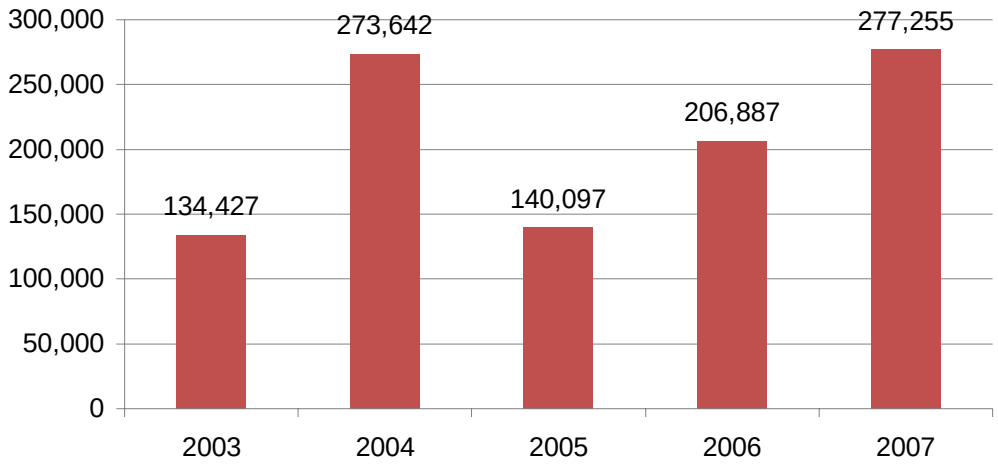


Figure 5 - Garment Manufactured By Volume

The Ethiopian Garment factories produced 277,255 dozens of clothes and had revenues of 253,839,000 Birr, largely consisting of sales in the local market. Furthermore percentage of value added by the sector in to the total value added in the manufacturing sector by the industrial groups are indicated in percentage in figure 6 this indicates that the value added of the sector is very small around 1% which is indicative of the need for further improvement in the sector.

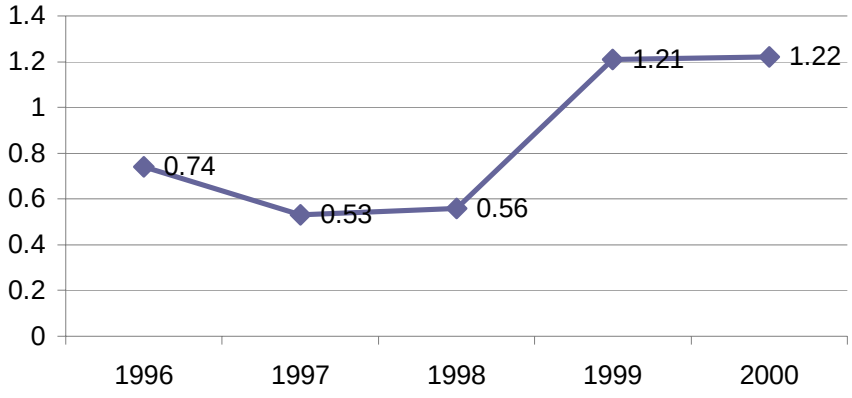


Figure 6 - Percentage Distribution of Value Added By the Sector

The ratio of imported items to total consumed raw materials costs are indicated in the following figure 7. Hence even though, the ratio has been general increasing, currently imported raw material usage is decreasing. Related to ratio of value added to gross value of production is shown in figure 10 and the trend shows that ratio of value added to gross value of production is generally decreasing.

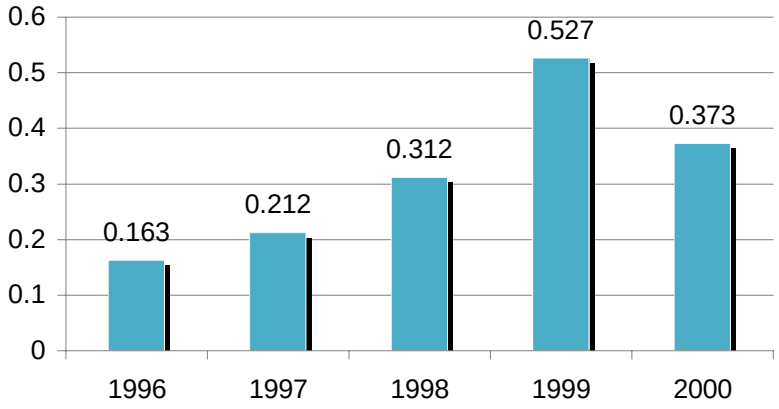


Figure 7 - Ratio of Imported to Total Consumed Raw Material Costs

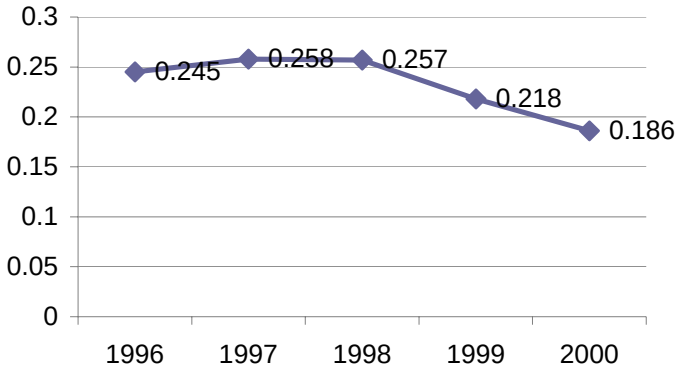


Figure 8 - Ratio of value added to gross value of production

The general trend of the cost of labor to gross value of production is shown in figure 11, which shows that it has been decreasing which is indicated in figure 10..

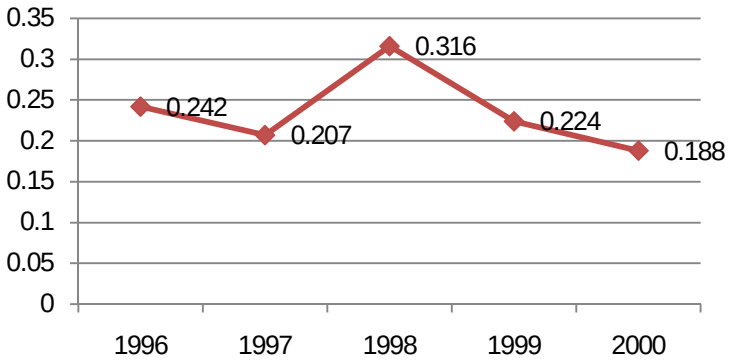


Figure 9- Ratio of Cost of Labor to Gross Value of Production

4.2 Apparel Production Process

Garment production consists of consecutive steps that are indicated as follows.

Pattern Making: Patternmaking is the process of creating all the correctly sized pieces needed to make a complete garment. The traditional method of pattern making includes creation of hard paper patterns. The modern garment making system has adopted the digitization of pattern making process whereby the use of designing software and plotting the pattern on paper.

Pattern Grading: To create a complete range of sizes, pattern pieces are increased or decreased geometrically. The process of resizing the initial pattern is called grading. The grade rules are developed keeping in view the market segment for which the product is intended.

Marker Making: Marking refers to the process of placing pattern pieces to maximize the number of patterns that can be cut out of a given piece of fabric. Marker making considers fabric width, length, fabric type and subsequent cutting method used. Markers can be made manually or using software where the computerized method is more efficient.

Fabric Spreading: It refers to spreading fabrics on tables by operators manually or by using spreading machine. The number of fabric layers depends upon the required demand of the product. After proper spreading is done, the pattern papers are properly laid upon the fabrics.

Fabric Cutting: Pattern pieces are cut out of fabric once the marker is made. At present, apart from using traditional tools, computerized cutting systems are widely used for cutting. Pattern specifications are kept into consideration while cutting which ensures that the constructed garment is exactly similar to the sample produced.

Fabric Sewing: this is the process seaming (joining) two or more patterns together by sewing threads. In doing so the final product is produced. The factory follows a type of chain work while doing the sewing process. This is the main assembly stage of the production process where fabric is stitched together and a garment is assembled. Computerized sewing machines can be programmed to sew a specific number of stitches. However, sewing remains largely labor intensive. The dominant process in garment assembly is sewing, still the best way of achieving strength and flexibility in the seam itself as well as flexibility of manufacturing method.

Pressing makes a large contribution to the finished appearance of garments and thus their attractiveness at the point of sale. The two main uses of pressing are to smooth away unwanted creases and crush marks and to make creases where the design of the garment requires.

Finishing: After the sewing operation, the constructed garments are examined, pressed, tagged and bagged. Special detailing such as pleats, embroidery and screen printing to a garment are also added.

Final inspection and storing: after the above operations are done the factory performs final inspection and the final completed product will be transported to store room and waits for dispatches

Some garment defects that are often encountered are described as follows;

Sewing defects - Like open seams, wrong stitching techniques used, same color garment, but usage of different color threads on the garment, miss out of stitches in between, creasing of the garment, erroneous thread tension and raw edges are some sewing defects that could occur.

Color effects - Color defects that could occur are, difference of the color of final produced garment to the sample shown, and accessories used are of wrong color combination and mismatching of dye amongst the pieces.

Sizing defects - Wrong gradation of sizes, difference in measurement of a garment part from other, for example- sleeves of 'XL' size but body of 'L' size.

Garment defects - During manufacturing process defects could occur like, faulty zippers, irregular hemming, loose buttons, raw edges, improper button holes, uneven parts, inappropriate trimming, and difference in fabric colors.

CHAPTER FIVE -DATA ANALYSIS AND INTERPRETATION

From the collected data, the following analysis and interpretations are made;

5.1 Organizational Structure

The questionnaire response indicates that the existing organizational structure have suitable working environment for workers. From observation, those with short years of establishment and mostly privatized industries have organizational structure in which general managers (owners) does the administration and marketing/sales work together. Moreover, production and technique department are integrated with quality department which creates complication and burden on the management and affects the performance of the industries. Besides departments such as information technology and legal are missing which are important to be world class competitive in the current global market.

The research also indicates that about 77.8 % of industries have training program and implement for workers, where the training constitutes in house and local trainings in Adey Ababa yarn sh co, TAI etc. Regarding the amount of expenditure for training, about 62.5% of these industries spend <2% of their total expenditure and 25% of these industries spends from 2-4% of their total expenditure and remaining 12.5 % spends from 4-6% of their total expenditure.

Furthermore from direct interview, it is understood that actual training programs existing at garment training institutes such as TAI are not sufficient, and it is observed that the trainings are focused mostly on garment production workers and less trainings focus is given for other personnel's such as line supervisors, production managers and general managers.

From the research it observed that about 55.6 % of these industries provide incentive and motivational system for their workers, and from direct interview it clear that incentive and motivational system is not efficient nor sufficient in most of the industries due to the fact that it is not applied systematically but randomly, when the profit of the company allows, besides the industries tend to strictly implement penalty system than motivational system.

Lack of coordination of the processes is also another observed cause for poor performance; there are often supply gaps in raw materials and accessories or in processing of the goods. Planning of the capacity based on the actual conditions is missing. Managements also tend to focus on the follow up of processes missing the planning stage.

Weak point is considered also the poor and not reliable feed backs to the customers regarding the status of the orders hence management need to advance in this area. Furthermore regarding social compliance, policies are not known by management and industries who leads to limited acceptability from international customers.

5.2 Financial Performance

The research indicates that all garment industries have a working capital problem and 55.6 % of these have arrears in payment of bank loan or exceed overdraft limit. The response indicates that 22.2 % of these industries source of finance is own fund from sales etc and the other 33.3 % is from local loan and the remaining 44.5 % is from both own fund and local loan.

The collected data also indicates that 62.5% of these industries profit haven't increased in the last three years and 87.5% don't have profit reinvested. Most of these (88.9 %) have no knowledge of market situation and their respective market share situation in the local as well as international market.

