



ADDIS ABABA INSTITUTE OF TECHNOLOGY
DEPARTMENT OF MECHANICAL ENGINEERING
(Industrial Engineering stream)

Productivity Improvement through Employee Based Technique for Ethiopian Garment Industries

(The case of Akaki Garment Factory)

A thesis submitted to school of graduate studies of
Addis Ababa University in partial fulfillment for degree of masters of
Science in industrial engineering (mechanical engineering)

By: Seleshi Tilahun

Advisor: Daniel Kitaw (Dr.-Ing)

Co-advisor: Amare Matebu (PhD candidate)

November/ 2011

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Approved by:

_____	_____	_____
Chairman of Department	Signature	Date
<u>Daniel Kitaw (Dr -Ing.)</u>	_____	_____
Thesis Advisor	Signature	Date
<u>Amare Matebu (PhD candidate)</u>	_____	_____
Thesis Co-Advisor	Signature	Date
<u>Gulilat Gatew (PhD candidate)</u>	_____	_____
Internal Examiner	Signature	Date
_____	_____	_____
External Examiner	Signature	Date

DECLARATION

I hereby declare that the work which is being presented in this thesis entitle “Productivity Improvement through Employee Based Technique for Ethiopian Garment Industries (The case of Akaki Garment Factory)” is original work of my own, has not been presented for a degree of any other university and all the resources of materials used for the thesis have been duly acknowledged.

Seleshi Tilahun
(Candidate)

Date

This is to certify that the above declaration made by the candidate is correct to the best of my knowledge.

Dr.-Ing. Daniel Kitaw
(Thesis Advisor)

Date

Acknowledgement

First of all, I would like to thank GOD our father, for what he has done to me, Holly Virgin Mary, and His saints too, for helping me throughout my life.

Next I would like to thank my thesis advisor Dr.-Ing Daniel Kitaw, who is the Associate Professor of Mechanical Engineering, for giving me to such kind of explorative and investigative thesis work. I believe that what I have learnt during the last two years will have an infinite profit for the rest of my life. Again, I would like to express my deepest thanks to Dr.-Ing Daniel Kitaw.

I am very grateful to thank my co-advisor Amare Matebu (PhD candidate), for his encouragement, excellent guidance, creative suggestions and critical comments which have greatly contributed to the thesis work.

During my study, special cooperation and continual support has given by Ato Sisay, the former administrative head, Ato Abay, quality head, and all employees of Akaki garment Share Company. Thus, I need to express my appreciation and thanks to all of them.

I would like to thank all garment factories who responded to my questionnaires which assisted me in a great deal in my study.

Next I would like to thank my brothers Taye Zeru and Demeke Endalamaw for their endless support throughout my thesis work. And also I would like to thank my friends Yeserah Gebeyehu, Getachew Kassa, Dessie Shitie and Abdurahman Mohammed.

The last but not the least my acknowledgement goes to my families; my mother Yeshalem Damitie, my wife Zigiju Tilahun, my child Elleni Seleshi and all of my brothers and sisters for their support in moral, material, financial and their kindness.

Table of Contents

Acknowledgement	iii
Table of Contents	iv
List of tables.....	viii
List of figures	ix
Abbreviations	x
Abstract.....	xi
Chapter one	1
1. Introduction	1
1.1 Back ground of the research.....	1
1.2 Statement of the problem	3
1.3 Objective of the research.....	4
1.3.1 General objective	4
1.3.2 Specific objectives	4
1.4 Scope of the thesis.....	5
1.5 Research Methodology.....	5
1.5.1 Literature survey	5
1.5.2 Data collection	5
1.5.3 Types of data to be collected	7
1.5.4 Analysis and discussion	7
1.6 Conceptual frame work of the study	8
1.7 Significance of the research	9
Chapter two.....	10
2 Literature review.....	10
2.1 Origin of the word productivity	10
2.2 Definition of Productivity	10
2.3 Labor productivity.....	12

2.4	Productivity cycle.....	13
2.5	Productivity measurement.....	14
2.6	Labor productivity measurement	15
2.7	Productivity evaluation	16
2.8	Productivity planning	16
2.8.1	Importance of productivity planning	17
2.9	Productivity improvement.....	17
2.10	Labor productivity improvement	18
2.11	Determinants of labor productivity	19
2.12	Labor productivity in Ethiopia.....	37
2.13	Over view of Garment industries in the world.....	38
2.14	Over view of garment industries in Ethiopia	39
2.15	Labor productivity in garment industries of Ethiopia	40
2.16	Garment Production Process	44
Chapter three.....		48
3. Case study on Akaki Garment Share Company.....		48
3.1	Introduction	48
3.2	Background	48
3.3	Product types and capacity	48
3.4	Site, Equipments and Machinery	48
3.5	Organization Structure and Manpower	49
3.6	Sales and Marketing.....	50
3.7	Productivity measurement of Akaki garment for the last five years.....	50
3.8	Best practice or benchmark in the world of garment manufacturing.....	56
3.9	Evaluation of the current status of the case company with respect to the employee based productivity improvement techniques.....	59
Chapter four		66

4. Data collection and analysis	66
4.1 Introduction	66
4.2 Data collection.....	66
4.2.1 Survey questionnaire.....	66
4.2.2 Interview	67
4.2.3 Direct observation.....	68
4.3 Data analysis and sentences	68
4.3.1 Data analysis and sentences of questionnaire type one	68
4.3.2 Data analysis and sentences of questionnaire type two	74
Chapter five.....	79
5. Employee productivity improvement model development for Akaki garment Share Company.....	79
5.1 Introduction	79
5.2 Most critical employee productivity improvement factors of Akaki garment Share Company	80
5.3 Employee Productivity improvement implementation frame work.....	86
5.3.1 Technical factors implementation frame work	86
5.3.2 Informational factors implementation frame work	89
5.3.3 Psychological factors implementation frame work.....	92
5.3.4 Economical factors implementation frame work	94
Chapter six	97
6. Conclusion and recommendation	97
6.1 Conclusions	97
6.2 Recommendation.....	98
Reference	99
Appendix A: survey questionnaire for Ethiopian garment factories	101
Appendix B: Amharic language questionnaire for Akaki garment share company employees .	107

Appendix C: The translation of Amharic questionnaire	111
Appendix D: Data collection formats for different departments of Akaki garment Share Company	115

List of tables

Table 2-1	Value added for ten years (source: central statistical agency)	41
Table 2-2	Index number of value added for ten years	42
Table 2-3	Number of employee for ten years (source: central statistical agency).....	42
Table 2-4	Value added per employee for ten years (data source central statistical agency)	43
Table 3-1	Partial productivity measurement data for the last five years	51
Table 3-2	Employee productivity measurement result for the last five years	51
Table 3-3	Material productivity measurement result for the last five years	52
Table 3-4	Capital productivity measurement result for the last five years	53
Table 3-5	Power and water productivity measurement result for the last five years.....	54
Table 3-6	Other miscellaneous productivity measurement results for the last five years	54
Table 3-7	Washing and sanitary standards	63
Table 4-1	Result of possible working definition of productivity in the garment factories.....	69
Table 4-2	Result of possible importance of productivity improvement	71
Table 4-3	Result of employee productivity improvement techniques	72
Table 4-4	Result of Compensation and Benefits of respondent garment factories.....	74
Table 4-5	Result of advantage of productivity improvement at Akaki garment factories.....	75
Table 4-6	Result of employee based productivity improvement factors	76
Table 4-7	Rank of employee based productivity improvement factors	77
Table 5-1	Education level of 68 respondent of Akaki garment Share Company	87
Table 5-2	The work experience of the respondent's employees.....	88

List of figures

Figure 1-1	Frame work of the study	8
Figure 1-2	Industrial development phases	9
Figure 2-1	The productivity cycle (source: Sumanth, 1984)	14
Figure 2-2	A conceptual model for successful productivity improvement program	18
Figure 2-3	Value added per employee in '000' US\$, 2007	37
Figure 2-4	Labor productivity of some African countries	38
Figure 2-5	Value added of Ethiopian garment factories from 1992 to 2001 E.C	41
Figure 2-6	Ten year value added index of Ethiopian garment factories	42
Figure 2-7	Ten year number of employee of Ethiopian garment factories	42
Figure 3-1	Organizational structure of Akaki garment Share Company	49
Figure 3-2	Employee productivity based on the output in pieces	51
Figure 3-3	Employee productivity index	52
Figure 3-4	Material productivity measurement results for the last five years	52
Figure 3-5	Material productivity indexes	53
Figure 3-6	Capital productivity measurement result for the last five years	53
Figure 3-7	Capital productivity index	53
Figure 3-8	Power and water productivity measurement result for the last five years	54
Figure 3-9	Power and water productivity index	54
Figure 3-10	Other miscellaneous productivity measurement results for the last five years	55
Figure 3-11	Other miscellaneous productivity indexes	55
Figure 4-1	Disagreement result of possible working definition of productivity	69
Figure 4-2	Undecided result of possible working definition of productivity	70
Figure 4-3	Agreement result of possible working definition of productivity	70
Figure 5-1	Percentage of 26 employee based productivity improvement techniques	80
Figure 5-2	Fish bone diagram representation of selected employee based productivity improvement techniques	83
Figure 5-3	Conceptual employee productivity improvement model	84
Figure 5-4	Implementation frame work of technical factors	86
Figure 5-5	Implementation frame work of information flow factors	89
Figure 5-6	Implementation frame work of psychological factors	92
Figure 5-7	Implementation frame work of economical factors	94

Abbreviations

APC	American Productivity Center
CSA	Central statistics agency
EPG	Employee participation groups
ILO	International Labour Organization
MBO	Management by objectives
MDW	Measured Day work
OEEC	Organization for European Economic Cooperation
PQ	Productivity quality
PWR	Piece work rate
QC	Quality circle
SAM	Standard Allowed Minutes
SHP	Standard hour plan
SPR	Standard production rate
SVOP	Sales value of production
TFP	Total factor productivity
USITC	United States International Trade Commission
WR	Wage rate

Abstract

Productivity means different things to different people as they tend to focus on the dimensions and factors which are relevant to them. We have considered productivity either as a very narrow or as a philosophical concept, and consequently have not exploited its full potential. Besides resource utilization (efficiency) and output (effectiveness), productivity has been considered as working smarter rather than harder, an attitude of mind, a process of change, improving the quality of life and creating wealth, a journey without an end, and a stride towards perfection.

The employee productivity trend of Ethiopian garment factories was assessed through questionnaire. While the detail analysis of employee based productivity improvement techniques was performed at the case study, Akaki garment Share Company.

The required information needed to investigate the current status of Akaki garment Share Company with respect to the employee based productivity improvement techniques was collected using different techniques. The first one was questionnaires and two types of questionnaires were prepared; one for the management body and the other for the workers. The second technique was document review. The last five years annual reports and different monthly reports were revised and the necessary data was collected. The other technique was shop floor survey. The last technique was structured and unstructured interview for both the management and the workers.

From the literature twenty six employee based productivity improvement techniques were identified. From which, sixteen techniques were selected to be implemented for Akaki garment share company based on the result of the analysis of collected data. The sixteen techniques were categorized in to four groups based on their similarity in application. Using the selected techniques, employee productivity improvement model was developed and the implementation procedure was proposed. For the developed model, implementation frame work was proposed for all four categories.

Finally, the thesis includes the suggestive conclusion and the possible recommendations.