5.3 Productivity

The data collected indicates 75% of these garment industries have productivity improvement program, where 87.5% of the employees are aware about their productivity programs and that all of these garment company have identified and recognize productivity problems.

Major productivity problems identified includes;

- Poor quality of local raw materials (fabrics and accessories)
- Limited availability of local raw materials
- Shortage of working capital
- Poor skill of workers and performance fluctuation
- Low employee moral and absenteeism
- Operating obsolete machineries and shortage of spare part
- Delivery time
- Electricity and other utilities
- Government double and triple tax system

The research has also identified that 75% of these industries determine their resource utilization and have indicated that the average capacity utilization for all the industries is less than 55%. And the major reasons listed for not being fully operational are analyzed as follows in pie chart.

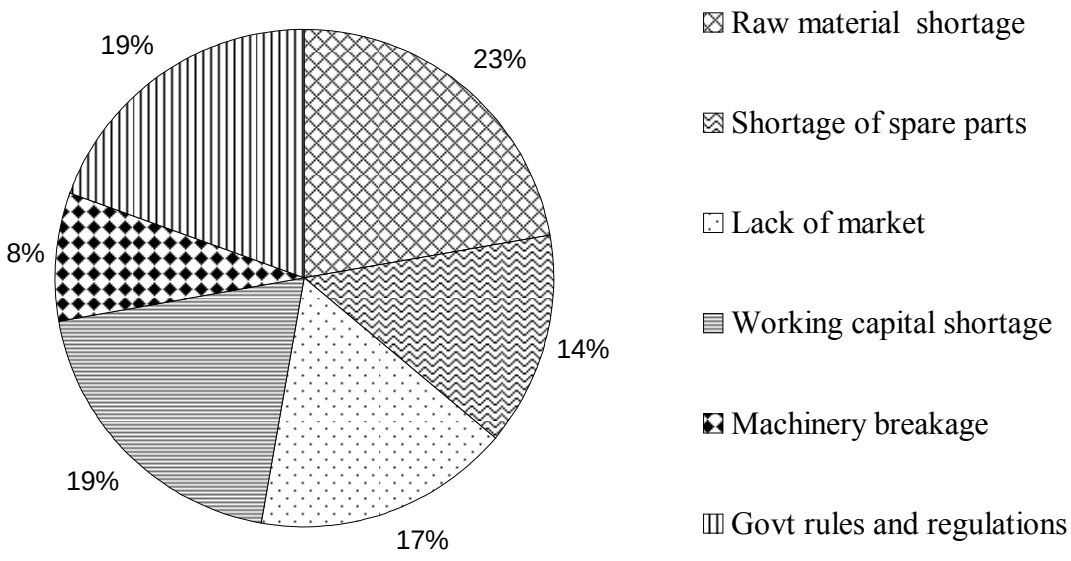


Figure 10 - Pie Chart Depicting Reasons Of Under Operational Of the Garment Industries

Hence from the figure above it is indicative that most of the garment industries are not using their production capacities due to raw material shortage, working capital shortage, tax systems, lack of market as well as machinery breakages and lack of spare parts.

In addition, 87.5% of the respondents believe that trial runs (production trials) save time, cost and minimize production errors and faults. But in actual all of these don't practice trial runs in proper way that production wastes are minimized. Only 37.5% of garment industries have their work standards compared with both national and international standards and 75% of these industries have set their standard time for their garment products.

The respondents have also indicated reasons for machine failure, which includes 50% due to lack of preventive maintenance, 30% due to improper handling of machines and 20% due to aging of machines and equipments.

Poor layout including missing factory layouts, material flow plans and work plans is another observed weakness, where these are vital for the coordination, flexibility of the factory production system and to see where production and machinery arrangements might be inefficient.

Sewing layouts is in almost all cases one single line cumulating preparation of parts and assembling, difficult to manage efficiency and quality wise, where this setting is suitable for products such as T-shirts and basic products and it is not recommended for trousers or complex products.

The general trend of the production processes are such that separate sections for cutting/sewing/finishing rooms exist which is difficult to manage and improper as utilization of resources. In addition position of departments, especially in case of warehouses, is not according to a general flow leading to extra material handlings and transport.

In cutting sections, accumulations of fabrics are observed, due to missing correct flow and limited skills of operators for the spreading and numbering operations. Furthermore intermediary between cuttings and sewing is missing, where mostly it is done directly in lines leading to poor utilization of available machines and personnel. Besides supplying accessories with fabrics according to the cut quantities are not done and all accessories are delivered directly to line generating waste and errors.

Furthermore, Ethiopian garment industries give focus for sewing process and while performance follow up are done for other activities and departments, where the fact is sewing processes accounts about 10 % of general cost and the rest processes accounts about 90 % of the general processes.

5.4 Quality

From the responses it is understood that, all industries have awareness about quality and quality control as well as participation in quality activities, though the degree of detail understanding and shop floor practice differ.

In addition it is understood that 100% of the garment industries recognize and solve quality related problems and have identified customer requirements where 87.5% of the responders believe that their company objectives are linked to customer needs and expectation and that their products (garments) satisfy the customers.

In practical it is observed that customer service department is missing, feed backs from clients are not filed and no database regarding the service provided is available in order to improve the process. Limited presentations are held for marketing the products of industries. Moreover regarding customer service, absence of this department is one of the reasons that clients avoid working with Ethiopian industries.

The research also indicates that 37.5% of these industries have a quality management system. Quality management system with established procedures for each point of the process, records, databases, analysis and action plans to improve the process does not exist. Only parts of the system exist in industries with limited effect over the process.

From the collected data causes of poor quality are determined as follows in the following pie chart.

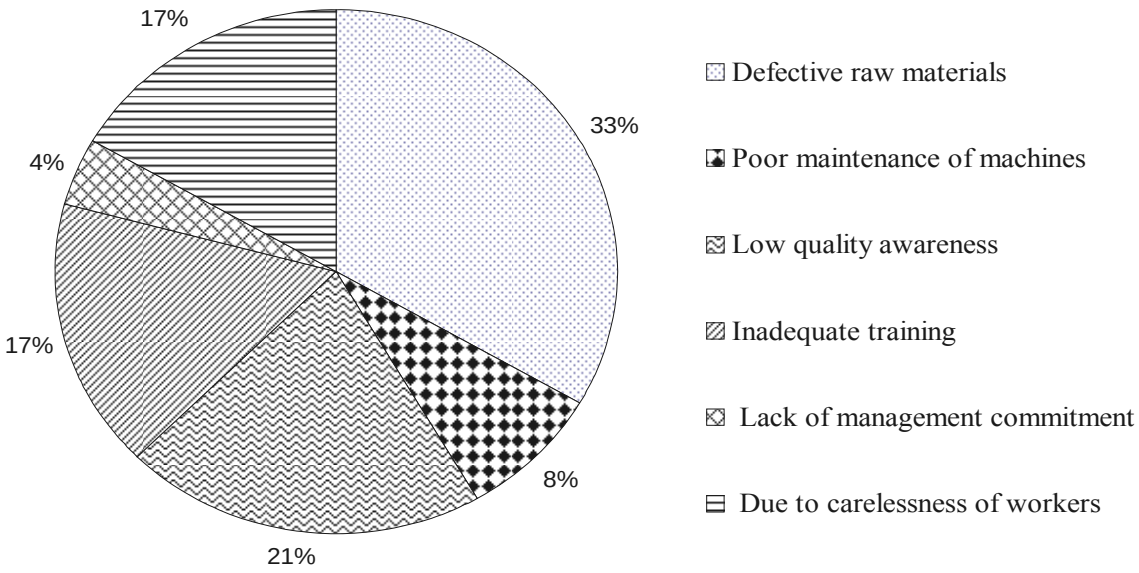


Figure 11 - Pie Chart Depicting Causes of Poor Quality in Ethiopian Garment Industries

Moreover from the research only 37.5% of these industries have procedures for evaluating subcontractors or supplier, even though 75% of these perform inspection and tests for incoming raw materials as well as in process and final products.

Regarding quality of goods, 72 % of the responders say that they ensure quality of raw materials from suppliers by inspection and 9% through ISO certification and remaining 19% through performance measurement practices.

Furthermore most of the industries have problems in delivering special operations like printing, special washing, product dyeing and handwork, besides quality of the provided processes is considered by most of the industries not constant and not satisfactory due to poor skill and carelessness of the operators even though the available technology is good.

5.6 Quality of work life

Responses indicate that 62.5 % of the industries have right materials handling equipments. Accident preventive methods applied in the garment industries include implementing occupational safety and health procedures by giving trainings, using protective apparatuses such as masks and by covering machines that need protection.

5.7 Inventory Management

Regarding access to raw materials 33.3% responded that they use locally purchased and 11.1% indicated imported whereas 55.6 % of the respondent use both locally purchased and imported raw materials. The problems encountered by garment industries during purchase of raw materials locally are shown in the pie chart figure 15 as follows. The problems encountered by garment industries during fully or partially importing raw materials are analyzed as follows using pie chart figure 16.

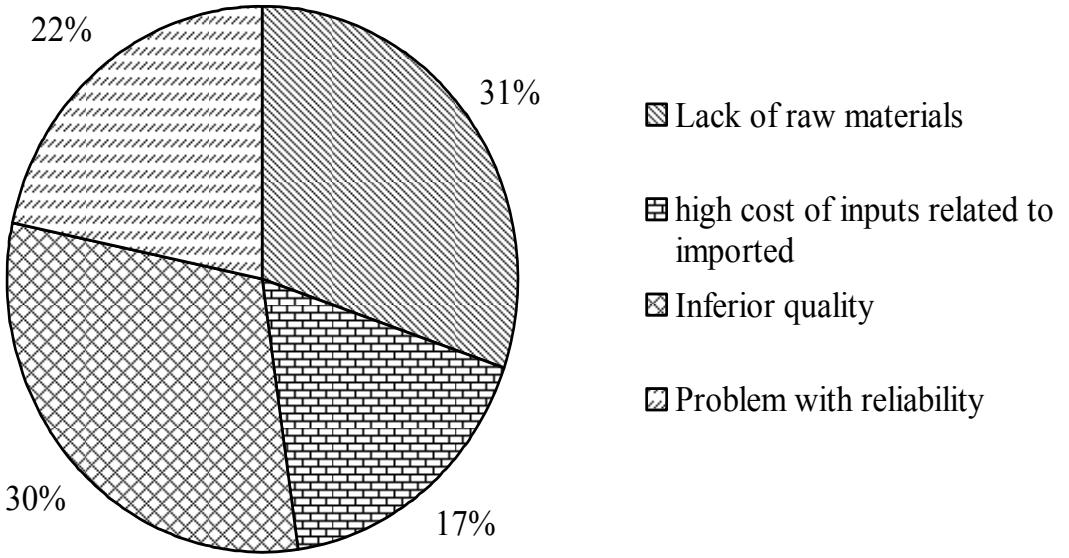


Figure 12 - Pie Chart Depicting Problems in Local Raw Materials

Concerning lead time for customer orders and suppliers' orders, a range of responses were given. Customer orders ranges from 2 up to 8 weeks meanwhile suppliers order range from 1 up to 8 weeks.

On the topic of trade 55.6% say that they negotiate a suitable terms of trade with suppliers and customers. And 77.8 % have a cost effective delivery system considering time, cost, reliability and safety.

On the subject of inventory, 77.8% have an inventory control system to ensure ideal stock levels (no overstock or out of stock) and 55.6 % of responders have a systems and records in place to track the number and cost of stock on hand, purchased and sold and in addition to check records against physical stock regularly.