Chapter one

1. Introduction

1.1 Back ground of the research

Today, productivity has become the national concern of both developing and developed countries. Particularly for developing countries productivity is very essential because of its use as a tool for national development.

The traditional interpretation of productivity, focusing the efficient use of resources, cannot meet the complex and diverse competitive needs of business. The economic conditions which prevailed when the productivity concept was propounded, dictated that labor should be the primary concern. Over a long period of time, other resources such as capital, energy and materials were brought into the ambit of productivity considerations to reflect their relative importance and contribution. Productivity meant producing "more and more" with "less and less" (21).

Productivity is probably the most widely discussed yet least understood concept of the present management era (Sink, 1985). Most managers do not know

- (i) What productivity really means?
- (ii) How vital it is to them and their organization?
- (iii) How to measure and analyze it?
- (iv) What factors affect it? and
- (v) How it can be improved significantly?

As a relationship between output and input, productivity is a universal and dynamic concept, comprising two dimensions (inputs and outputs). To stay competitive in the present environment, we need to rethink what productivity really means and to improve it (21).

However, recent literature and approaches are beginning to emphasize the output dimension of the productivity equation to meet the emerging challenges of competition and social expectations. The output dimension has been given various labels in the literature: set of results; highest level of performance; organizational objectives; total tangible output; and all measurable output, among others. The International Labour Organization (ILO) has for many years promoted an advanced view of productivity which refers to the effective and efficient utilization of

resources capital, land, materials, energy, information and time in addition to labour (Prokopenko, 1987) (21).

Besides resource utilization (efficiency) and output (effectiveness), productivity has been considered as working smarter rather than harder; as an attitude of mind; as a process of change; as improving the quality of life and creating wealth; as a journey without an end; as a destination; as a concept of mind; a stride towards perfection. Clearly, productivity means different things to different people as they tend to focus on the dimensions and factors which are relevant to them. We have considered productivity either as a very narrow and myopic idea or as a philosophical concept, and consequently have not exploited its full potential.

Emphasizing the relationship between output and input, the conceptual perspective considers productivity as a comprehensive whole incorporating both the input dimension (efficient use of resources) and the output dimension (effective accomplishment of goals). A comprehensive view is essential to match the multidimensional competitive profile and diverse needs of organizations; it has the capacity to integrate various dimensions of a productive and healthy organization. Such a view of productivity would focus on both outputs what is required by the customer and stakeholders and the inputs, processes employed and materials consumed in the process of production. Productivity means how much and how well we produce from the resources used (Bernolak, 1997) (21).

Higher productivity leads to a reduction in cost of production, reduces the sales price of an item, expands markets, and enables the goods to compete effectively in the world market (18).

To improve productivity there are different techniques with different scholars. But the known professor on productivity improvement, Professor David J. Sumanth divides in to seven groups which have different factors within each group (6). These are

1. Technology-based techniques
2. Employee-based techniques
3. Product-based techniques
4. Process/activity-based techniques
5. Material-based techniques
6. Management based techniques and
7. Investment based techniques

All techniques may apply together or individual for different industries depending on the nature of the organization. But basically employee based techniques is recommended for labor intensive organizations and when we improve employee productivity it is easy to implement other techniques. Garment factories are labor intensive in our country. To contribute the development of the garment industries in our country, this thesis selects employee based techniques to improve labor productivity for Ethiopian garment factories.

When we compare the labor productivity of our country to the world, it is very low and needs attention for improvement to compete the global business (23). Especially the labor intensive sectors like garment industry needs improvement for labor productivity. The basic aim of this paper is to improve labor productivity of garment industries using employee based techniques.

1.2 Statement of the problem

Development of garment industries has been a first step for the industrialization and economic growth in many low income countries with abundant and inexpensive labor (27). But this needs high labor productivity. When we compare the Ethiopian labor productivity to developed countries, it is very low. According to The World Bank study in 2004, Ethiopian workers were about 80 percent less productive than workers in Bangladesh and more than 1.5 times less productive than those in China (24). Even it is lower than most developing countries like Kenya and Uganda (3).

With this low labor productivity, it is impossible to think about development of garment factories. To make competent Ethiopian garment factories in the global business, it is necessary to improve labor productivity. But, in most of our country manufacturing firms including garment sectors, productivity measurement and improvement program is not common.

When we come to Akaki garment Share Company, even if the company has labor efficiency measurement system, it has no defined labor productivity measurement techniques. The efficiency measurement system may show labor productivity in some instant but it is not scientific and standard system of employee productivity measurement. Using this measurement system, the trend of labor productivity for the last five year was decreasing and there was no any implemented program to improve the productivity of labor.

During shop floor survey, there was unnecessary movement of operators, unnecessary talking between the operators and sometimes there were some idle operators. This shows that the operators were neither motivated nor committed to their work and also did not internalize the work. In addition there was a great turnover of employees in the company.

As the supervisor explained, the workers left the company in different time because of the absence of motivation system either financially or non-financially. The management system of the company is poor to manage employees. They did not allow the employees to participate on different discussions like problems on working area, incentives, and goal of the company. The company did not have incentive systems and the salary of machine operators is very low on which it is difficult to support their life. Due to this reason, the employees were not able to perform their jobs with motivation and interest rather they preferred to leave the company.

This research tried to identify the most critical employee productivity improvement factors of Akaki garment Share Company from employee based improvement techniques and developed employee productivity improvement model. By modifying the model according to the factory working culture, it can be implemented in other garment factories.

1.3 Objective of the research

At the end of the thesis the following general and specific objectives are expected to be achieved.

1.3.1 General objective

The general objective of this research was to develop employee productivity improvement model for Ethiopian garment industries using employee based technique by considering the case company.

1.3.2 Specific objectives

The specific objective of this research was

- 1) To assess the current employee productivity improvement system of garment industries
- 2) To create awareness about labor productivity measurement and improvement program for garment industries
- 3) To measure the productivity of the employee for the case garment factory

- 4) To select the suitable labor productivity improvement tools from the employee based techniques and
- 5) To develop employee productivity model for Ethiopian garment industries by considering the case company.

1.4 Scope of the thesis

- ❖ This research tried to measure labor productivity of the case company and to identify the basic factors for labor productivity.
- ❖ Developed model for labor productivity improvement using employee based techniques for Ethiopian garment factories by considering the case company is the output of this thesis.

1.5 Research Methodology

This research has been designed to study the productivity improvement of the employees for garment manufacturing sector using employee based techniques. The research involved different approaches and discussed below.

1.5.1 Literature survey

Literature survey was conducted to gain a fundamental understanding of labor productivity, labor productivity measurement, labor productivity improvement, and different labor productivity improvement techniques for garment factories internationally, in Africa and in Ethiopia. Having detail understanding of these points, data was collected using different techniques.

1.5.2 Data collection

After having the basic concept regarding the productivity measurement and improvement system, the next step was data collection. To collect data, different techniques have been used.

A. Primary data collection

The primary data was collected directly from the garment industries in different collection methods.

I. Questionnaire

Two types of questionnaire were prepared. The first type of questionnaire was prepared for Ethiopian garment factories and was distributed in two ways. For factories located in Addis Ababa, the questionnaire was directly distributed and for those located out of Addis Ababa, was distributed using email. The main objective of the questionnaire was:

- ❖ To understand the definition of productivity of the company by giving some alternative formal definitions and by advising to mention the company definition.
- ❖ To identify the factors of labor productivity in the company
- ❖ To know the current practice of employee productivity measurement system of the company
- ❖ To understand the current practice of employee productivity improvement system of the company
- ❖ To assess the trends of employee productivity for the last some years

The second type of questionnaire was prepared for the employee of the case company to know the employees' understanding on definition of employee productivity and employee based productivity improvement factors and to prioritize the factors.

II. Interview

The interview was basically prepared for the case company and was done to collect data that were not covered in the questionnaire part and when more clarification was needed. The interview was conducted with different department heads especially administrative head, techniques and production head, supervisors and employees through face to face and phone.

B. Secondary data

The basic source of secondary data was the recorded document of the case company. Therefore, quarter and annual reports were observed to see the general trends of employee productivity, employee productivity measurement and improvement practice of the factories.

The other main sources of secondary data were central statistics agency report on large and medium scale manufacturing and electricity industries survey of ten years starting from 1992E.C to 2001 E.C. From this document total output, number of employee, value added, labor cost and other necessary data of all Ethiopian garment factories was collected.

In addition data like labor law of Ethiopia, different occupational safety and health standards was collected from ministry of labor and social affairs.

1.5.3 Types of data to be collected

A. Quantitative data

- Total output and value added of the company in different time of reference
- Labor inputs with the same time reference of value added and total out put

B. Qualitative information

- The current productivity improvement system of the company
- The employee management system like promotion, incentive, training, etc scheme of the company
- The basic factors for employee productivity improvement in the company

1.5.4 Analysis and discussion

After the collection of necessary data, it was analyzed using appropriate statistical tools like SPSS. From the result of SPSS different charts, graphs and diagrams were sketched and finally the labor productivity improvement model was developed.

1.6 Conceptual frame work of the study

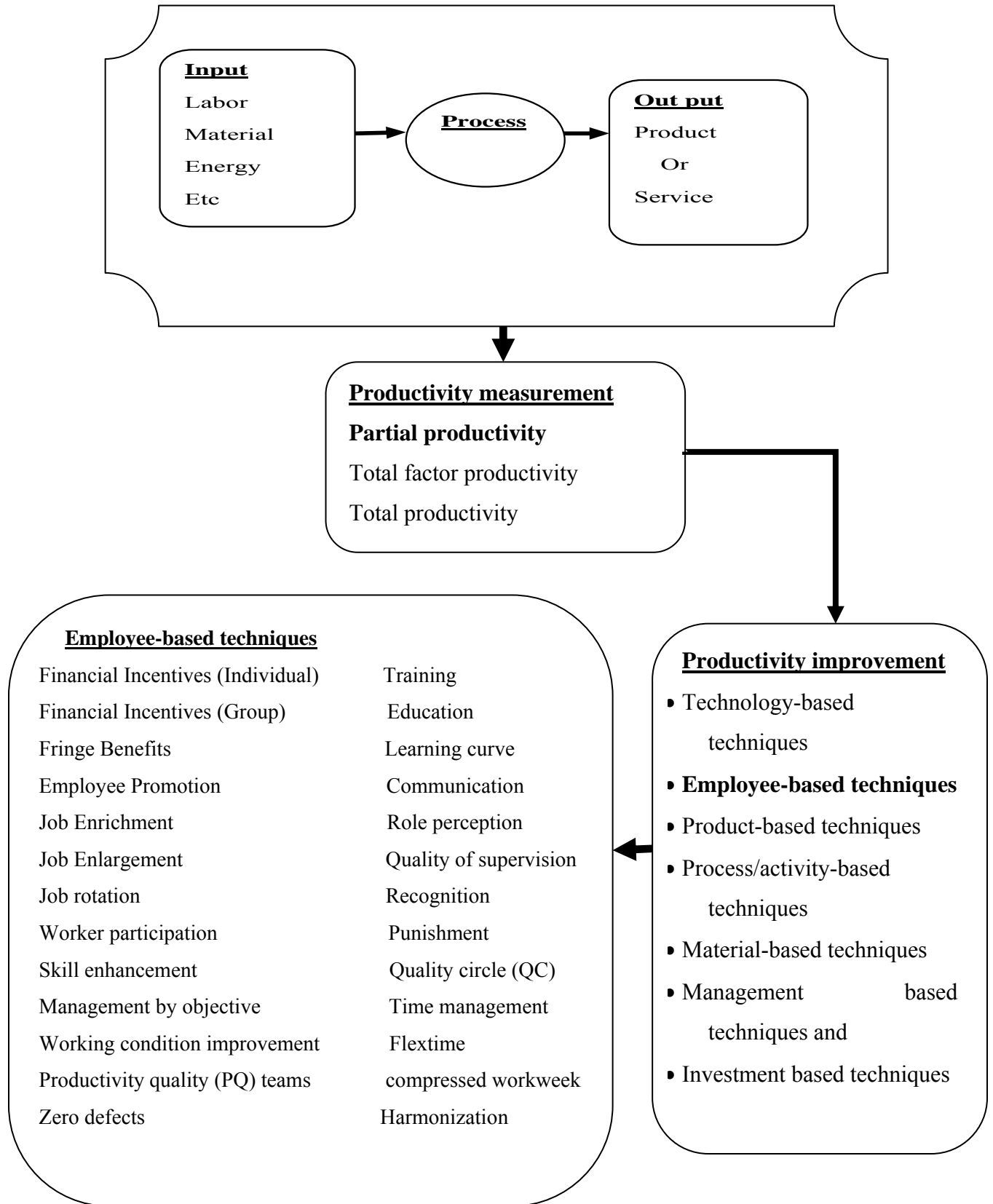


Figure 1-1 Frame work of the study

1.7 Significance of the research

Different researches were conducted on labor productivity in developed countries. But it was not common in developing countries particularly in our country Ethiopia. Not only for developing countries but also for developed countries, there is always a room for improvement.

In addition to the above point, in industrial development there are different phases starting from labor intensive to knowledge intensive

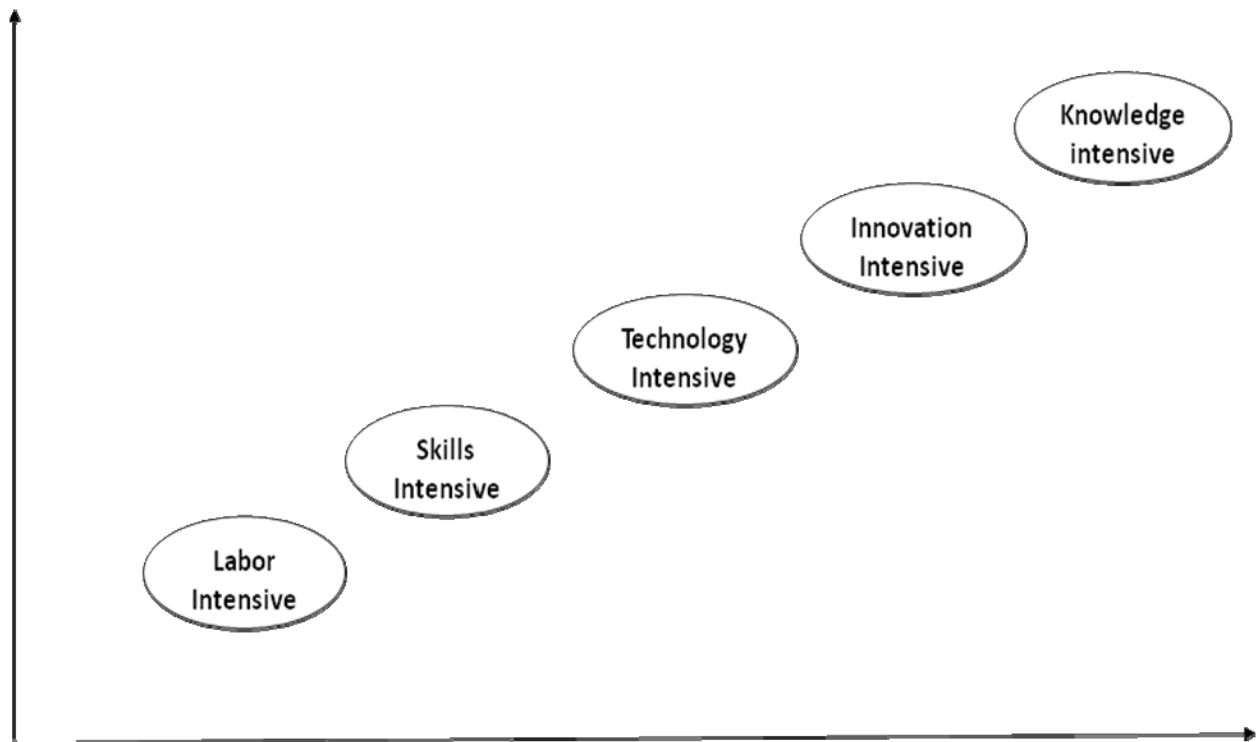


Figure 1-2 Industrial development phases

Our country is at labor intensive phase of industrial development. The government gives attention for labor intensive industries to create job opportunities for the available labor force and to transform the country to the next phase of development. Garment industries are one of the labor intensive sectors, so it is very important to conduct research on labor productivity improvement.

Chapter two

2 Literature review

2.1 Origin of the word productivity

In a formal sense, probably, the first time the word "productivity" was mentioned in an article by Quesnay in the year 1766. More than a century later, in 1883, Littre defined productivity as the "faculty to produce," that is, the desire to produce. It was not until the early twentieth century, however, that the term acquired a more precise meaning as a relationship between output and the means employed to produce that output. In 1950, the Organization for European Economic Cooperation (OEEC) offered a more formal definition of productivity. Generally the origin of productivity is summarized as: (7)

- ❖ Quesnay, 1766, the word “productivity” appears for the first time.
- ❖ Littre, 1883, “faculty to produce”.
- ❖ Early 1900s, “Relationship between output and the means employed to produce this output”.
- ❖ OEEC, 1950, the Organization for European Economic Cooperation: “Quotient obtained by dividing output by one of the factors of production”
- ❖ Davis, 1955, “Change in product obtained for the resources expended”.
- ❖ Fabricant, 1962, “Always a ratio of output to input”.
- ❖ Kendric & Creamer, 1965, Functional definitions for partial, total factor and total productivity
- ❖ Siegel, 1976, a family of ratios of output to input
- ❖ Sumanth, 1979, Total productivity: the ratio of tangible output to tangible input.

2.2 Definition of Productivity

It is a very comprehensive concept, both in its aim and also in its operational content. It is a matter of common knowledge that higher productivity leads to a reduction in cost of production, reduces the sales price of an item, expands markets, and enables the goods to compete effectively in the world market. It yields more wages to the workers, shorter working hours and greater leisure time for the employees. In fact the strength of a country, prosperity of its economy, standard of living of the people and the wealth of the nation are very largely determined by the extent and measure of its productivity. By enabling an increase in the output of goods or services for existing resources, productivity decreases the cost of goods per unit, and makes it possible to

sell them at lower prices, thus benefiting the consumers while at the same time leaving a margin for increase in the wages of the workers (18).

Productivity can be defined in many ways

- Productivity is nothing but the reduction in wastage of resources such as labor, machines, materials, power, space, time, capital, etc.
- Productivity can also be defined as human endeavor (effort) to produce more and more with less and less inputs of resources so that the products can be purchased by a large number of people at affordable price.
- Productivity implies development of an attitude of mind and a constant urge to find better, cheaper, easier, quicker, and safer means of doing a job, manufacturing a product and providing service.
- Productivity aims at the maximum utilization of resources for yielding as many goods and services as possible, of the kinds most wanted by consumers at lowest possible cost.
- Productivity processes more efficient works involving less fatigue to workers due to improvements in the layout of plant and work, better working conditions and simplification of work. In a wider sense productivity may be taken to constitute the ratio of all available goods and services to the potential resources of the group.

Depending upon who is defining it whether it is an economist, accountant, manager, politician, union leader, or industrial engineers we will get a slightly different definition of the term productivity. However, if we closely examine the various definitions and interpretations of this term, three basic types of productivity appear to be rising. (7)

1. Partial Productivity

Partial productivity is the ratio of output to one class of input. For example, labor productivity (the ratio of output to labor input) is a partial productivity measure. Similarly, capital productivity (the ratio of output to capital input) and material productivity (the ratio of output to materials input) are examples of partial productivities.

2. Total Factor Productivity

Total factor productivity is the ratio of net output to the sum of associated labor and capital (factor) inputs. By net output, we mean total output minus intermediate goods and services purchased. Notice that the denominator of this ratio is made up of only the labor and capital input factors.

3. Total Productivity

Total productivity is the ratio of total output to the sum of all input factors. Thus, a total productivity measure reflects the joint impact of all the inputs in producing the output.

Productivity is the relationship between output of goods and services and the inputs of resources, human and non-human used in the production process, with the relationship usually expressed in ratio form. Both outputs and inputs are measured in physical volumes and thus are unaffected by price changes. Constant prices as of one period are used to add up the units of different outputs and inputs in order to combine them into aggregate measures. The ratios may relate to the national economy, to an individual industry, or to a company (17).

According to the book, *Industrial Engineering Terminology* (American National Standard Institute, 1983), the definition of productivity is “the quantitative and qualitative results of the input of all resources. (22)

From the above literatures the definition of productivity can be summarized as the efficient utilization of resources and effective production of outputs by considering different factors like customer needs and quality of the product or service, environmental impacts of the process, working conditions of the firm, and it is generally the development of an attitude of mind.

2.3 Labor productivity

As we define in the above section, productivity is the efficient utilization of resources. Labor is one of the basic resources of any organization whether much automated or manually operated. Therefore, labor productivity is the efficient utilization of labor by considering less fatigue to workers due to improvements in the layout of plant and work, better working conditions and simplification of work. In addition, there are other factors for the productivity of labor.

Those factors are mentioned in detail in David J. Sumanth book of productivity engineering and management (1984).

- ❖ Financial Incentives (Individual)
- ❖ Financial Incentives (Group)
- ❖ Fringe Benefits
- ❖ Employee Promotion
- ❖ Job Enrichment
- ❖ Job Enlargement
- ❖ Job rotation
- ❖ Worker participation
- ❖ Skill enhancement
- ❖ Management by objective
- ❖ Learning curve
- ❖ Communication
- ❖ Working condition improvement
- ❖ Training
- ❖ Education
- ❖ Role perception
- ❖ Quality of supervision
- ❖ Recognition
- ❖ Punishment
- ❖ Quality circle (QC)
- ❖ Productivity quality (PQ) teams
- ❖ Zero defects
- ❖ Time management
- ❖ Flextime
- ❖ Compressed workweek
- ❖ Harmonization

Three reasons are sometimes put forward to justify the use of labor input for purposes of partial productivity measurement, these are (8):

- (I) Labor is regarded as the most important factor of production;
- (II) Labor is the most easily quantified factor of production;
- (III) Labor is the factor of production that has conscious control over its contribution to output.