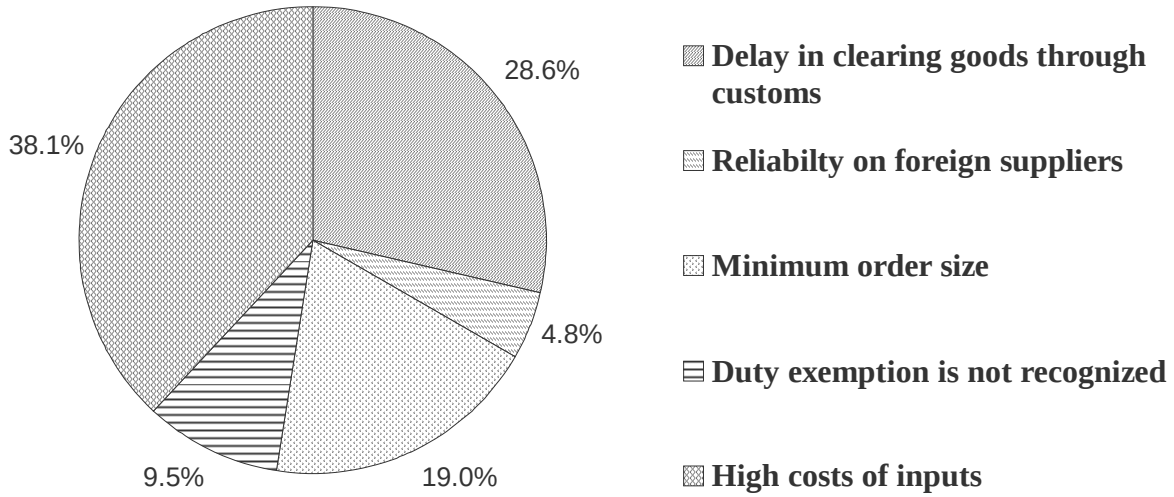


Figure 13 - Pie Chart Illustrating Problems Encountered In Importing Raw Materials

5.8 Product Development and Innovation

From the collected questionnaire it is understood that, 77.8% of garment industries have design department consisting of pattern making, sample maker but from observation it is clear that the design and product development department is neither sufficient nor efficient. The time taken to develop a new product (time to market) ranges from 2 to 3 weeks and depends on the activity of shop floor and market.

Lead times for deliveries are with large margin therefore industries are not competitive in delivery. 66.7 % responders have confirmed that their company production system is flexible in handling different volume of production and delivery time adjustments.

Preproduction areas consist of computerized system for product design, pattern makeup, layout and automatic spreading and cutting machines for cutting section. Production areas also have good sewing machines.

5.9 Problems of Performance Improvement

Different researchers have indicated different key performance improvements but for this research the following has been chosen determine rate of obstacle ness for performance improvement in the garment industries, where the rate varies from no obstacle to very sever obstacle.

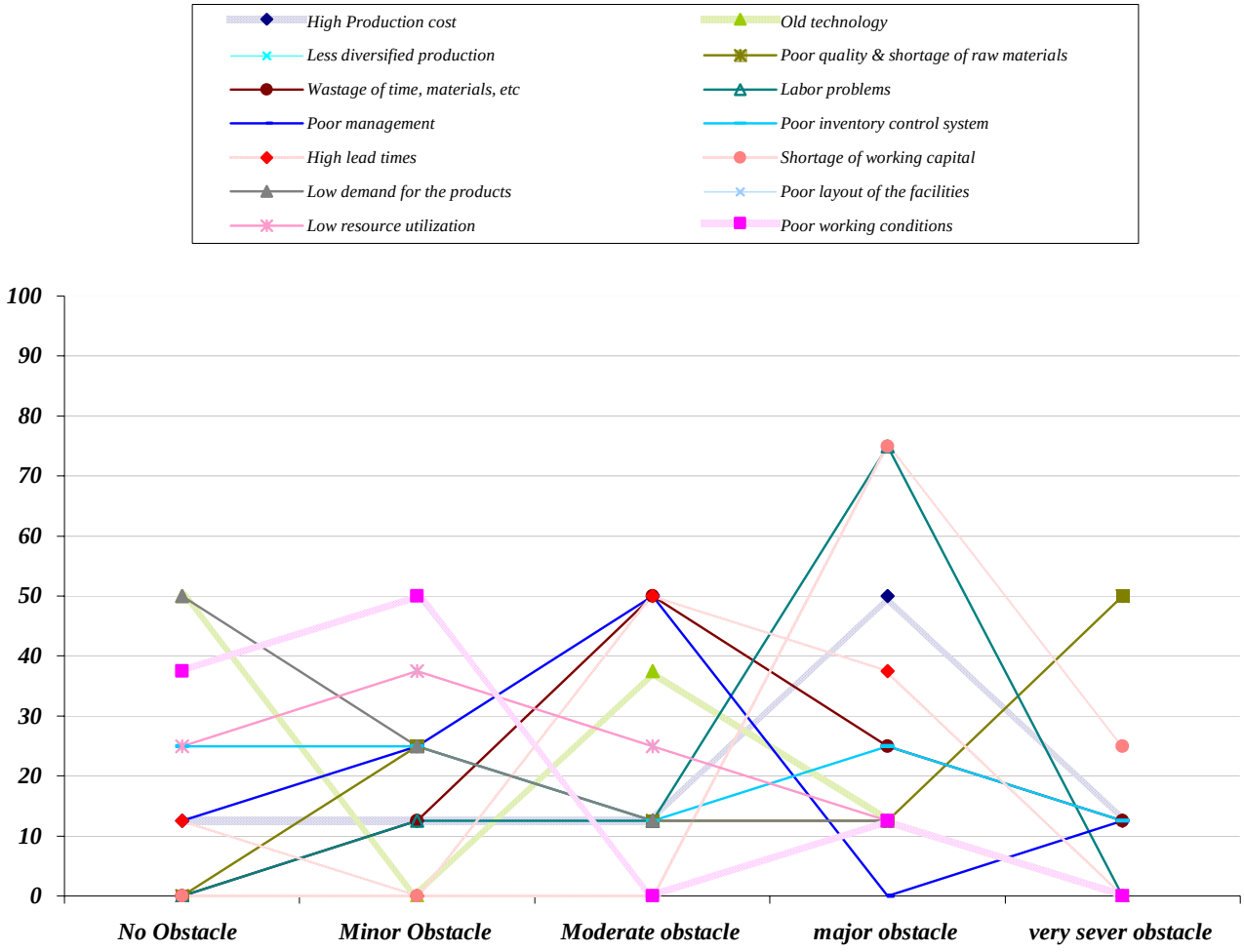


Figure 14 - Problems of Performance Improvement

From the above graph it is identified that, the most sever obstacles for performance improvement are poor quality and shortage of raw materials (fabrics and accessories), secondly factors rated as major obstacles are shortage of working capital, poor labor skill, and high production costs. Following rated factors as moderate obstacle include wastage of time and materials, poor management, and high lead times (production and order). Minor obstacles are including less diversified production, poor layout of the facilities, low resource utilization and poor working conditions. And the factors that are considered as no obstacle are technology of machines and methods and demand for products.

5.10 Performance Evaluation Practices

More than 67 % of responders have confirmed that performance evaluation have high importance for decision making in their industries. 33.3 % of the industries have their performance evaluation being reported weekly and the other 33.3 % have monthly. While the remaining responders report their performance evaluation is done in relatively longer time intervals.

To identify areas that need strategic focus in the industries, more than 65 % of industries have responded that they use regularly performance evaluation reports, while around 22.2 % have replied that they apply sometimes. The rest have replied to have rarely use performance evaluation as a method of identifying strategic focuses in the company.

From the responses it is understood that financial performance measures such as total sales volume/growth, operating profit, return on asset/capital employed and return on investment are used very rarely. Whereas non financial measures such as customer and market measures including increase in market share, reduction in customer complaint, increase customer retention/ acquisition and customer profitability are applied highly during performance evaluation.

Internal process/operation measures such as improvement in product and service quality are highly applied in the industries and other such measures including reduction in manufacturing lead time, reduction in operating costs and improvement in operating efficiency are moderately applied in performance evaluation.

Employee satisfaction measures are those highly used in this category, while accidents and working environment and incentive and reward are rarely implemented in performance evaluation. Training and development measures including training and education skill & capacity development,

qualification growths and innovation (new products, methods, ideas, etc) are moderately applied in performance evaluation.

Social and environmental measures such as waste treatment & pollution control and society complaint/satisfaction are highly implemented whereas market stabilization and cash outflow for social security are applied moderately in performance evaluation.

Finally regarding question raised to the industries about, how often should the performance evaluation be reported, 11.1% replied weekly, 33.3 % replied monthly, 33.3% replied quarterly and remaining 11.1% replied twice a year.

5.11 Cause and Effect Analysis

From the garment analysis the following cause and effect analysis is done in order to determine the causes of poor performance.

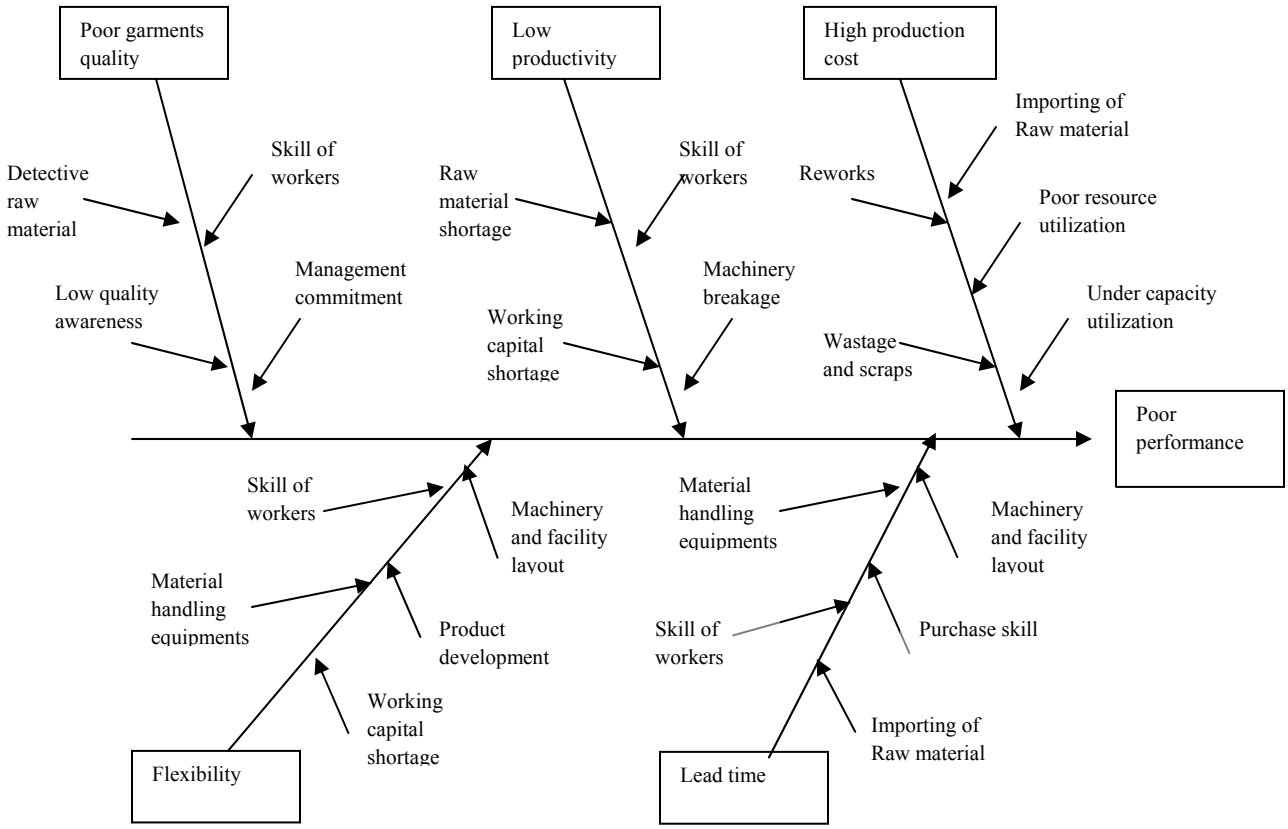


Figure 15-Cause and Effect Diagram

5.12 Garment Benchmarking

In order to determine the performance gap of Ethiopian garment industries, benchmarking was made to two references and to two competitor countries [11]. Reference countries considered are Romania and Turkey, where Romania is an important European supplier of high quality garments using imported fabrics (textile infrastructure does not exist) whereas Turkey is the second major supplier of garments in European. Turkey apparel production is high value added products using high quality local fabrics, the pre-production stage as well as the skills of the workers is also well developed.