2.4 Productivity cycle

At any given time, an organization that is in the midst of an ongoing productivity program may be involved in one of the four stages or phases: Productivity Measurement, Productivity Evaluation, Productivity Planning, and Productivity Improvement. An organization that begins a formal productivity program for the first time can begin with productivity measurement. Once the productivity levels are measured, they have to be evaluated or compared against planned values. Based on this evaluation, target levels of productivity are planned on both short and long-term bases. To achieve the planned targets, productivity improvement takes place in a formal manner. In order to assess the degree to which the improvement will take place next period, productivity levels must be measured again. This cycle thus continues for as long as the productivity program operates in the organization. (7)

The productivity cycle concept shows that productivity improvement must be preceded by measurement, evaluation, and planning. All four phases are important, not just productivity measurement or just productivity improvement. Also, this cycle emphasizes the process nature of the productivity issue. A productivity program is not a onetime project, but rather a continuous, ongoing process. (7)

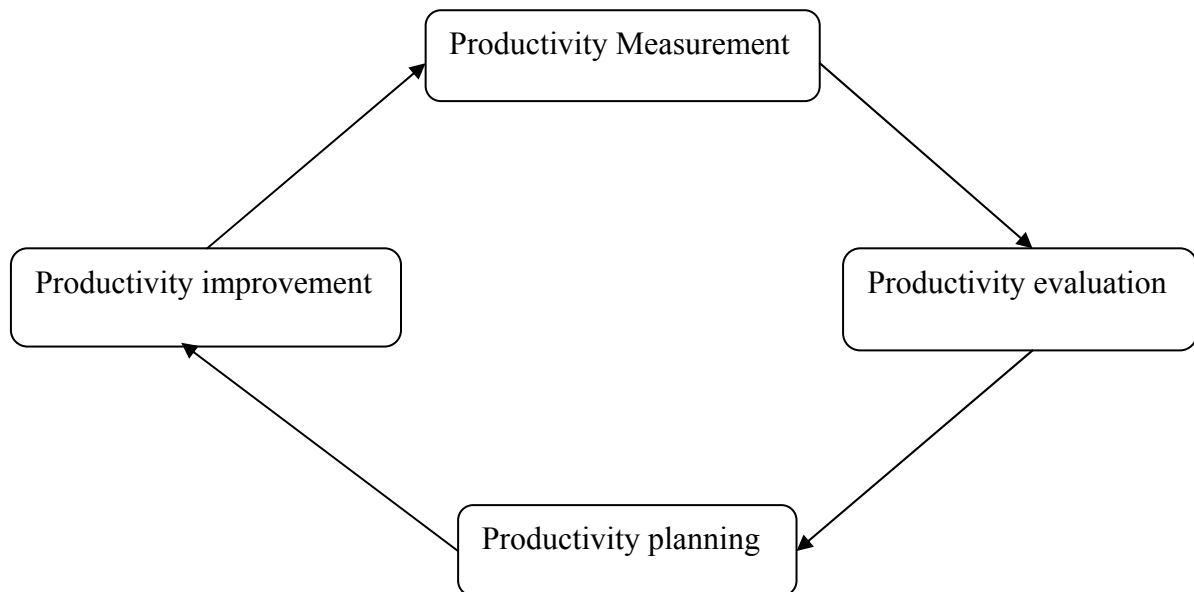


Figure 2-1 The productivity cycle (source: Sumanth, 1984)

2.5 Productivity measurement

Productivity measurement is the basic need for the analysis of the productivity. Productivity measurement is the quantification of both the output and input resources of a productive system. The objective is to come up with a quantified monitoring index. The goal of productivity measurement is productivity improvement, which involves a combination of increased effectiveness and a better use of available resources.

Productivity is often used to evaluate the aggregate performance of a business unit, generally defined as the ratio of output to input. However, for different applications and research domains there are different definitions of productivity. Kendrick and Creamer (1965) presented three kinds of productivity indices, i.e. total productivity index, capital-labor productivity index, and partial productivity index. Taylor and Davis (1977) presented a model of TFP to assess the productivity of an enterprise. In the TFP model, the concept of added value is used as the output, and labor and capital inputs are included in the input items to measure the added value by a business unit per unit of input. Sumanth (1984) forward a total productivity model, considering inputs and outputs in terms of physical concepts. (4)

It can be said that the measurement of productivity is only simple conceptually. In practice, however, both measurement of outputs and inputs involves aggregation problem, and this problem alone has situated productivity measurement in the realm of complexity. For example, the question of how to aggregate different products that do not have constant quality or characteristics constitutes the veil to be removed from output measurement. In the same way, the problem of how to aggregate the different types of inputs into a well defined composite unit remains a critical one on the side of input measurement. (8)

To solve output and input aggregation problem, particularly when heterogeneous inputs and outputs are combined, some authors have suggested that inputs should be added up in 'constant price' money values. The same thing should be done for output (Iyaniwura and Osoba, 1983, David, 1972). The loophole in this approach is that the resultant productivity index will be economic productivity and not physical productivity, which, obviously, should convey more meanings to most of the users of productivity measures. Again the input measurement problem is the question of how to measure capital input. Consequently, preference is often expressed for a single factor measure of productivity, and it is common to see emphasis being placed on labor input. (8)

2.6 Labor productivity measurement

The simplest and most frequently used measure of productivity is labor productivity. Labor productivity is a single (partial) productivity measure. The level of labor productivity is measured as a ratio between output (Q) and hours worked (L): To compare productivity estimates across products, factories, or even industries, economists define labor productivity as the production value added that each worker generates. In this case, labor productivity equals the value of production divided by labor input. The value of production is generally measured as value added, equal to the gross value of sales minus the value of purchased inputs like energy. Labor input is measured by total work hours.

Labor productivity can thus be estimated at the national, aggregate level and for specific industries in an economy (14).

$$\text{Labor productivity} = \left(\frac{\text{production value added}}{\text{labor inputs}} \right)$$

There are two types of output measures that can be used to measure Labor productivity. One is the value-added output, which is gross output corrected for purchases of intermediate inputs, and the other measure is gross output. To measure Labor productivity, it is best to use value-added output rather than gross output as the latter includes the purchase of intermediate inputs. Use of the gross output may also bias the results because of substitution in the production process between intermediate goods. (19)

Labor input reflects the total hours of all workers in an industry. Employment and hours of all persons include those of paid employees, the self-employed (partners and proprietors), and unpaid family workers (persons who work in a family).

2.7 Productivity evaluation

Sumanth (1984) introduced the following mathematical model for evaluating productivity between two period t-1 and t (22).

$$\Delta TP_{it} = (\Delta O_{it} - \Delta I_{it} \cdot TP_{it} - 1) / (I_{it} - 1 + \Delta I_{it})$$

ΔTP_{it} = change in total productivity of product i in period t with respect to period t-1

$\Delta TP_{it} < 0$, means that total productivity has decreased in period t as compared to period t-1.

$\Delta TP_{it} = 0$, means that total productivity remained constant between periods t-1 and t.

$\Delta TP_{it} > 0$, means that total productivity has increased in period t as compared to period t-1.

2.8 Productivity planning

Productivity planning is concerned with the setting up of target levels of total and/or partial productivities so that these levels can be used as bench marks for comparison in the evaluation stage of productivity cycle, as well as for mapping the strategies of improving productivity in the improvement phase of the productivity cycle (7).

Productivity planning requires forecasting the level of total productivity in future time based on the past performance. Forecasting can be performed based on a simple linear trend model and it has the advantage of forecasting for productivity increase. Goodwin (1968), emphasized that improvement must be managed in deliberate manner. He attempted to answer a question on how we can improve the way improve. Sutermeister (1976) provided a descriptive model to view the interaction of several factors in affecting employee productivity. He identified two major categories: technological development and employee motivation. Hershauer and Ruch (1978) presented a servo system model of employee productivity considering the individual worker performance as the focal point of the model. Their model's difficulty in practical usage is the inability to quantify the behavioral and marginal factors, which leads to sub-optimization in total productivity improvement. Crandall and Wooton (1978) presented a model that integrates the role of productivity improvement with the growth of the organization. They identified four possible sequential stages of organizational growth and specified three basic types of productivity strategies for each of the four growth phases of an organization. This specification seems logical, though not empirically tested. (11)

2.8.1 Importance of productivity planning

Just as revenues, rates of return, market shares, and profits are planned, so must productivity levels be. An organization that employs a formal approach to productivity planning can be in a better position to compete than one that does not. By setting goals for productivity achievement, there is a certain amount of self examination and soul-searching on the part of an organization. By being forced to preplan the levels of total and/or partial productivities, an organization may find ways of operating more efficiently and productively even before the targets are actually achieved.

We must distinguish between "productivity planning" and "planning for productivity improvement." While the former is concerned with setting up targets for productivity levels, the latter is implicit in the "improvement" phase of the productivity cycle. In other words, once productivity levels are planned for the future, the planning of the implementation for productivity improvement begins. The actual implementation or installation of a certain set of productivity improvement techniques becomes the improvement stage of the productivity cycle. Thus, planning for productivity improvement emphasizes planning to achieve better productivity, while productivity planning is concerned with setting up targets for productivity level and growth rate, be they partial or total productivities.

2.9 Productivity improvement

There are two types of processes for increasing productivity. The first type is buying productivity, which means buying facilities and machines for improving productivity. Buying productivity necessitates a large investment, not a small amount of money (Helmrich 2003). Productivity can be increased by buying productivity without creating ideas for a production method. This is simple to implement, but the productivity level after being implemented is not easy to identify in terms of successful competitiveness. The robotics line of a welding shop in a car manufacturer is a typical example. The second type of process for increasing productivity is creating productivity, or creating ideas for combining ideas from outside sources. Other features of creating productivity are less expenditure and knowledge of methods rarely open to others. When these ideas are used by a company, it provides great examples of optimizing human resources (22).

Stewart (1978) proposed a productivity improvement strategy for organizations based on system perspective described in twelve steps. Based on the analysis of twenty seven published case studies, Aggarwal (1979) proposed a step-by-step procedure to productivity improvement in companies composed of nine steps. Sink (1982) proposed a motivation oriented productivity improvement model, which is worth pursuing in empirical testing. Sumanth and Yavauz (1983) proposed an analytical model, which was

later adapted by Sumanth (1984). The model is based on a scientific selection of a set of improvement techniques for a given time period to achieve the best level of total productivity. In addition, the selection techniques vary according to availability of funds to install the techniques and the payback associated with such selection (11).

Whereas Joyce M. Hoffman and Satish Mehra propose the following conceptual model for successful productivity improvement program:

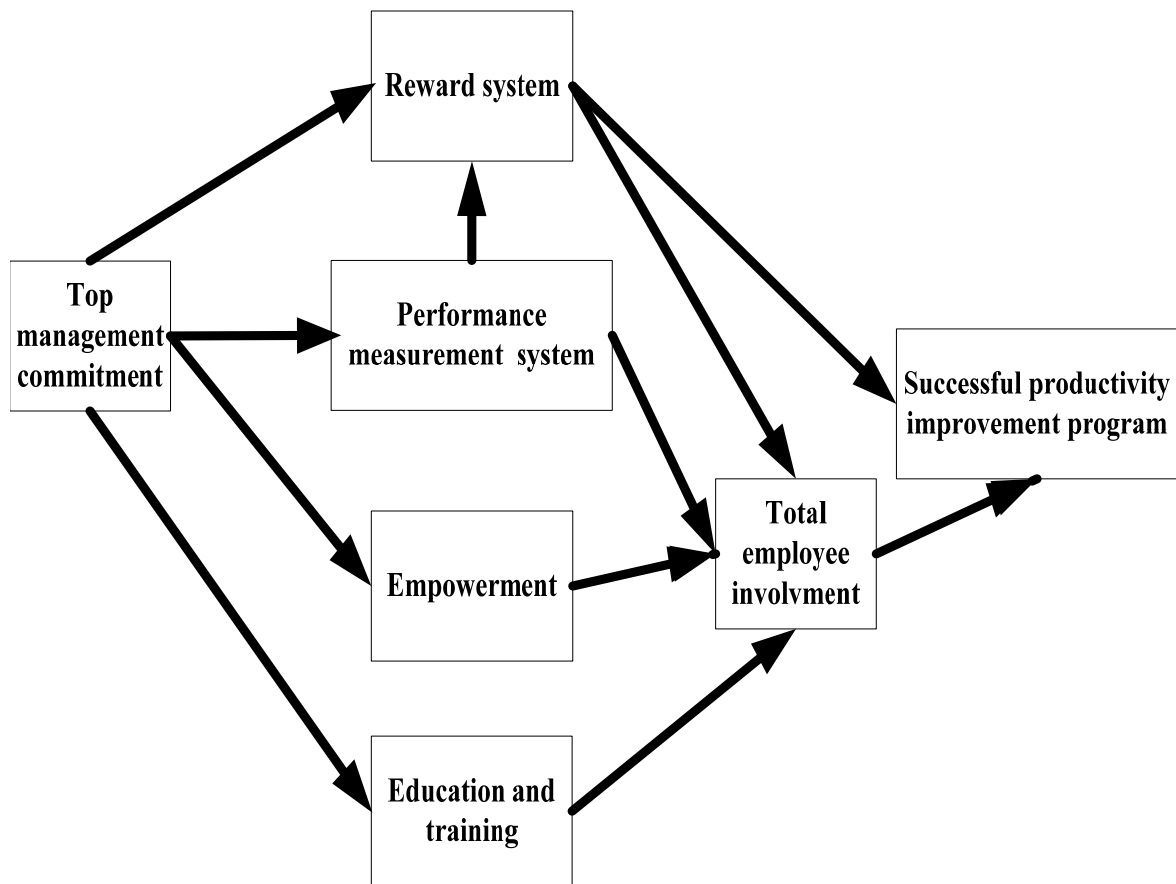


Figure 2-2 A conceptual model for successful productivity improvement program (journal of applied quality management vol.2/number 2/1999)

2.10 Labor productivity improvement

Labor productivity is very much related to skills among workers that can be acquired through proper training. Workers who have attended training will be more efficient, productive and contribute to productivity growth. Rahmah (2000), for example found that SMIs’ expenditure on training had a significant positive impact on labor productivity. A positive relationship between human capital and productivity is also much influenced by workers’ wage rate. A higher wage rate received by the workers will encourage them to work harder and contribute to higher productivity (10).

Increasing labor productivity is not only keys to improving a firm's competitiveness, it is widely acknowledged as the key to improving national economic well-being. Increases in labor productivity allow payments to workers wages to rise. With increasing productivity and wages come rising living standards. Productivity enhancements in one industry also have spillover effects into other industries, as new domestic and foreign investors are encouraged to invest in the local economy (14).

No matter how sophisticated the technology a company has at its disposal, the human beings working for the company are its greatest asset: Until there are totally automated, fully integrated factories, at least some human help is necessary in the design of such automated plants, let alone their operation (7).

2.11 Determinants of labor productivity

Labor productivity is determined by a range of variables. Studies have identified several sets of variables that determine labor productivity across industries and countries: human capital, capital utilization, innovation, firm characteristics and management, competition and openness to trade, and industry environment (14).

Generally the Labor productivity determinants are grouped as broad range of variables (14):

- **Structural characteristics**, such as the size of the factory, physical layout of the workspace, workplace design, materials handling, and use of advanced technology
- **Product characteristics**, such as the complexity of product design
- **Labor and workforce development related practices**, such as wages, benefits, workforce stability characteristics, operative skills and motion patterns, the relative participation of factory management and workers, recruiting procedures that include aptitude testing, pre-employment and on-the-job training, the percentage of work time lost to strikes and absenteeism, and the rate of labor turnover
- **Characteristics related to a firm's position in the global value chain**, such as a firm's product mix, the degree of concentration of its client base or export markets, the duration of the manufacturing process, whether the factory is accredited by external organizations, the extent to which the factory manages its own sourcing
- **Management variables**, such as the allocation of personnel between direct (manufacturing) and indirect (management) positions, and whether a firm performs efficiency measurements or conducts benchmarking analysis.

According to Sumanth a known professor on productivity engineering and management in his book of productivity engineering and management (1984), employee productivity improvement techniques are categorized in to twenty six. Let us see each technique on by one

1. Individual financial incentives

Several individual financial incentive plans have been used in companies, businesses, and other organizations to increase labor productivity. Some of the well known plans are:

- ☞ Piecework plan
- ☞ Standard hour plan
- ☞ Measured day work plan
- ☞ Emerson plan
- ☞ Halsey plan
- ☞ Taylor's differential piece-rate plan
- ☞ Merrick multiple piece-rate system
- ☞ 100 percent plan
- ☞ Bedeaux plan
- ☞ Rowan plan

Out of these plans, the Taylor plan, the Merrick plan, and the Rowan plan are not in common use today (13). Since the piecework plan, the standard hour plan, and the measured day work plan are used relatively more often, we discuss them very briefly.

Piecework plan (PWP)

This plan is characterized by two main features

Pay is directly proportional to the number of units produced. Minimum daily rate is guaranteed (in most cases). The earnings generated by the PWP is given by

$$EPW = \sum(N_i)(PWR_i)$$

Where

N_i = number of pieces of type i produced

PWR_i = piecework rate for type i item (dollars per piece)

Let SPR_i = standard production rate for type i item (pieces per hour)

WR_i = wage rate for type i item (dollars per hour)

Then $PWR_i = WR_i/SPR_i$

Standard hour plan (SHP)

The standard hour plan overcomes the problems with the piecework plan by using standard hours per piece instead of dollars per piece.

The earnings in this plan are given by

$$ESH = (SHE_i) \times (WR_i)$$

Where SHE_i = standard hours earned for item type i

$$SHE_i = N_i / SP_{R_i}$$

The advantage of SHP

- Standards are never changed (as long as the methods have not changed), even if the base wage rates are changed.
- The earnings are easy to compute; also this plan helps to provide merit differential since, for the same standard, there may be different wage rates.

The only disadvantage is that the individual incentive is not as high as in the PWP

Measured Day work (MDW) Plan

The MDW plan was introduced in the United States during the early 1930s when organized labor tried getting away from time studies and piecework rates. Many modifications of MDW plans exist today. They are similar to the Day work (DW) plan, except that standards are used.

Let t = any time period and BR_t = base rate in period t . Then, in the MDW plan,

$$BR_t + 1 = (BR_t) (\eta_{std, t})$$

$$\eta_{std, t} = SHE_t / HW_t$$

Where,

HW = hours worked

η_{std} = the efficiency of standard work

2. Group financial incentive

The second type of financial incentive system is the group incentive plan. Some well-known group plans include the following

- ✓ Scanlon plan
- ✓ Rucker plan
- ✓ Kaiser plan
- ✓ Tonnage plan
- ✓ Dollar sales plan
- ✓ Profit sharing
- ✓ Improshare

Scanlon Plan

The Scanlon plan was developed by Joseph Scanlon, a trade union official who worked for a steel mill in the late 1930s. His plan, which encourages employee participation in solving production problems, received a tremendous amount of publicity. This plan has been used by many companies over the years. Trans-Matic, Midland Ross, Herman Miller, Atwood Vacuum, and American Valve and Hydrant are a few users of the Scanlon plan. This plan works as follows:

- a) Set up a target ratio (or norm),

$$TR = \text{labor cost or wage bill} / SVOP$$

By estimation using past data

Where

$$SVOP = \text{sales value of production}$$

$$= \text{value of receipts for goods sold} + \text{value of goods in stock}$$

- b) Each month, compute the sales value of production (SVOP) at the selling price.
c) Compute allowable labor cost: $(TR) (SVOP)$.
d) Compile actual labor cost.
e) Compute savings in labor cost: Allowable labor cost - actual labor cost.
f) Share the labor cost savings in an agreed proportion. (A common proportion used is 25/75; that is, 25 percent to the company and 75 percent to the workers.)

Out of the share to workers, usually 75 percent is paid to them as a cash bonus.

The remaining 25 percent is set aside in what is called the employee bonus reserve fund.

- g) At the end of a year, if the reserve balance is positive, pay it to the employees; if not, wipe out the deficiency by using the reserve fund.

The plan is popular, but one of the main disadvantages is this: If workers suggest automation and capital investment, there is a substitution of capital for labor and management has to adjust the target ratio. If no standards exist, such an adjustment becomes difficult. It may be suggested that the percentage of return on additional capital be deducted from the total savings before the bonus is determined.

Another problem with this plan is that the target ratio is not necessarily fixed over time. Changes in the prices of the final output, or prices of raw materials, or changes in the capital/labor ratio, may warrant a change in the norm.

Rucker plan

The Rucker plan is a group incentive plan similar to the Scanlon plan. It was developed by Allen W. Rucker in 1932 when he found that the wage payrolls of hourly rated employees in a manufacturing firm were a nearly constant part of its production value. Some of the current users of the Rucker plan are: Buck-Knives, Morse Borg-Warner, Black-Clawson, Teledyne, and Universal Cyclops.

The plan establishes a relationship between the total earnings of hourly rated employees and the net production values created in the plant. That is, employee earnings are related to the value-added output.

The plan works thus:

1. Compute the standard (target) percentage of labor cost from historical records.

The target ratio is given by: $\$wages/\$valueadded$

2. Compute the actual percentage of labor cost given by: $\frac{\$current\ wages}{\$current\ value\ added}$

3. Pay the bonus on the savings

The advantages of Rucker plan are

- It takes into account not only the labor cost savings but also the savings in materials and supplies.
- No time standards are needed.
- Both direct and indirect labor can be covered by the plan.
- The plan is well-suited to job shops, where standards may be somewhat more difficult to establish.
- It is simple to install.

However, it suffers from the following disadvantage

- ⊕ The success of the plan depends upon the willingness of the employees to believe management's figures.
- ⊕ The plan is not widely accepted by unions because it is not as generous as the Scanlon plan.
- ⊕ It still does not protect against gains unaccounted due to mechanization and automation.

Kaiser plan

The Kaiser plan was presented in 1962. It provides employees with a 32.5 percent share of the savings from increased productivity over base-year costs of labor plus material. This share is guaranteed even if the company does not make a profit. It guarantees against loss of job and income when improvements in methods or technology are introduced. This plan is not practiced widely; when compared with the Scanlon or the Rucker plans.

Tonnage plan

The tonnage plan is another group incentive plan used by some steel companies and foundries. The plan bases its "standard" on the tons of material produced per man-hour. The norm is a base period that is established by historical data and the entire workforce shares in the percent increase in succeeding periods. For example, if there is a 10 percent increase in tonnage, there is a corresponding 10 percent bonus to workers. The tonnage of output may increase not because of increased labor productivity but because the casting weight has gone up. This will obviously cause problems in giving proper credit to the actual source.

Dollar sales plan

The dollar sales plan, also a group incentive system, is based on the volume of goods sold or shipped in a previous period. As long as the volume of sales or shipments increases, the workforce shares in the percentage increase. But when the sales or shipments decrease, the workers' share is reduced, even though their productivity may still be high. This plan is also not very popular.

Profit-Sharing Plan

Profit sharing, as defined by the Council of Profit Sharing Industries, is any procedure under which an employer pays to all employees, in addition to good rates of regular pay, special current or deferred sums based not only on performance but on the prosperity of the business.