Competitor countries considered are Bangladesh and Egypt. Bangladesh is an important garment supplier using locally made raw materials for EU and US where 75% the country's export is textile and garment. The infrastructure is poor and Productivity is medium, the technology used is also medium but country is very competitive price wise due to low wage workers. Egypt infrastructure is medium but sea port access makes an advantage for Egypt to exchange goods with all EU countries. Egypt apparel productivity is low, the skill does not exist, but Egypt has a policy to attract textile & garment industries and is in process of upgrading the industry.

Ethiopia level of industrial development is low; textile is only 1% from the export as well as the level of workers skill. However, Ethiopia is a cotton producer and workers are available; which is a competitive advantage to develop a strong apparel industry. Turkey and Romania are from far expensive countries which compensate their labor cost with high productivity and value added products. Bangladesh and Egypt have strong advantage over Ethiopia due to the abilities of producing garments from high quality local fabrics and accessories.

	Ethiopia	Egypt	Turkey	Romania	Bangladesh
Average rework rate 2007-sewing (%)	5-10	30	5	5	10
Average 2nd quality fallout rate 2007-garmenting (%)	2	10	4	3	7
Average overall efficiency –garmenting (%)	30	40	75	80	50
Productivity-causal trousers (pcs/workers/day)	10	15	40-50	50	30
Productivity – T-shirt (pcs/workers/day)	30	40	70	80	50
Average export selling price-T-shirt (USD/pcs)	0.45	2.5	10	10-12	1.8
Average export selling price-trouser(USD/pcs)	0.85-	7.5-10	20	25	5
Average standard allowed minutes T-shirt(min/pcs)	5-6	5-6	10-12	15	5-10
Average standard allowed minutes-trouser (min/pcs)	20-30	15-20	15-30	25-35	15-25
Average cost price per minute(USD/min)	0.015-0.02	0.05	0.2	0.16	0.03

Table 1 - Garment Benchmarks With the Reference and Competitor Countries

CHAPTER SIX - PROPOSED PERFORMANCE MEASUREMENT AND IMPROVEMENT MODELS

6.1 Performance Measurement and Improvement Integrated Model

The main focus of this chapter is to propose performance measurement and improvement model for Ethiopian garment industries. The proposed model adapted from performance measurement model described in handbook of performance measurement [18] consists of serious of stages and steps which can be expressed as follows.

6.1.1. Identify critical process

Identifying the critical garment making process is the first step in the performance improvement frame work. Hence at this stage all performance measurement teams need to agree on their process, in order to effectively measure it and utilize the output of the measurment. The process may be one of the key performance improvement factors such as productivity, second grade quality, waste, lead time as well as production cost and selling price.

6.1.2 Define Desired Performance goals

In order to meaningfully interpret the results of performance measurements and determine the success of the company, desired performance goals must be defined. These desired performances address the quality, quantity and timeliness of performance and sets initial and final target levels of performance. Hence garment industries need to define the desired performance goals which could be higher productivity with numerical value, reduction of lead time, high quality garment, or minimum production cost or a mix of different objectives.

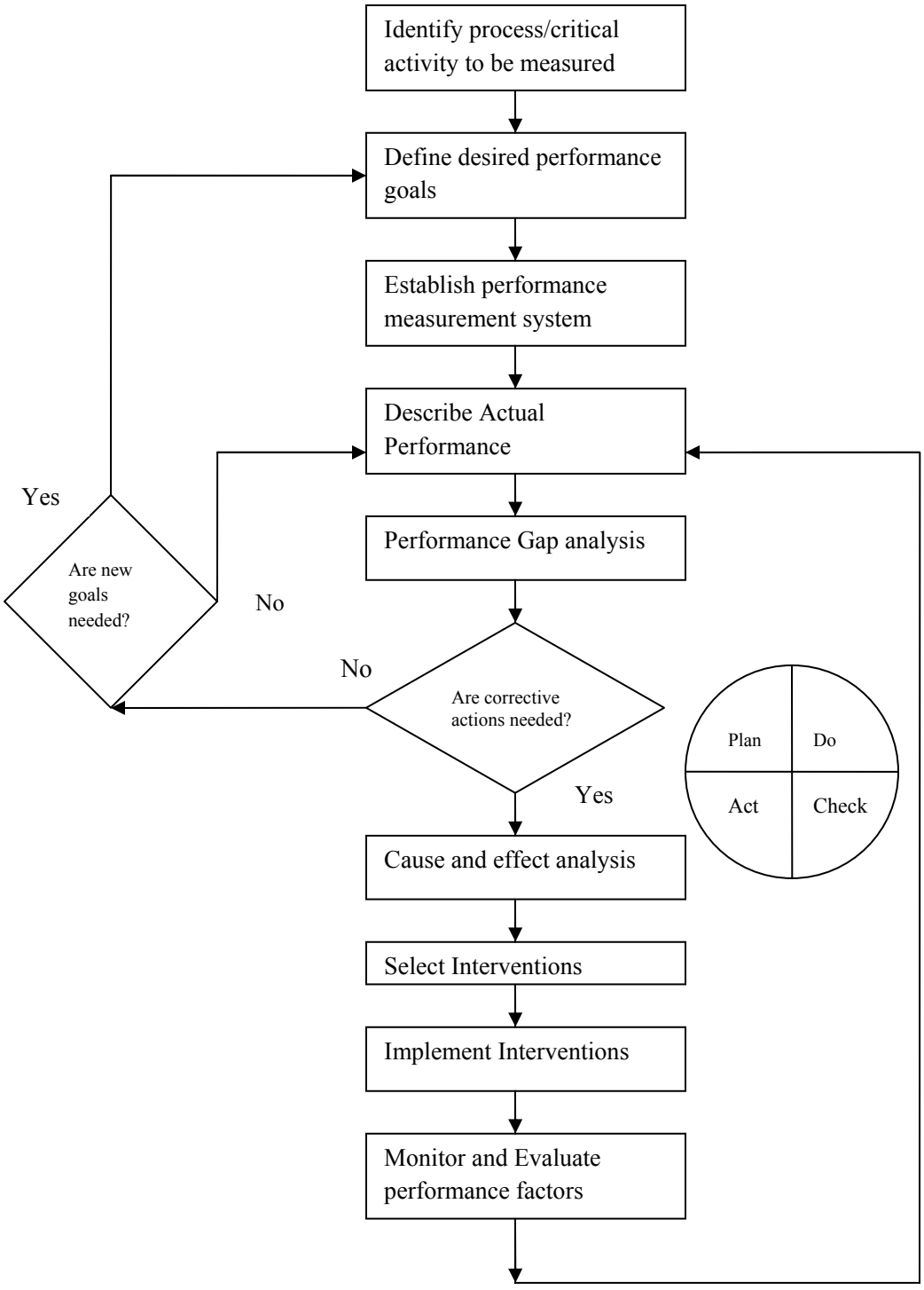


Figure 16 - Performance Measurement and Improvement Integrated Model

6.1.3 Establish performance measurement system

In this step based on the selected process to be measured, the appropriate performance measurement systems need to be established by identifying individual measures suitable for the process and identify responsible party(s) as well as team needs to be assigned the responsibilities for each of the steps in the performance measurement process.

6.1.4 Describe Actual Performance

In this step, actual performance data are collected. Where the data to be collected could be productivity of labor, machinery and material and rework amount, number of garment defects, lead time, as well as production cost and selling price. The data gathered for this stage will serve as the baseline for determining the effectiveness of the intervention in the latter stage. After the interventions have been implemented for a designated time period, performance data can be compared to baseline data to determine whether or how much performance has changed.

6.1.5 Describe Performance Gaps

Once the desired and actual levels of performance have been defined, identifying the performance gaps becomes a matter of comparing the two levels. The gap should be described using the same indicators that were employed to describe desired and actual performance. The gap description shows, in objective terms, the difference between current performance and the performance the garment company wants to achieve (best practice). Hence based on the result further decision can be taken whether correction and intervention are required in order to eliminate the gap.

6.1.6 Causes and effect analysis

Once performance gaps have been described and if the result indicates under performance, the next step is to determine the cause of those gaps by cause and effect analysis. Using the performance factors as a starting point, the stakeholder group should participate in a root cause analysis to uncover the environmental factors that are impeding good performance.

6.1.7 Select and Design Interventions

The stakeholder group should next select interventions that will tackle the root causes discovered during the previous stage. Each intervention or set of interventions must address at least one root cause. Hence the team may consult experts in each possible intervention areas in designing and developing the selected interventions.

6.1.8 Implement Interventions

During the implementation stage, management commitment is required for properly implementing the designed interventions, also for allocating budgets and resources and monitoring progress. Hence performance improvement team may recruit additional expertise as needed, assures organizational readiness, applies the interventions, and helps enable and monitor organizational change.

6.1.9 Monitor and Evaluate Performance

Through monitoring and evaluation, the team measures the change in the performance gaps identified during gap analysis. Monitoring happens on an ongoing basis so that changes in implementation can be made as needed. Whenever possible, the team should develop an evaluation method that can be integrated into workplace processes and remain in the workplace after the interventions as a feedback device for workers and managers. The final evaluation should be measured again for performance gaps and assess the extent to which they have closed the gap as a result of the interventions.

6.2 Performance Improvement System

The main components of performance improvement system for garment industries are identified based on the research analysis in addition to literature surveys and previous research works on similar industries. These are; management responsibility, quality, productivity, flexibility, time and cost. Following the implementation model has been stated considering the specific nature of the garment industry, present technology, culture, financial ability, organizational structure and personnel involved.

6.2.1 Management Responsibility

Managements are responsible for planning and executing performance improvement programs. They shall ensure that it is understood and applied to the daily work of the organization through the establishments of performance improvement goals and objectives. They should encourage employees' involvement in performance improvement activities, should describe the responsibilities, authorities, and interrelationships of the personnel of the garment industries.

Moreover to be competitive, it requires industries to perform a continuous improvement of their process, hence continuous improvement should always be an elusive goal for Ethiopian garment industries in order to improve the performance and competitiveness in the current global market. Management commitments are also required for allocating budgets and resources and monitoring progress. Particularly management commitment needs to improve regarding training system, motivational system and social compliances to meet international working conditions.

The management should give attention for customers and must recognize that the purpose of all work and efforts to make improvements are to serve the customer better. Hence to satisfy customers' requirements, industries must fully understand the customers' current and future needs and expectation. The management is also responsible in supplier evaluation and selection, where the selection of suppliers must be based on existing relation with garment industries, previous records and testimonies from previous clients and financial capacity and other relevant information about the supplier.

6.2.2 Productivity

In order to improve the productivity, extensive training in every stage of garment production process on job as well as in institutions should be provided including; for designers, pattern makers, marker makers as well as for supervisors and production managers. In order to improve the productivity, material handling system as well as the general layout of the factory need to be efficient, hence the general direction of the flow and orientation of all equipments and machineries according to garment production processes should be further researched. To compete successfully manufacturers must build up the backward linkage industry to reduce the dependence on imported raw materials and improve productivity.

6.2.3 Quality

Garment industries must have quality improvement plan to improve the performance of the industries where it should include a quality policy that contains goals and methods to achieve it. They should implement and maintain a documented quality system as a means of ensuring quality.

Quality control system should be implemented to measure the percentage that deviate from the acceptable in order to prevent the reoccurrence of a defect garment. Quality control techniques should include monitoring incoming raw material quality levels as well as utilizing statistical quality control methods to reduce garment variability. Implementation of the quality systems, together with an intensive training over the handlings, methods, records, database building, and data analysis is necessary for all management positions.

6.2.4 Flexibility

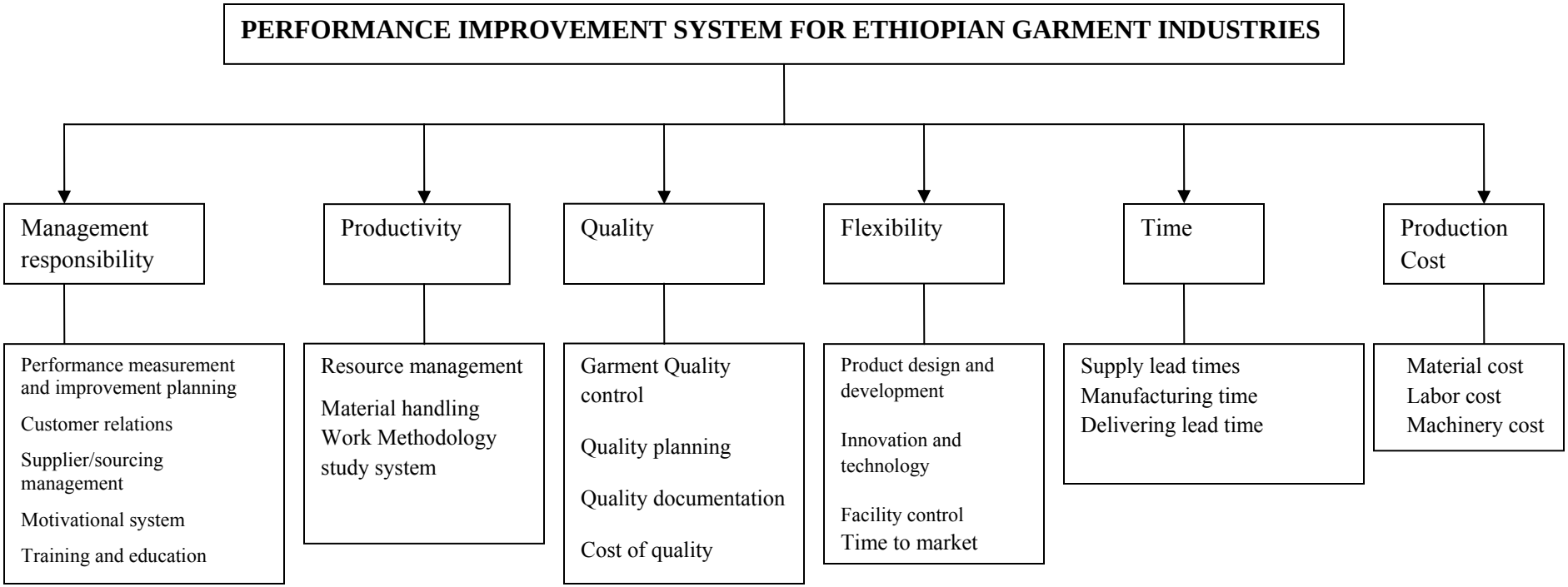
Due to the nature of garment, flexibility including in time, variety of style and volume is essential. Hence industries need to achieve shorter planning and production lead times, respond faster to and market trends. Hence workers skills need to be improved in designing, patter making and grading as well as marker making and cutting. Moreover upgrading technology and adopting automated manufacturing methods is also needed. Facility layout optimization and optimum material handling system usage should also improve for better flexibility.

6.2.5 Time

Lead time includes the total system time from receipt of order to payment for the delivery of the supplied product. Hence delivery speed, reliability and time to market need to greatly improve as well. Where in order to minimize these lead times, supplier management need to improve, manufacturing process need to be efficient. Manufacturing lead time can be reduced by implementing state of the art technology, by training workers, optimum facility layout and by using adequate material handling system. To compete successfully manufacturers must build up the backward linkage industry to reduce the dependence on imported raw materials and minimize lead-time. In the lead time reduction process identifying the beginning of the process and walking through the process is very important.

6.2.6 Cost

In garment operation, production costs constitute mainly, raw material cost, labor cost, and overhead costs. Thus to reduce production costs, resource utilization should improve i.e. wastage of fabrics and accessories, reworks as well as 2nd degree quality need to be avoided. Inspection of raw materials, good relation with suppliers in order to get optimum cost of raw materials is also important. In addition by properly utilizing existing machineries and applying preventive maintenance the cost of machineries could be reduced. By providing training to workers and by using proper equipments especially in preproduction areas hence turnover could increase per labor. Furthermore awareness of optimal productivity level should be developed. And economic ordering quantity of raw materials should be applied and work in process should be minimized.


PERFORMANCE IMPROVEMENT SYSTEM FOR ETHIOPIAN GARMENT INDUSTRIES
Management responsibility
Productivity
Quality
Flexibility
Time
Production Cost
Performance measurement and improvement planning
Customer relations
Supplier/sourcing management
Motivational system
Training and education
Resource management
Material handling
Work Methodology study system
Garment Quality control
Quality planning
Quality documentation
Cost of quality
Product design and development
Innovation and technology
Facility control
Time to market
Supply lead times
Manufacturing time
Delivering lead time
Material cost
Labor cost
Machinery cost

6.3 Implementation of Proposed Model

The research has suggested a sequence of implementation for the proposed performance improvement system by adapting from performance improvement model by Kasul and Motwani [1] in order to achieve world class operations. The model suggests that industries are expected to follow a distinct sequence of improvement programs which aim at building one capability upon, and not instead of, another as depicted below. The essence of this implementation model is that excellence in manufacturing is built on a common set of fundamental manufacturing capabilities prioritized and staged for implementation.

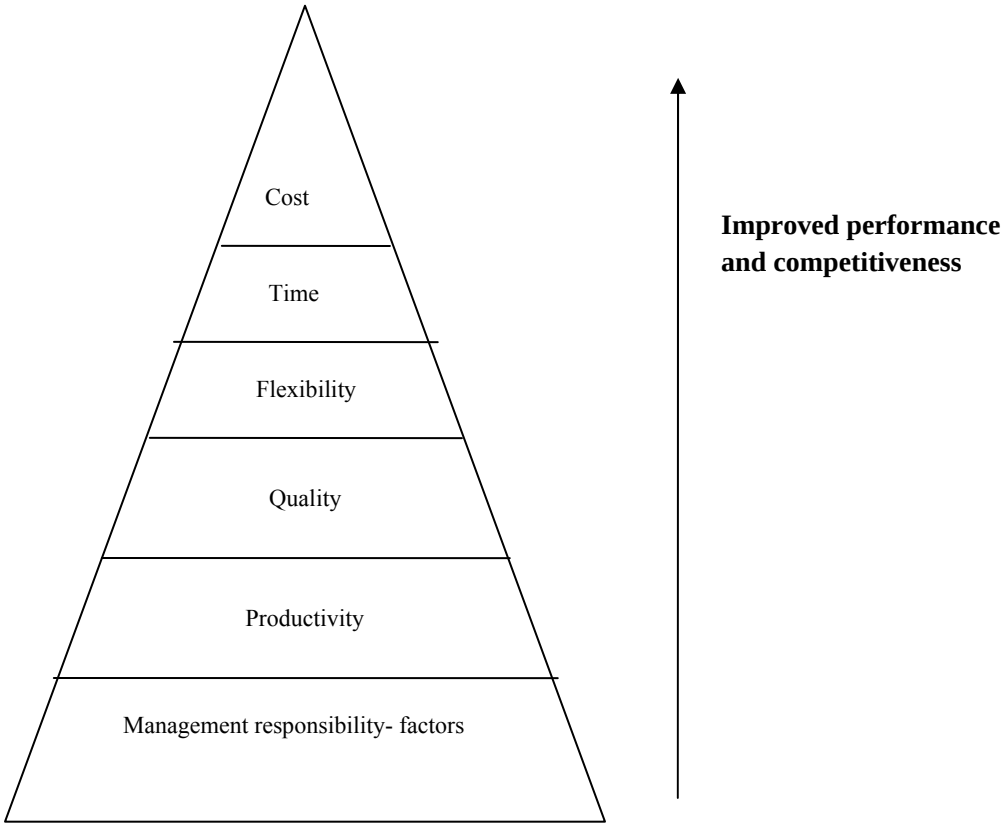


Figure 17 – Performance Improvement Factors Implementation

The sequence that is suggested is one that puts management commitments at the bases which includes attention to customer satisfaction, supplier relation management, trainings; then while the efforts on the mentioned sub factors continue, attention is given to productivity. Following attention is given to improving the quality improvement of the product and process and while this is continued and expanded attention is given to operations flexibility, time and lastly cost.

It is to be noted that though the suggested implementation method is sequential, continuous improvements of all factors are necessary. The researcher believes that at this point local lead could be achieved and international strategy could be further discussed. Thus, improvements obtained in this manner would be more stable and likely to last due to deeper penetration of good manufacturing management practices in the organization.

CHAPTER SEVEN -CONCLUSION

It can be concluded from the research that there are different performance factors that are hindering the performance improvement of the garment industries, where the factors can be categorized as external factors and internal factors. Internal factors are linked with the factory capabilities to improve their actual performances including; poor quality of garment, low productivity, poor performance measurement practice, under utilization of resources, lack of information about market as well as poor skill of workers. External factors are linked with the Ethiopian business environment including, infrastructure and local conditions outside the control of the industry.

From the research it is understood that, quality awareness exists from top management to shop floor workers, but in actual case, the garment industry cannot fulfill the demand required by markets due to poor quality of garment products. Quality level provided by the Ethiopian producers does not satisfy the requests of export clients since quality improvement systems are not implemented effectively in the industries.

Market research is missing from the activities of industries due to involved cost and to missing advertising and communication channels, contact with potential customers is limited by the relatively new exposure of the country to the markets. Hence customer requirement could not be determined and applied in garment designs which results in poor quality of garments. Moreover poor supplier relation is also observed and is considered as one of factors of performance improvement, due to lack of information's and experience in foreign purchases.

Ethiopian garment industries have low productivity, and one of major factors is poor skill of workers. Workers skills are characterized as medium complex and further training should be given to increase the skill of the workers to more complex and flexible designs. Moreover production managers and supervisors are not trained enough in order to properly manage the process and unable to balance efficiently the production lines with constant supplying of fabrics and accessories. Furthermore, utilization of available resources, fabrics, machines, workforces is not satisfactory.

The researcher has also observed that industries concerning productivity, give more attention to sewing section than to other processes including pattern making, cutting, inspection etc where these are considered a weak point in the industry and reason for low productivity.

In cutting sections, accumulations of fabrics are observed, due to missing correct flow and though the existing technology is suitable for a basic process, skills of operators are to be improved. And further activities such as the numbering, panel control, stocking, follow up and especially fabric utilization need to be improved.

Operational flexibility of the industries is very poor, no sufficient design nor product development exist and fashion designers are nonexistent, moreover workers skill need to improve and the industries should have flexible operational system to have a shorter product time to market with variety of garment style.

Moreover the garment sector is in a very disadvantageous situation due to long lead time which has negative impact on export growth. From the research it has been found that import dependency is the major bottleneck and it is the main factor for greater lead time which includes shipment time, unloading time, and customs clearance time and transportation time to factory warehouse. Import dependency arises out of the absence of sufficient backward linkage industry in the supply chain hence it is important to ensure the availability of fabrics from the local market.

Those external factors that are considered as hindrance to performance in these research includes financial constraints, unavailability of raw materials and weak supply chain relation. Infrastructure is not satisfactory causing delays in raw materials and accessories supply.