Profit sharing encourages everyone in the company to work toward increasing profit. Since profits can be improved even by simply increasing the selling prices (causing inflation), it is not a direct approach to productivity improvement. If profits are generated due to overall reductions in total manufacturing costs, however, it is indeed a reflection of good productivity management.

The distribution of profits can take anyone of the three forms:

- ❖ Cash plan, wherein profits are paid directly to workers on a periodic basis.
- ❖ Deferred plan, under which the profits are invested for the employee and paid to him or her upon retirement or separation.
- ❖ Combined plan, under which both forms (1) and (2) are used.

Improshare

Improshare is another group incentive plan. It has been developed by Mitchell. Fein, a well-known consultant, and has been applied to many companies since 1974. Some of them are: General Electric, Firestone Tire, Columbus Auto Parts, Hackney & Sons, Hinderliter, Prestolite, Ingersoll-Rand, Universal Cyclops Steel, and others.

The Improshare plan is designed to share productivity gains between employees and management, with no attempt to determine the source of the gains or the extent to which each contributes. The plan operates on the premise that workers and management will be interested in raising productivity when both gain from the increase.

- I.** Increased productivity of groups is shared by employees in the group.
- II.** The past average productivity level is used as the measurement base. The average man-hours required during a base period to produce a unit of product established as standard. This includes all so-called nonproductive time, such as the work done by material handlers, setup men, inspectors, and others involved in the group.
- III.** The value of the output of the group is the total units produced multiplied by the past average man-hours standard. With multiple products, the total output is the sum of all the products completed multiplied by their respective standards.
- IV.** Everyone in the plant or department is included in the plan. The input is the total man-hours worked by the group.
- V.** Productivity improvement is shared 50-50 between employees and management.
- VI.** Gains are calculated weekly, with a moving average to span several weeks to create a stable output level. Productivity is shared and paid weekly. Losses are absorbed into the moving average.
- VII.** Man-hour standards are frozen at the past average. Standards will not be changed when operations are changed by either management or the employees, except for capital equipment and technology changes, which are specifically defined. Increased productivity will be shared with no attempt to pinpoint whether employees or management created the savings.
- VIII.** An agreed ceiling is established on productivity sharing earnings. The excess over the ceiling will be carried forward to future weeks and eventually bought back from the workers by cash payments.

3. Fringe benefits

Many organizations find it necessary to provide incentives to management and supervisory people just as in the case of blue collar workers. However, in many cases, apart from the regular bonuses, or profit sharing, companies come up with some intangible means of rewarding and encouraging a management employee.

These benefits are usually referred to as the "fringes" Some typical forms of fringe benefits include the following:

- ❖ Medical insurance
- ❖ Disability insurance
- ❖ Entertainment expenses
- ❖ Relocation expenses
- ❖ Subsidies for buying or renting a home
- ❖ Free airfares for family and employees
- ❖ Free company car, telephone, newspaper, and/ or chauffeur
- ❖ Marriage subsidy
- ❖ Free educational trips abroad
- ❖ Free or subsidized higher education

At the top management level, fringe benefits take on very novel form. Apart from the above, a general manager of a company or the chief executive officer of a firm may be given a very expensive car, boat, or motor home. A vacation around the world at company's expense is another form of recognition and reward for top management officials. All these are good forms of motivation for management people as long as such fringe benefits are administered within reasonable bounds, making sure that the other expense input is not increased unduly for a proportionately smaller increase in the total productivity.

4. Employee promotion

Employee promotion is both a financial and nonfinancial form of motivation to enhance human productivity. It involves the upgrading of an employee's status, and is a natural way of recognizing an employee's skills, knowledge, proficiency, and effort at his/ her present job.

At the blue collar level, employee promotion may be from machine operator to machine setup operator or foreman; at the clerical staff level, it may be from clerk to administrative assistant; at the management level, it may be from manager manufacturing to vice president manufacturing; and so on.

According to Maslow's theory of hierarchy of needs [1954] only unsatisfied needs can motivate a worker to higher human productivity. Also, the lowest level of unsatisfied need becomes an important factor. Thus, for example, if the physiological, safety and security, and belongingness needs of an employee are satisfied, but self-esteem (self approval, prestige) is not satisfied, then the self esteem need becomes the employee's main concern, and by improving the self esteem need, his or her productivity can be enhanced. The highest level in the hierarchy of needs is self actualization (realization of one's potential).

While Maslow's theory was assumed by many to be too simplistic, Herzberg's two factor theory was considered controversial. Lawler, Vroom, and others have proposed their own motivational concepts. There is no consensus as to which is the best in the contemporary world.

Whether employee promotion is indeed a productivity improvement tool may be as controversial as some of the motivation theories themselves. However, at least for a short period of time after employee promotion, there may be an increase in an individual's enthusiasm to perform better, but much more research needs to be done in this area.

In the Japanese style of management, employees are promoted strictly on a seniority basis, granted that all of them are motivated to perform well. A 25-yearold brilliant engineer may have to wait to be promoted not because of ability, skill, and knowledge, but because of the number of years he or she has been with the company. Needless to say, in the United States and other Western countries, this is not the case. Whether it is just the culture element or something else that plays part in the Japanese style of management is not thoroughly established.

5. Job enrichment

Job enrichment is a nonfinancial motivation technique that provides Variety in assigned tasks, Employee autonomy and discretion in performing tasks and Feedback on performance. The satisfaction of completing a whole or identifiable portion of work that can be associated with an end product or service

Herzberg's two-factor theory [1968] is applied in job enrichment. His theory is that the factors for job satisfaction are distinct and separate from those leading to job dissatisfaction.

Factors leading to satisfaction are referred to as motivators, and those leading to dissatisfaction-avoidance are known as hygiene factors. The motivators include achievement, recognition, nature of work, responsibility, and growth or advancement. The hygiene factors include company policy and administration, supervision, interpersonal relationships, working conditions, salary, status, and security.

Some studies using Herzberg's research methodology have been able to support his theory, but there have been others that have been unable to validate it when different research methodologies were used. This is why Herzberg's theory is controversial. Those who have been unable to obtain results similar to Herzberg's with different research methodologies believe that the effect of motivators and hygiene factors on employee motivation and productivity are not separate and distinct. They believe that both the hygiene factors and the motivators should be considered in work design to achieve employee job satisfaction, increased motivation, and higher productivity.

Stinson and Johnson [1977] have shown that high need employees tend to respond more favorably to job enrichment programs than low need employees, who are not dissatisfied with rationalized (highly structured, non autonomous) jobs. Thus, in applying the two factor theory to job enrichment, individual differences are likely to exist.

6. Job enlargement

Job enlargement involves the enlargement of responsibilities associated with a job. The proponents of job enlargement argue that jobs, when made very specialized and specific, become routine that they get to be boring and monotonous, causing high absenteeism, high turnover, and low morale, with consequent low productivity.

Job enlargement includes a number of different workplace practices, such as quality circles, self directed teams, job rotation, information sharing and others. One possible motivation for adopting such practices is to challenge and motivate workers, and to encourage them to participate in improving productivity, safety, and the quality of their product. To the extent that workers enjoy the challenge and the autonomy, this will raise job satisfaction and reduce hiring and training costs and increase productivity. An alternative motivation for adopting job enlargement is to enlarge the jobs by encouraging multi tasking and to adopt peer monitoring. These steps would also improve productivity, but without an accompanying increase in job satisfaction.

7. Job rotation

Job rotation involves the rotation of workers into different jobs for short periods of time. In the long run, this method can provide all rounder in a company's operations because the workers are given an opportunity to learn and perform tasks and operations that they were not originally hired for.

Job rotation is not exactly the same as retraining. The need for the latter generally arises out of the necessity to displace an employee from his or her existing job, whereas job rotation is a conscious effort

on an ongoing basis to provide the opportunity for workers to exercise their freedom in staying on a given task for a certain length of time.

Job rotation can be controlled in a formal manner when workers in a group decide for themselves which tasks should be performed by whom and when. Or the foreman or supervisor in conjunction with the operators can decide the interchange schedule. Thus, job rotation involves the interchange of operators and tasks at specified time intervals.

Job rotation relieves boredom by providing flexibility in job assignments. All the employees in a work group have a detailed knowledge of the various jobs in their work plan, which means they would be able to compensate well for absenteeism.

8. Worker participation

Participation is an approach to overcoming resistance to change through employee involvement in planning and implementing the change. It is the mental and emotional involvement in a group situation that encourages the person to contribute to group goals and to share responsibility in them [Davis, 1957].

There are several participation approaches to improving partial or total productivity.

These include:

- ✓ Quality-control (QC) circles
- ✓ Productivity quality (PQ) teams
- ✓ Productivity action teams
- ✓ Productivity circles
- ✓ Productivity maintenance groups
- ✓ Employee participation groups (EPGs)

The principle behind all these approaches is the basic premise that group wisdom is better than individual knowledge, and that employees know their job better than anyone else.

9. Skill enhancement

Skill enhancement is a formalized technique to increase the skills needed to perform a job. Skill training or coaching may be needed for an employee when the employee's attitude toward the job is positive but his or her abilities are low [Peelle, 1981].

There is a certain amount of training cost involved whenever skill enhancement has to occur. Also, this technique may yield productivity improvement more on a long term than a short term basis. Therefore, the

other expenses input may go up in terms of training expenses, though there must be a corresponding increase in the output.

With the advent of computers, robotics, fiber optics, and other advanced technologies, there is a great need for skill enhancement at all levels of management and operation of a company, not only to train new employees in these technologies but also to train those displaced from other jobs due to the introduction of these technologies.

10. Management by objectives

Management by objectives (MBO) is a managerial motivation technique that has received worldwide attention. The MBO process aids motivation of all participants by having superior and subordinate managers jointly identify common goals, carefully define them, and together monitor progress toward achieving results [Odiome, 1965].

We can see that a person is more enthusiastic when the goal is clearly seen and progress toward it is easily measured. By coordinating or matching the personal goals of employees with those of the company, employees are likely to improve productivity more than when the goals of the employees and management are not congruent.

The goals set by the MBO strategy are of four basic types: routine goals, problem solving goals, innovative goals, and personal development goals. Corresponding to each of these goals, objectives are written.

In setting up the goals, care must be taken not to

- Set simplistic goals
- Set goals without adequate resources
- Set harsh goals that cause resentment

If properly administered, MBO can create joint goals and can help in team building. MBO goals provide fairness to both the employer and the employee. MBO can also help in evaluating group performance. The MBO technique has often been cited as one of the ones more commonly used for productivity improvement.

11. Learning curve

The basic assumption underlying the learning curve is that peoples either individually, or as members of a production team, gain proficiency with repetition of the same task or project. People are able to see how much progress they have made with time and are therefore motivated toward better performance.

Learning is time dependent. The property of the learning phenomenon is that whenever the total quantity of units produced doubles, the time per unit to produce the unit decreases by a constant rate (known as the learning rate).

12. Communication

Communication refers to the adequate and timely flow of information with feedback mechanism. The purpose of effective communication is to achieve mutual understanding between the employees and management, and to help establish the social conditions that will motivate the employee to improve productivity.

When the employees and management of an organization communicate consistently, openly, and with mutual trust, a certain amount of loyalty develops, and this loyalty is not something that can be purchased simply by paying higher salaries or wages. The terms "consistently," "openly," and "mutual trust" have been emphasized intentionally, since so many new productivity programs fail because the initial enthusiasm in communications between top, middle, and lower management and the employees fade after some weeks or months. To advertise a program, management will be open about disclosing even the financial status of the company; but when productivity gains start occurring, management hesitates to give the good picture for fear that employees will ask for higher wages. Of course, a management that truly preaches and practices productivity distribution will not find openness of communication a problem at all. Mutual trust between employees and management and within the management ranks can be enhanced only when both sides make sincere efforts to define the organizational goals and match them with the employees' goals in order to make them congruent. If both their goals are not the same, it will be like going in two separate directions while trying to reach the same destination.