To conclude, the research has aimed to assess the current situation of the industries regarding performance measurement and improvement practices and the research has find out that there are internal and external performance factors, and though the industries need to improve their internal performance problems prior, both internal and external factors have to be solved simultaneously in order to improve the performance of the sector.

CHAPTER EIGHT –RECOMMENDATION

Ethiopian garment industries should design performance improvement plans in such a way that it can be implemented in practice and should focus on the key performance improvement areas. In order to have a continuous improvement, it is essential to monitor their performance on regular basis. During planning, implementation procedures as well as allocation of required resources for implementation should be given due attention.

The performance measurement allows the garment industries to determine their strengths and weakness, as a result, improvement areas can be identified and proper actions can be taken. Current performance measurement system has to advance to more organized systematic, state of the art measurement systems which include quality measurement, employee performance measurement, and customer satisfaction evaluation.

Quality of garment is one of the vital performance improvement factors. Thus in garment industries quality management system procedures need to be implemented including: basic inspection, testing procedures according to the international standards should be implemented in different stages of the garment production process. Regarding quality improvement, one of the essential components is quality system documentation which shall include quality policy manual, quality procedures manual and work instructions supported with detailed procedures and specifications of garment production.

Quality control should include raw material inspection over the fabrics such as color resistance, variation, chemical and physical tests, stretch ability etc; moreover quality control points are needed over fabrics, accessories, cutting room, and special operations, in line, end of line, finishing and packing in order to identify problems as early as possible.

Establishing customer service is considered a priority especially for export purposes, extensive marketing need to be established for categories of producer. Customer service program should include: providing customers with timely information and responding quickly to complaints, maintaining a corporate goal to reduce the quantity of questions or complaints. For every delivery the client feedback regarding: lead time, quality, service provided, comments should be collected and action plan must be established to improve the process.

Ethiopian garment industries should apply benchmarking, which is an effective tool for continuous improvement. Through benchmarking, the garment industries will be able to compare their practice and performance against that of successful competitors and understand the gap which shall be base for improving performance.

Moreover to improve the efficiency, another key is implementation of basic incentive system based on: productivity, complexity of the operation performed, skills, multiple operations, attendance level, and quality level provided etc. Implementing social compliance requirements along with other basic standard procedures is also important especially in dealing with international customers.

Furthermore preparation for sewing should be established as it is an important step that affects the productivity as well as the quality of the process which helps to deliver for sewing operation, hence will improve utilization of accessories by delivering only the necessary quantity.

Employee skill development is also another performance improvement factor, by experts and professionals from different field of research and management should allocate necessary amount of investment. Education and training should be given in continual basis on job and institutional in every stage of garment production process for every employee. Trainings should be, including for models and pattern makers, a fashion module should be established, special course for analyzing technical documentation should be established, special course for marker makers in efficiency of fabric utilization and also trainings should be provided for supervisors, production managers and administration. Moreover finishing section workers, a special recruitment and training program must be settled not by reallocating the workforce improper for sewing but by selecting the most careful, sensitive and responsible workers.

Lead time is one of competitive factors and in the garment sector main factor for longer lead time is purchase of raw materials by importing hence it is important to ensure the availability of fabrics from the local market by developing backward linkage industry in the supply chain. Manufacturing lead time can be reduced by implementing state of the art technology, training of workers, as well as better facility layout and material handling system should be implemented. In the lead time reduction process identifying the beginning of the process and walking through the process is very important.

In order to improve flexibility, workers skills need to be improved in designing, pattern making and grading as well as marker making and cutting. Hence upgrading technology and moreover adopting CAD/CAM will increase the speed and the accuracy for the sampling process; transfer of data from customers will also be easier and faster hence increases flexibility. Facility layouts are to be reorganized in order not to allow accumulation of fabrics in cutting areas as well as sewing. Optimum material handling system usage should improve for better flexibility.

Utilization of available technology by implementing systems of monitoring the machine time, calculation of productivity by machine and establishing priorities in investments that will avoid situation like actual when important resources are not used, are considered necessary for production cost minimization and increase of efficiency of resource utilization.

In garment operation, production costs constitute mainly, raw material cost, labor cost, equipments and machineries costs. Thus to reduce production costs, resource utilization should improve i.e. wastage of fabrics and accessories, reworks as well as 2nd degree quality need to be avoided. Inspection of raw materials, good relation with suppliers in order to get optimum cost of raw materials is also important. In addition by properly utilizing existing machineries and applying preventive maintenance the cost of machineries could be reduced.

Finally, Ethiopian garment industries have to be able to utilize their opportunities such as low wage labor, free quota export system and due to the potential of the industry and its benefit for the economic growth of the country. Hence as indicated for all these to succeed a strong top management commitment is crucial as well as organizational working culture change. Moreover external factors need to be approached by the government since the creation of an improved business environment is the strategic pillar for the future development of the industries.

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Appendix 1 - Questionnaire

ADDIS ABABA UNIVERSITY

SCHOOL OF GRADUATE STUDIES

DEPARTMENT OF MECHANICAL ENGINEERING (INDUSTRIAL ENG. STREAM)

Performance Measurement and Improvement in Ethiopian Garment Industries

Dear Participants;

With sincerity we would like to extend our deep appreciation to your company and the staff for the willingness and cooperation in undertaking this valuable research. We ask your kind cooperation in answering the questions as truthfully as possible and your response will be highly confidential.

This questionnaire is developed to conduct a scientific research by one of our student, **Ms. Rahel Sorri** on Performance measurement and Improvement of Ethiopian Garment industries.

For other questions pertaining to this project, please contact Addis Ababa University, Faculty of Technology, and Department of Mechanical Engineering. Tel: +251111232414, P.o.box 385

Thank you for your assistance!

PROFILE OF THE COMPANY

- Name of the company _____
- Date of Establishment _____
- Company location _____
- Current capital of the company _____
- Total number of employees _____
- Products of the company 1) _____
  2) _____

I. PERSONAL DATA (not necessary to write your Name!)

Current position (GM, Production Head, shift leader, etc) _____

Qualification_____

Service year _____

Gender _____

II- Organizational Information

1. Has the company an organizational structure? List out the main departments/sections?

   ---

2. Does the organizational structure create suitable working environment? Yes ☐ No ☐
3. What are the objectives and mission of the company for its performance? ----------

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   ---

4. Does the company set its goals and targets for its performance? yes ☐ No ☐
5. Does the company establish its clear vision of the future for its performance? yes ☐ No ☐
6. Does the company evaluate its performance activities regularly? yes ☐ No ☐
7. Does the company identify problems of performance improvement? yes ☐ No ☐
8. Does the company have a training program? □ Yes □ No

   If the answer is yes, provide the number of employees involved in training per annum, by mode of training:

Types / topics of trainings delivered	Abroad	Local	In house

9. Provide an average expenditure on training (as a percentage of total expenditure) in a year.

   □ < 2% □ 2-4% □ 4-6% □ 6-8% □ > 8%

10. Does the company provide incentive based on performance for its operators? □ Yes □ No

III. Financial Performance of the Company

11. What are the sources of finance for company?

□ Own fund □ Foreign loan □ Local loan □ Credit from supplier □ Advanced payment

12. Does the company have working capital problems? ☐ yes ☐ No
13. Does the organization have arrears in payment of bank loan or exceed overdraft limits?
14. Please give the financial performance data of your company for the last fours.

Performance Criteria	1998 E.C	1999 E.C	2000 E.C	2001 E.C
Sales (Birr)				
Cost of Production (Birr)				
Return on investment (Birr)				
Net profit after tax (Birr)				
Total Assets (Birr)				

15. Is the company's profit increasing for the last three years (1999, 2000, 2001 E.C)? yes ☐ No ☐
16. How much percentage of profit is reinvested per year at average? ----------
17. What is the company's market share in 2001 E.C? local _____% and foreign (export) _____%
18. Has the company's market share increased for last three years (1999, 2000 &2001 E.C)? ☐ yes ☐ No

IV. Productivity

19. Does the company have Productivity Improvement Program? ☐ yes ☐ No
20. Does the company determine its resource (labor, materials, machines, etc) utilization rate? ☐ yes ☐ No
21. Does the company identify and recognize the productivity problems? ☐ yes ☐ No

    If the answer is yes, what are they? ----------

    ----

22. Does the employees in the company aware about productivity improvement? ☐ yes ☐ No
23. What was company's average capacity utilization in the production year of 2001 E.C? _____ %
24. What are the reasons for not being fully operational? (Select one or more of the following).

a. Raw material shortage ☐
b. Shortage of spare parts ☐
c. Lack of market ☐
d. Working capital shortage ☐
e. Frequent machinery breakage ☐
f. Government rules and regulation ☐
g. other please specify----------

25. Do you think trial runs save time, save cost and minimize production errors and faults? □ Yes □ No

Labor productivity

26. How labor productivity measured in your company? ----------
27. Are the company's work standards compared with both national & international standards? □ Yes □ No
28. How do you rate the productivity of the following workforces? (Tick the rating level in the box)

Work forces	High	Medium	Low	poor
Top manager's level				
Middle manger's level				
Experts' level				
Supporting staff				
Shop floor level				

29. Do you have "standard time" for each garment style for all tasks required? □ Yes □ No
30. Please provide the following labor productivity measurements:

	Garment type	Number of garment pieces per operator per shift	Number of garment pieces per operator per machine per shift
1	Shirts with long sleeve		
2	Polo shirt		
3	Police uniforms		
4	Military uniforms		
5	Suitings		

6	Sports wear		
7	Pyjamas		

31. What is the workers' absenteeism and labor turnover in your company? Indicate the percentage in the box.

Monthly Absenteeism (%)	1-2 %	3-4 %	5-6 %	7-8 %	9-10 %	>10%
Labor turnover/month (%)	1-2 %	3-4 %	5-6 %	7-8 %	9-10 %	>10%

Machine Productivity

32. Please provide the following information /data on the utilization of your machines /equipments.

Machine/equipment type	Machine running hrs/Day	Machine Idle hrs/day	Machine failure hrs/day	Average Age
Spreading machine				
Cutting machine (Straight Knife)				
Over lock Sewing machine				
Lock stitch machine				
Button fixing machine				
Hand iron/ pressing machine				
Fusing machine				
Packing machine				

33. What are the reasons of machine failure?

□ Lack of preventive maintenance □ Due to aging of machines/ equipments

□ Improper handling of machines □ other, please specify _____

34. Are machinery maintenance services available locally? □ Yes □ No

35. What is the lead time to obtain spare parts?_____

Material productivity

36. Please give the average percentage of the rework, defects, and scrap in the production process.

Rework %	Defects%	Scraps%

37. Please provide the percentage cost of each of the following issues as a percentage of total costs.

Labor	Raw material (Fabrics)	Accessories	Electricity, water & gas	Rent	Other expenses
%	%	%	%	%	%

38. What is the cost of workers' overtime with a month? _____Hrs
39. Does the company calculate the cost of quality? □ Yes □ No

V. Quality Practices in the company

40. What is the quality awareness level in the company?

---

41. How high is your role and participation in quality activities?

---

42. How is quality defined in the company?

---

43. Does the company recognize and solve the quality related problems? □ Ye □ No
44. Does the company identified customer requirements? □ Yes □ No
45. Are objectives of the company linked to customer needs and expectations? □ Yes □ No
46. Does the company have a procedure for evaluating subcontractors or suppliers? □ Yes □ No
47. Are there inspection & tests for incoming, in-process and final products? □ Yes □ No
48. Does the company have quality management system (TQM, ISO 9000 QMS, etc)? □ Yes □ No
49. Does the company have customer's complaints handling mechanism? □ Yes □ No
50. What are the causes of poor quality products (garments)?

□ Defective raw materials delivered from suppliers □ Inadequate training of workers in the company

□ Due to poor maintenance of machines in the company □ Lack of top management commitment to quality

□ Low quality awareness of workers in the company □ Due to carelessness of workers in the company

□ Other ----------

51. Do the company's products (different garments) satisfy customer needs? □ Yes □ No

VI. Quality of Work Life in the company

52. Do you have the right materials handling equipments? (For safety and efficiency) □ Yes □ No
53. What preventive methods do you apply to avoid accidents/ risks? ----------

    ----

    ----
54. Is the physical working environment suitable for workers? □ Yes □ No

VII. Status of Inventory Control/Management in the Company

55. Access to the raw materials :

    □ Own made □ locally purchased □ Imported □ Partially Imported

56. How is a raw material purchase done?

    □ Directly from export customer □ Through agent/sourcing office □ Subcontractor □ Other---------

57. If the raw materials locally supplied then, what are the problems with local inputs?

    □ Lack of inputs/ raw materials □ Inferior quality □ Problem with reliability

    □ High cost of inputs relative to imported □ other, please specify ----------

58. If the inputs are fully or partially imported then, what are the problems with importing process?

    □ Delay in clearing goods through customs □ Duty exemption is not recognized

    □ Reliability on foreign suppliers is problematic □ High cost of inputs

    □ Minimum order size □ other, ----------
59. What is the average lead time for your customer orders? _____ Weeks
60. What is the average lead time for your supplier's orders? _____Weeks
61. Are you purchasing raw materials from your suppliers at the best possible price? □ Yes □ No

62. Are you purchasing raw materials in economical quantities? □ Yes □ No
63. How the Company ensure the quality of goods (raw materials) from your suppliers?
    □ Inspection □ Auditing □ ISO certification □ Performance measurement □ other ----------
64. Have you negotiated suitable terms of trade with suppliers and customers? □ Yes □ No
65. Have you arranged cost effective delivery? (Consider time, cost, reliability, safety) □ Yes □ No
66. Does the company have an inventory control system to ensure ideal stock levels (no overstocks or out of stocks)? □ Yes □ No
67. Are goods handled carefully and promptly and securely stored to prevent breakage, spillage and other deterioration and wastage? □ Yes □ No
68. Do you have systems and records in place (electronic or manual) to track the number and cost of stock purchased, sold and on hand? To track sales trends (seasonal demand, lifecycle)? □ Yes □ No
69. Are your records checked against a physical stock take regularly? □ Yes □ No

VIII. Product Development /Innovation

70. Does the company have garment design department? □ Yes □ No
71. How many new products (i.e. those that involve a significant change in the production process) has your company introduced in the last three years? _____
72. How long does it take to develop a new product to market? Please state for each product type. ----------
    ---
    ---
73. Does the company production system flexible in handling different volume of production and delivery time adjustments? □ Yes □ No
74. How trained is the staff for effective design change? ----------
    ---
    ---
75. Does the company consider the customer requirements in the product design? □ Yes □ No
76. How is the degree of computerization of the organization production and distribution functions?
    a. Preproduction including Product design, pattern makeup, layout, cutting, ----------
    b. Production including sewing, ----------
    c. Inventory management; customer relation, input sourcing searches, output marketing, ----------
77. What are the sources of information for learning about market? ----------
    ---

78. What are the sources of information for learning about new technology? ----------
---

79. What are the sources of information for learning about product design? ----------
---

80. Has your company undertaken any of the following initiatives in the last three years?

☐ Developed a major new product line ☐agreed a new joint venture with foreign partner

☐ Upgraded an existing product line ☐ obtained a new licensing agreement

☐ Discontinued at least one product (not produced) line ☐Closed at least one existing plant or outlet

☐ Outsourced a major production activity that was previously conducted in-house

☐ Brought in-house of a major production activity that was previously outsourced

☐ Introduced new technology on the way that the main product is produced

81. Please tell us if any of the following issues are a problem for performance improvement; please judge its severity as an obstacle on four point scale (0 = No obstacle, 1= minor obstacle, 2 = moderate obstacle, 3 = major obstacle, 4 = very severe obstacle).

	No Obstacle	**minor obstacle**	**moderate obstacle**	**major obstacle**	**Very severe obstacle**
a) High production cost	☐	☐	☐	☐	☐
b) Old technology (machines, methods, etc)	☐	☐	☐	☐	☐
c) Less diversified production	☐	☐	☐	☐	☐
d) Poor quality & shortage of raw materials	☐	☐	☐	☐	☐
e) Wastage of time, materials, etc	☐	☐	☐	☐	☐
f) Labor problems (shortage, low skill)	☐	☐	☐	☐	☐
g) Poor management	☐	☐	☐	☐	☐
h) Poor inventory control system	☐	☐	☐	☐	☐
i) High lead times (production & order)	☐	☐	☐	☐	☐
j) Shortage of working capital	☐	☐	☐	☐	☐
k) Low demand for the products	☐	☐	☐	☐	☐

l) Poor layout of the facilities	☐	☐	☐	☐	☐
m) Low resource utilization	☐	☐	☐	☐	☐
n) Poor working conditions	☐	☐	☐	☐	☐

o) If other, specify ----------

82. What could be the strategy to improve performance of the firm in the future?
    - □ Improve the networks with input suppliers
    - □ Expand total production capacity and invest in advance production technology
    - □ Computerize design and manufacturing, management and input sourcing, advertising and marketing
    - □ Diversify local sales into exports
    - □ other please specify ----------

IX. Performance (Efficiency and Effectiveness) evaluation practices in the Company

83. The importance of performance measurement/evaluation for decision making in your company is;
    □ Extremely Low □ Low □ Middle □ High □ Extremely High

84. How often is the performance evaluation being reported?
    □Weekly □ Monthly □ Quarterly □ Twice a Year □ Yearly □ other ----------

85. How does your company use performance evaluation reports to identify areas that need strategic focus? □
    □Never □ Rarely □ Sometimes □ Frequently □Always

86. Does your company use a financial performance measurement approach? □ Yes □ No
    If the answer to Yes, please state ----------

87. The degree of alignment & linkage between strategic performance measures and strategic goals is
    □ Extremely Low □ Low □ Middle □ High □ Extremely High

88. How does the company modify its performance measures as it changes its strategic objectives?
    □ Never □ Rarely □ Sometimes □ Frequently □Always

89. The degree of integration between financial and non-financial measures in the firm is
    □ Extremely Low □ Low □ Middle □ High □ Extremely High

90. Is your performance measurement/evaluation system computer-based? □ Yes □ No

91. How often should the performance evaluation be reported?

□Weekly □ Monthly □ Quarterly □ Twice a Year □ Yearly □ other ----------

92. To what extent does your company utilize performance measures that are described from question "**A**" to "**G**" below during performance evaluations? Please tick (X) mark on space provided in each table with a scale of five points.

(Score of 5 = Very Highly, 4 = Highly, 3 = Moderately, 2 = Lowly, & 1= Very Lowly).

Description performance measures		**1**	**2**	**3**	**4**	**5**
A. Financial Measures						
	Total sales volume/growth					
	Operating profit					
	Return on asset/capital employed					
	Return on investment					
B. **Customer and Market Measures**						
	Increase in market share					
	Reduction in customer complaint					
	Increase customer retention/ acquisition					
	Customer profitability					
C. **Internal Process/Operation Measures**						
	Improvement in product and service quality					
	Reduction in manufacturing lead time (MLT)					
	Reduction in operating costs					
	Improvement in operating efficiency					
	Down time & machineries availability					
D. **Employee Satisfaction Measures**						
	Employee complaint /satisfaction					
	Employee retention /turnover/absenteeism					

	Accidents and working environment					
	Salary, incentive and reward					
E. **Training & Development Measures**						
	Training and education					
	Skill & capacity development					
	Qualification growths					
	Innovation (new products, methods, ideas, etc)					
F. **Social and Environmental Measures**						
	Market stabilization					
	Waste treatment & pollution control					
	Cash outflow for social security					
	Society complaint/satisfaction					
G. **Supplier Partnership Measures**						
	Materials quality					
	Delivery time					
	Materials cost					

THANK YOU FOR RESPONDING ALL THE QUESTIONS!

Appendix 2 - Questionnaire Responses

II- Organizational Information

1. Does the organizational structure create suitable working environment? Yes 87.5 % No 12.5 %
2. Does the company set its goals and targets for its performance? yes 100% No 0%
3. Does the company establish its clear vision of the future for its performance? yes 100% No 0%
4. Does the company evaluate its performance activities regularly? Yes 77.8 % No 11.1 % N/A 11.1 %
5. Does the company identify problems of performance improvement? Yes 77.8 % No 11.1 % N/A 11.1 %
6. Does the company have a training program? Yes 77.8 % No 22.2 %
   - No data is available, regarding number of employees participating in a training program per annum.

     No training -17%

     In-house training -50%

     Local training -33%

     Abroad training -0 %
7. Provide an average expenditure on training (as a percentage of total expenditure) in a year.
   □ < 2% = 62.5 % □ 2-4% =25 % □ 4-6% =12.5 % □ 6-8% □ > 8%
8. Does the company provide incentive based on performance for its operators?
   Yes 55.6 % No 44.4 %

III. Financial Performance of the Company

9. Sources of finance
   □ Own fund =22.2 % □ Local loan =33.3 %
   □ Own fund and Local loan =44.5 %
10. Working capital problems □ yes = 100% □ No = 0%
11. Arrears in payment of bank loan or exceed overdraft limits
    □ Yes = 55.6% □ No =22.2% □ N/A=22.2%
12. Is the company's profit increasing for the last three years (1999, 2000, 2001 E.C)?
    Yes =11.1% No= 88.9%
13. How much percentage of profit is reinvested per year at average?
    - 88.9 % reinvested= none and 11.1 % of respondents(Yonis) =20% reinvested
14. The company's market share in 2001 E.C.
    - Adey Ababa = 25% local & 2% foreign

- For the rest 87.5% of respondents =no response

15. Has the company's market share increased for last three years (1999, 2000 &2001 E.C)? Yes =12.5% No= 25% N/A=62.5%

IV. Productivity

16. Does the company have Productivity Improvement Program? yes = 77.8% No = 22.2%
17. Does the company determine its resource (labor, materials, machines, etc) utilization rate? ? yes = 66.7% No = 22.2% N/A = 11.1%
18. Does the company identify and recognize the productivity problems? yes = 100% No = 0%
    If the answer is yes, what are they?