The communication technique may not have short term impact on total productivity, but it will certainly have a positive effect on it in the long run.

13. Working condition improvement

Working condition improvement is another employee based productivity improvement technique that is often emphasized but rarely applied consistently. This technique involves a detailed audit of the working conditions at each of the operations designing improved conditions of working

Installing and maintaining improvements in the working conditions. The factors that must be audited to assess the present working conditions at each workplace area are

- Temperature, light, and humidity

- Noise
- Colors of the surroundings
- Extent of handling hazardous materials, parts, or products
- Extent of manual handling of heavy items

The level of safety for operators depends on the extent to which these five factors are in the satisfactory zone.

14. Training

Training seeks to achieve improved human productivity by increasing the ability levels of the workforce. It seeks to meet the demands of growth and change [Jucius, 1963].

Some of the common forms of training are

- ✦ On-the-job training
- ✦ Apprenticeship training
- ✦ Internship training
- ✦ Outside courses
- ✦ Visitation training (i.e., visits to other organizations, both domestic and foreign)

Training must be an ongoing feature if total productivity is to be improved on a consistent basis. The necessity for training increases to a greater extent when new technologies emerge. Again, the best example is robotics. When the computer technology started taking shape in the 1950s, there was fear of losing jobs; but today, several millions of jobs are created because of the computer industry and the several related industries that use computer technology.

Training may actually decrease the total productivity initially (because the other expense input will increase when training expenses are incurred) without offering an immediate increase in the output. However, the long-term effect of training on human productivity and on total productivity should be favorable.

15. Education

Education refers to the level of high school, college, or vocational training acquired by an employee. It is believed that a worker who has acquired a good and sufficient education, and is able to apply it, is more capable of effecting a positive change in productivity. A company or organization can play a great role in increasing an employee's level of education by providing programs that support such employees while they are serving the company. Such programs are usually provided in the form of evening courses in local high schools or colleges.

Employees, whether blue collar workers on the shop floor or engineers in management, have a certain level of formal or informal education. They have, however, different levels of analytical skills, and that makes the difference in analyzing a particular problem or situation. Different solutions to a given problem are proposed by different people because of their education level.

16. Role perception

Role perception refers to the manner in which an individual defines his or her job; the type of effort the employee believes is essential for effective job performance.

According to Sutermeister [1969], if workers see high (or low) productivity as a path to the attainment of one or more of their personal goals in the work situation, they will tend to be high (or low) producers.

This statement reinforces the importance of the congruence of corporate and employee goals. Unfortunately, organizational and employee goals do not coincide, causing friction between management and employees. All managers should ask themselves what they would do in the same situation their employees are in. Likewise, workers should imagine themselves in their manager's position in order to analyze critical situations. The most harmonious work group is the one whose productivity objectives and goals coincide with their personal goals on the job and outside the job. Work on a company job does not end there. The effects of the job travel to and from the employee's home, family, friends, and social affiliations. There is a feedback system in all these interactions. Employees respond favorably to their superiors when the latter treat them well not only in the company atmosphere but even outside it. For example, when the boss visits an employee at home because the latter was down with the flu for three days can mean a lot to that employee. This employee will hesitate to disappoint that boss in improving productivity and quality at work. In essence, if the role perception of an employee can be positively oriented toward productivity as well as personal objectives, productivity improvement will follow.

17. Quality of supervision

Supervision is concerned with the work of creating and maintaining environments in which people can accomplish goals efficiently and effectively [Albanese, 1975].

Note the key words "creating," and "maintaining." The supervision quality is dependent upon the extent that the creation and maintenance take place. A supervisor can create either a pleasing or a hostile atmosphere for the employees to perform in. If a happy environment for work is created on a consistent basis the human productivity will be affected positively; if not, negatively. Maintenance and consistency of the happy working environment is equally important.

18. Recognition

Recognition is a process whereby management shows acknowledgement of an employee's outstanding performance (in terms of improved productivity, ideas, or any act of good workmanship). It can take several forms: pay raise, bonus, award, certificate of appreciation, special highlights in the company newsletter, special parking provisions, engraving on a plaque in the cafeteria. In fact recognition can take any form of fringe benefit. Positive reinforcement is an effective form of recognition, since it promotes and perpetuates improved individual and group performance.

19. Punishment

Although punishment may not appear like a productivity improvement technique because it sounds too harsh to deal with grown up employees, it can be effectively used to eliminate or suppress certain types of behavior or not to reinforce those types of behavior.

A punishment contingency attempts to decrease the likelihood of a particular behavior occurring by making the punishment contingent on the behavior. Some common punishment contingencies used in work organizations include:

- ❖ Disciplinary layoffs
- ❖ Discipline for rule infractions
- ❖ Transfer to undesirable jobs
- ❖ Withholding salary increases

20. Quality circles

The quality-control (QC) circles, or quality circles, are groups of employees who voluntarily cooperate to solve problems related to production, quality, work environment, maintenance, scheduling, or anything that affects these areas. This concept applies many of the motivational theories proposed by American scholars.

The next technique, PQ teams, is an extension of the quality circles. While describing that technique, we shall touch upon the main features of the QC circle technique.

21. Productivity quality teams

Productivity quality (PQ) teams (short for productivity and quality teams) are small groups of people (doing similar tasks) that meet regularly to select, investigate, and solve problems related to the workplace, products, and services.

The team members join a PQ team voluntarily after a brief presentation by the team leader (who can be either the supervisor or one of the employees although it is preferable to have the supervisor as the team leader to preserve the present authority structure). Lots may be drawn if necessary, to limit the team size to about ten.

PQ teams are an effective means of improving employee morale, quality, and productivity in an organization. They have one single purpose in mind: To surface the talents of individuals working in the organization to the maximum extent possible by providing the specialized training and management support necessary to accomplish this.

Team spirit, positive thinking, and the philosophy of achieving excellence are three important characteristics of PQTs, making them not only efficient in accomplishing improvement in morale, communication, loyalty, productivity, and quality, but also making them effective in achieving organizational goals.

22. Zero-defects programs

Zero-defects programs attempt to improve quality by changing workers' attitudes. Their theme, "do it right the first time," stresses error free performance. It relies on the workers to identify error prone situations with the assumption that the people best prepared to eliminate errors are those who create them. In this program, employees are encouraged to sign pledge cards signifying intent to reduce errors. Suggestions are solicited to help identify areas where mistakes can occur. Good quality through fewer errors leads to increased output and hence higher productivity.

23. Time management

Time management involves the minimization of the wasteful elements of a person's administrative work. Some such specific elements include the following:

- a. Interruptions by drop-in visitors (without appointments)
- b. Attending lengthy and unnecessary meetings that accomplish very little
- c. Inability to say 'no' for some tasks
- d. Procrastination and lack of decisiveness
- e. Inability to delegate work
- f. Taking on much more than can be handled
- g. Lack of responsibility and authority to do certain jobs
- h. Delayed, inaccurate, or inadequate information

- i. Taking orders from too many people
- j. Handling too many "crises" situations
- k. Lack of organization of tasks by priority or target dates
- l. Lack of determination to complete tasks assigned
- m. Lack of organization on and around the desk
- n. Unnecessary socialization
- o. Poor filing system
- p. Making unnecessary trips to people, departments, copy machines, etc.
- q. Excessive conversation time
- r. Too many rescheduling of meetings, personal engagements, etc.

To minimize these "time-wasters," time management applies simple, commonsensical, but very effective programming rules to every item of work, one of which is: "Never handle the same paper twice."

Time management always improves human productivity. It is a tool often ignored, particularly by management people who preach productivity to their subordinates.

24. Flextime

Flextime is a personnel scheduling system in which employees are given a certain amount of freedom and responsibility in determining their hours of work. The concept of flextime was first developed by economist Christine Kammeral in Germany. However, the concept did not gain popularity until 1967, when the German firm Messerschmidt Bolkow Blohm developed a flextime system as a means of reducing traffic congestion. Flextime is a popular method in many industries throughout Europe and the United States.

There are several flextime systems, but all of them have two basic elements:

- ❖ Core time (the hours when all employees must be at work)
- ❖ Flexible time (the hours when employees vary their arrival and departure times)

Flextime affects an individual's productivity by taking advantage of the person's biological time clock. One of the common forms of flextime consists of flexible arrival and departure time bands on either side of the core hours.

Flextime has several advantages including the following:

- I. It decreases overtime substantially
- II. Tardiness is virtually eliminated.

- III. It is an effective recruiting mechanism to attract and retain better qualified applicants.
- IV. Most importantly, it improves human productivity, because employees become more autonomous and self directed on the job.

25. Compressed workweeks

The concept of compressed workweeks [Nollen, 1981] came in with a bang in the early 1970s, but their growth rate since 1975 has become almost stagnant. They are good for some companies but not for all. Compressed workweeks involve working for the same 40 hours a week, but for fewer days. For example, a common one is working 10 hours a day for four days.

26. Harmonization

Seeking harmony in the operation of an organization need not be just a philosophy; it can be a practical tool to increase labor productivity. Harmonization, involves the integration of the interests of the stockholders (owners), board of directors, management at all levels, and all employees in a consistent manner both within and outside the physical boundaries of an organization. The latter part of the definition implicitly emphasizes that harmony must be sought after, trained for, and nurtured. Both the long term and short term effects of harmonization should be an improvement in human productivity and total productivity.

2.12 Labor productivity in Ethiopia

Coparison of ethiopian labor productivity to some developed and developing countries.

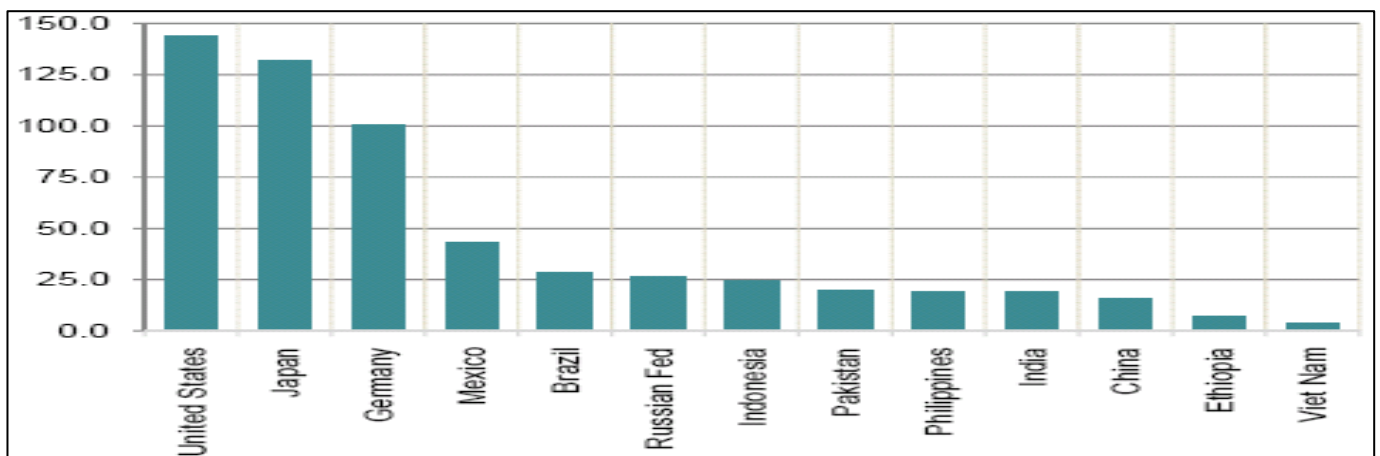


Figure 2-3 Value added per employee in '000' US\$, 2007 (Source: UNIDO database)

The above figure shows that labor productivity of Ethiopia is very low compared with most developed countries like United States, Japan, Germen, etc. It is known that there is a great difference in technology

and working culture between the developed countries and Ethiopia. But the comparison is to show the gap of employee productivity between developed and developing countries.