    - Poor raw material quality
    - Poor skill of operators
    - Shortage of working capital
    - Operating obsolete machineries
    - Shortage of spare part
    - Low employee moral
    - Delivery time
    - Quality of products
    - Productivity
    - Absenteeism
    - Performance fluctuation
    - Electricity
    - Government double and triple tax system

19. Does the employees in the company aware about productivity improvement? yes = 87.5% No =12.5%
20. What are the reasons for not being fully operational? (Select one or more of the following).
    h. Raw material shortage = 22.2%
    i. Shortage of spare parts = 13.8%
    j. Lack of market = 16.7%
    k. Working capital shortage = 19.4%
    l. Frequent machinery breakage = 8.3%
    m. Government rules and regulation = 19.4%
21. Do you think trial runs save time, save cost and minimize production errors and faults?
    Yes = 87.5% No = 12.5%

Labor productivity

22. Are the company's work standards compared with both national & international standards? yes = 37.5 % No = 62.5%
23. Do you have "standard time" for each garment style for all tasks required? yes = 75% No = 25%
24. Does the company calculate the cost of quality? yes = 62.5% No = 37.5 %

Addis Garment

Productivity (garment/ operator/ shift)

- Shirts with long sleeves =10-12
- Pajamas =20-22

Material productivity

- Rework 20-30%
- Defects 0%
- Scraps 0%

Adei Ababa Garment

Productivity (garment/ operator/ shift)

- Shirts with long sleeves =19 or {370 garment /shift/line }
- Poloshirt =22 or {450 garment /shift/line }

Material productivity

- Rework =15%
- Defects =2%
- Scraps = 1%

Akaki Garment

Productivity (garment/ day/line)

- Shirts with long sleeves =184/8hr/20
- Overall=245 /8hr/24
- Trousers = 310/8hr/36

- Overcoat=150/8/20
- Field jacket=154/8/42
- Field cape=252/8/10

Machine productivity

Machine/equipment type	Machine running hrs/Day	Machine Idle hrs/day	Machine failure hrs/day	Average Age
Spreading machine	2	6	0	
Cutting machine (Straight Knife)	4	4		
Over lock Sewing machine	8	0		
Lock stitch machine	8	0		
Button fixing machine	8	0		
Hand iron/ pressing machine	8	0		
Fusing machine	2	6		
Packing machine	-	-		

Material productivity

- Rework =2%
- Defects =1%
- Scraps = 0%

Feleke Garment

Productivity (garment/ operator/ shift) - N/A

Machine productivity – N/A

Material productivity

- Rework =20%
- Defects =2%
- Scraps = 1%

Cost of issues as indicated in the questionnaire

Labor	Raw material (Fabrics)	Accessories	Electricity, water & gas	Rent	Other expenses
25 %	65 %	5 %	2 %	2%	1 %

GMM Garment

Productivity (garment/ operator/ shift)- N/A

Machine productivity

Machine/equipment type	Machine running hrs/Day	Machine Idle hrs/day	Machine failure hrs/day	Average Age
Spreading machine	7	0	1	
Cutting machine (Straight Knife)	4	2	1	
Over lock Sewing machine	7	-	1	
Lock stitch machine	7	-	1	
Button fixing machine	7	-	1	
Hand iron/ pressing machine	7	-	1	
Fusing machine	7	-	1	
Packing machine	-	-	-	

Material productivity

- Rework =2%
- Defects =1%
- Scraps = 1%

Cost of issues as indicated in the questionnaire

Labor	Raw material (Fabrics)	Accessories	Electricity, water & gas	Rent	Other expenses
30 %	50 %	10 %	5 %	-%	5%

Nova star Garment

Productivity (garment/ operator/ shift) - N/A

Machine productivity – N/A

Material productivity

- Rework =20%
- Defects =N/A
- Scraps = 2%

Yonis Garment

Productivity (garment/ operator/ shift)-

	Garment type	Number of garment pieces per operator per shift	Number of garment pieces per operator per machine per shift
1	Shirts with long sleeve	3000 pcs	
2	Polo shirt	2000	
3	Police uniforms	400	
4	Military uniforms	400	
5	Suiting	-	
6	Sports wear	4500	
7	Pajamas	2500	

Machine productivity

Machine/equipment type	Machine running hrs/Day	Machine Idle hrs/day	Machine failure hrs/day	Average Age
Spreading machine	8	30 min		
Cutting machine (Straight Knife)	8	1 hr		"
Over lock Sewing machine	8		20 min	"
Lock stitch machine	8		10 min	"
Button fixing machine	8			"
Hand iron/ pressing machine	8	20 min		"
Fusing machine	2	7 hours		"
Packing machine	8			"

Material productivity

- Rework =2%
- Defects =1 %
- Scraps = 0 %

Cost of issues as indicated in the questionnaire

Labor	Raw material (Fabrics)	Accessories	Electricity, water & gas	Rent	Other expenses
10 %	80%	1%	3%	2%	4%

Oasis Garment

Productivity (garment/ operator/ shift)

	Garment type	Number of garment pieces per operator per shift	Number of garment pieces per operator per machine per shift
1	Shirts with long sleeve		
2	Polo shirt	15/operator/shift	
3	Police uniforms		
4	Military uniforms		
5	Suitings		
6	Sports wear	20 pcs/operator	
7	Pyjamas	10 pcs/ operator	

Machine productivity

Machine/equipment type	Machine running hrs/Day	Machine Idle hrs/day	Machine failure hrs/day	Average Age
Spreading machine	8	~ 30 min		2 yrs
Cutting machine (Straight Knife)	4	1 hr		"
Over lock Sewing machine	8		20 min	"
Lock stitch machine	1		10 min	"
Button fixing machine	1			"
Hand iron/ pressing machine	2	20 min		"
Fusing machine	1	7 hours		"
Packing machine				"

Material productivity

- Rework =5 %
- Defects =10%

V. Quality Practices in the company

25. Does the company identified customer requirements? yes = 100% No = 0%
26. Does the company have a procedure for evaluating subcontractors or suppliers yes = 37.5 % No = 62.5%
27. Are there inspection & tests for incoming, in-process and final products? yes = 75% No = 25%
28. Does the company have quality management system (TQM, ISO 9000 QMS, etc)? yes = 37.5 % No =62.5 %
29. Does the company have customer's complaints handling mechanism? yes = 62.5 % No = 37.5%
30. What are the causes of poor quality products (garments)?
    - □ Defective raw materials delivered from suppliers = 33.3%
    - □ Inadequate training of workers in the company= 8.3%
    - □ Due to poor maintenance of machines in the company = 20.8%
    - □ Lack of top management commitment to quality = 16.7%
    - □ Low quality awareness of workers in the company = 4.2%
    - □ Due to carelessness of workers in the company= 16.7%
31. Do the company's products (different garments) satisfy customer needs? □ Yes □ No

VI. Quality of Work Life in the company

32. Do you have the right materials handling equipments? (For safety and efficiency) yes = 62.5 % No = 37.5%
33. Is the physical working environment suitable for workers? yes = 87.5 % No = 12.5%

VII. Status of Inventory Control/Management in the Company

34. Access to the raw materials :
    - □ locally purchased =33.3 %
    - □ locally and partially Imported = 55.6 %
    - □ Imported = 11.1 %
35. How is a raw material purchase done?

□ Directly from export customer =14.3 %

□ through agent/sourcing office =28.6 %

□ Subcontractor =21.4%

□ Other (local) =35.7 %

36. If the raw materials locally supplied then, what are the problems with local inputs?

□ Lack of inputs/ raw materials =30.4 %

□ High cost of inputs relative to imported =17.4 %

□ Inferior quality =30.4 %

□ Problem with reliability =21.8 %

37. If the inputs are fully or partially imported then, what are the problems with importing process?

□ Delay in clearing goods through customs = 28.6 %

□ Reliability on foreign suppliers is problematic = 4.76 %

□ Minimum order size = 19.04 %

□ Duty exemption is not recognized = 9.5 %

□ High cost of inputs = 38.1 %

38. Are you purchasing raw materials from your suppliers at the best possible price? yes = 37.5 % No = 62.5%
39. Are you purchasing raw materials in economical quantities? yes = 50 % No = 50%
40. How the Company ensure the quality of goods (raw materials) from your suppliers?

□ Inspection = 72%

□ Auditing

□ ISO certification =9%

□ Performance measurement =19%

41. Have you negotiated suitable terms of trade with suppliers and customers? yes = 55.6% No = 11.1% N/A = 33.3%
42. Have you arranged cost effective delivery? (Consider time, cost, reliability, safety) yes = 77.8 % No = 0 % N/A = 22.2%
43. Does the company have an inventory control system to ensure ideal stock levels (no overstocks or out of stocks)? yes = 77.8 % No = 11.1 % N/A = 11.1%

44. Are goods handled carefully and promptly and securely stored to prevent breakage, spillage and other deterioration and wastage? yes = 88.9 % No = 0 % N/A = 11.1%
45. Do you have systems and records in place (electronic or manual) to track the number and cost of stock purchased, sold and on hand? To track sales trends (seasonal demand, lifecycle)?
    Yes = 55.6% No = 11.1% N/A = 33.3%
46. Are your records checked against a physical stock take regularly? yes = 55.6% No = 11.1% N/A = 33.3%

VIII. Product Development /Innovation

47. Does the company have garment design department? yes = 87.5 % No = 12.5%
48. Does the company production system flexible in handling different volume of production and delivery time adjustments? yes = 87.5 % No = 12.5%
49. Does the company consider the customer requirements in the product design? yes = 100 % No = 0%
50. Has your company undertaken any of the following initiatives in the last three years?

- ☐ Developed a major new product line = 20 %
- ☐ Upgraded an existing product line = 26.7%
- ☐ Discontinued at least one product (not produced) line = 13.3 %
- ☐ Outsourced a major production activity that was previously conducted in-house = 13.3 %
- ☐ Brought in-house of a major production activity that was previously outsourced = 6.7 %
- ☐ Introduced new technology on the way that the main product is produced = 13.3 %
- ☐ Agreed a new joint venture with foreign partner = 0%
- ☐ Obtained a new licensing agreement = 0%
- ☐ Closed at least one existing plant or outlet =6.7 %

51. Please tell us if any of the following issues are a problem for performance improvement; please judge its severity as an obstacle on four point scale (0 = No obstacle, 1= minor obstacle, 2 = moderate obstacle, 3 = major obstacle, 4 = very severe obstacle).

	No Obstacle	minor Obstacle	moderate Obstacle	major Obstacle	Very severe Obstacle
1. High production cost	**12.5%**	**12.5%**	**12.5%**	**50%**	**12.5%**
2. Old technology (machines, methods, etc)	**50%**		**37.5%**	**12.5%**	
3. Less diversified production	**25%**	**37.5%**	**25%**	**12.5%**	
4. Poor quality & shortage of raw materials		**25%**	**12.5%**	**12.5%**	**50%**
5. Wastage of time, materials, etc		**12.5%**	**50%**	**25%**	**12.5%**
6. Labor problems (shortage, low skill)		**12.5%**	**12.5%**	**75%**	
7. Poor management	**12.5%**	**25%**	**50%**		**12.5%**
8. Poor inventory control system	**25%**	**25%**	**12.5%**	**25%**	**12.5%**
9. High lead times (production & order)	**12.5%**		**50%**	**37.5%**	
10. Shortage of working capital				**75%**	**25%**
11. Low demand for the products	**50%**	**25%**	**12.5%**	**12.5%**	
12. Poor layout of the facilities	**37.5%**	**50%**		**12.5%**	
13. Low resource utilization	**25%**	**37.5%**	**25%**	**12.5%**	
14. Poor working conditions	**37.5%**	**50%**		**12.5%**	

52. What could be the strategy to improve performance of the firm in the future?

□ Improve the networks with input suppliers = 19 %

□ Expand total production capacity and invest in advance production technology = 23.8 %

□ Computerize design & manufacturing, management & input sourcing, advertising and marketing = 19 %

□ Diversify local sales into exports = 23.8 % and N/A 14.4 %

IX. Performance (Efficiency and Effectiveness) evaluation practices in the Company

53. The importance of performance measurement/evaluation for decision making in your company is;
Extremely Low ____ Low 33.9 % Middle 22.2 % High 44.4 % Extremely High_____

54. How often is the performance evaluation being reported?
Weekly 33.9 % Monthly 33.9 % Quarterly 11.1 % Twice a Year 11.1 % Yearly 11.1 % other ____

55. How does your company use performance evaluation reports to identify areas that need strategic focus?
Never ____ Rarely 11.1 % Sometimes22.2 % Frequently33.9 % Always33.9 %

56. Does your company use a financial performance measurement approach? Yes 22.2 % No 66.7 % N/A 11.1 % If the answer to Yes, please state ----------

57. The degree of alignment & linkage between strategic performance measures and strategic goals is
Extremely Low ____ Low 44.4 % Middle55.6 % High _____Extremely High_____

58. How does the company modify its performance measures as it changes its strategic objectives?
Never 11.1 % Rarely 33.9 % Sometimes33.9 % Frequently22.2 % Always____

59. The degree of integration between financial and non-financial measures in the firm is
Extremely Low ____ Low 55.6 % Middle44.4 % High _____Extremely High_____

60. Is your performance measurement/evaluation system computer-based? Yes 44.4 % No 55.6 %

61. How often should the performance evaluation be reported?
Weekly 11.1 % Monthly 33.9 % Quarterly33.9 % Twice a Year11.1 % Yearly____ other ____