The following figure showed that Ethiopia's annual employee productivity was \$1,626, the lowest among comparison countries. Kenya's employee productivity was \$2,388, Uganda's was \$2,066 and South Africa's was \$10,929. (3)

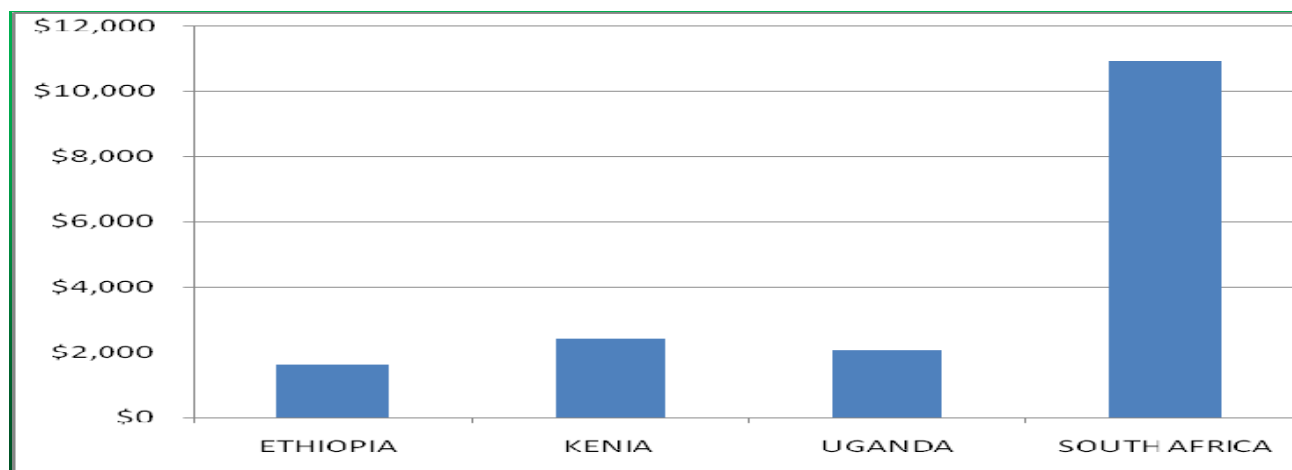


Figure 2-4 Labor productivity of some African countries (Source: measure Ethiopia the enterprise development diagnostic for USAID/Ethiopia, 2009)

Figure 2.4 shows that labor productivity of Ethiopia was lower than Kenya, Uganda and South Africa. Presence of poor labor productivity means disease for different sectors. Several firms commented that their firm's poor productivity has hindered growth because they are no longer able to secure contracts with international customers. The owner of one apparel company in particular commented that two of his principal customers have reduced orders. These customers are sending their business to China because they can buy more at better margins than Ethiopia. Manufacturers complain that lack of an industrial working culture miss too many working days due to social and cultural reasons. Another firm in the services sector complained that his employees do not perform well because they are not properly equipped. Training institutions are in short supply and existing institutions do not produce graduates with requested skills. Nevertheless, very high degrees of staff turnover make the training programs difficult to sustain (3).

2.13 Over view of Garment industries in the world

The global textile and garment industry has expanded continuously to meet the demands of a growing world population with increase in standards of living worldwide and diversification of end use applications. In 1950, for example, the consumption of fiber by the world's textile mills was 7 million tons

and that increased to almost 55 million tons in 2003. It is interesting to note that polyester, first discovered by The Calico Printers' Association in Manchester, UK in the early 1950s, now represents about 65% of total fiber consumption, i.e. about 36 million tons. The principle end use applications for textiles fifty years ago were in the manufacture of garments (about 84%) and home textiles, e.g. bed linen, furnishings, towels, etc., (about 12%) while other end uses represented some 4%. Today, one of the key growth areas for textiles is in industrial textiles, e.g. fabric substrates for the production of shoes, airbags for cars, buses, etc., and in technical textiles, e.g. geo-textiles, agro-textiles, and construction textiles. (26)

Total global apparel exports increased by 31 percent between 2001 and 2005. Meanwhile, SSA apparel exports increased by 13 percent in the same period. The three largest global exporters of apparel are China, Turkey, and Hong Kong, together accounting for nearly one-half of global apparel exports in 2005 (United States International Trade Commission (USITC), 2007). (2)

2.14 Over view of garment industries in Ethiopia

The modern textile sector was started in Ethiopia in 1939, established by foreign capital under the name of Dire Dawa Textile Mills. A recent study of the Ministry of Agriculture indicates that there is some 2.6 million hectares of land suitable for cotton production, which is equivalent to that of Pakistan, the fourth largest producer of cotton in the world. The major cotton markets for Ethiopia are Africa, Asia and Europe. The largest portion (67%) of the cotton export was destined to Asian countries, namely Pakistan, India, Bangladesh, while about 23% went to Africa. The remaining 10 % was destined to European markets. (2)

From the SSA, the major exporting countries are Kenya, Lesotho, Swaziland, Madagascar, Botswana and Ethiopia. A study reported by United States International Trade Commission (USITC, 2007) shows that only Botswana and Ethiopia increased their exports of apparel from 2004 through 2005 and Ethiopia exports more textiles than apparel (2).

The industrialization process of Ethiopia garment manufacturing started in the 1950's. In 1958, an Italian took the lead to establish the Addis Garment Factory, which was nationalized in 1975. The public Akaki garment factory was found in 1963, followed by the Gullele Garment Factory in 1983 and the Nazareth garment factory in 1992. These 4 state owned garment factories have dominated Ethiopia's garment sub-sector for a long time. (15)

In the 1990's, with the development of market economy, private and foreign capitals began to make investment in garment sub-sector and over time established 25 non-state owned garment enterprises.

However, these factories are generally of small scales, except the Express Garment Factory, which was found by an American Ethiopian private investor. (15).

According to the textile and garment industry development institute, currently there are twenty seven large and medium scale garment industries. In addition, there are some small scale garment industries. But, there are some medium scale garment industries that did not listed by the textile and garment industry development institute like WOW international Plc and evolution garment.

2.15 Labor productivity in garment industries of Ethiopia

Labor remains the single most important input to many production processes. From a perspective of production analysis, ignoring quality differences, labor input is most appropriately measured as the total number of hours worked (16). However, when it is difficult to quantify the numbers of hours worked and to see the general over view of the labor productivity of the organization, it is possible to use number of employees and labor cost as the labor inputs.

According to Central statistics agency (CSA) published results of the survey on Manufacturing and Electricity industries since 1968 E.C, there are definitions of some terminologies described as follows.

Gross Value of Production: - includes the sales value of all products of the establishment, the net change of stocks between the beginning and end of the reference period in the value of finished goods and the value of semi finished goods, the value of industrial services rendered to others, the value of goods bought and resold without any transformation or processing, and other receipts. The valuation of gross value of production is in terms of producers' values where indirect taxes are included in the value of sales of the establishment and the value of subsidies received is excluded.

The above definition didn't include different costs like labor cost, material cost, energy cost etc. Therefore, the increment of gross value production doesn't indicate the improvement of productivity. In other words, calculating labor productivity based on gross value production is not correct.

Labor productivity = gross value production / labor cost This May not indicate the correct productivity. This is because gross value production may increase with expenditure of different activities like expensive technologies and also it may increase by increasing the price of products.

Census Value Added (at Market Price):- is the difference between Gross Value of production and Industrial cost. Census Value Added at market price minus indirect taxes net (i.e., indirect taxes less subsidies) gives census value added at factor cost.

Value Added in the National Account Concept (at Market Price):- is defined as the difference between the gross value of production and industrial and non industrial costs.

Value Added in the National Account Concept (at Factor Cost):- is the gross income from operating activities after adjusting for operating subsidies and indirect taxes.

Value Added in the National Account Concept (at Factor Cost) is better to use in Ethiopia. Because at the market price didn't show the actual value added, since it may fluctuate when the price of the product vary.

Even though there was some drawback on the definition and evaluation of data, ten years data starting from 1992 to 2001 E.C were used to see the trends of labor productivity of garment factories in Ethiopia.

These were:

- ☞ Value added per year
- ☞ Number of employee per year
- ☞ Value added per employee

The data are presented using tables and graphs as follows.

Table 2-1 Value added for ten years (source: central statistical agency)

years	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
value added	14,964	13,613	14,148	23,144	21,114	16,129	20,712	59,459	72,169	67,130

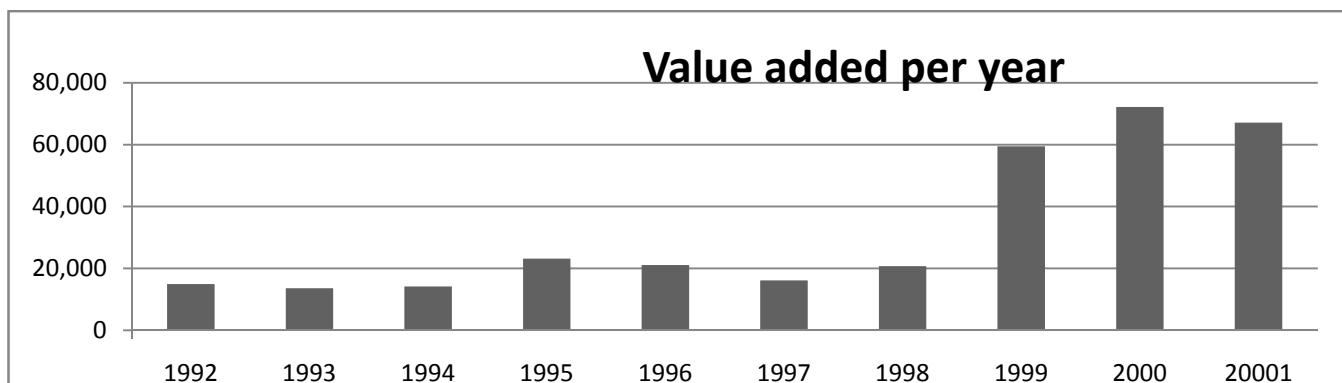


Figure 2-5 Value added of Ethiopian garment factories from 1992 to 2001 E.C

The above table and graph didn't show continuous improvement trend of value added. Its peak period was 2000 E.C with the value of 72169 Birr and the dip period was 1993 E.C with the value of 13613 birr.

To compare the value added in garment industries of Ethiopia from 1992 to 2001 E.C, the index number was calculated.

Table 2-2 Index number of value added for ten years

years	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
value added	14,964	13,613	14,148	23,144	21,114	16,129	20,712	59,459	72,169	67,130
value added index		-0.091	0.039	0.636	-0.088	-0.236	0.284	1.871	0.214	-0.069

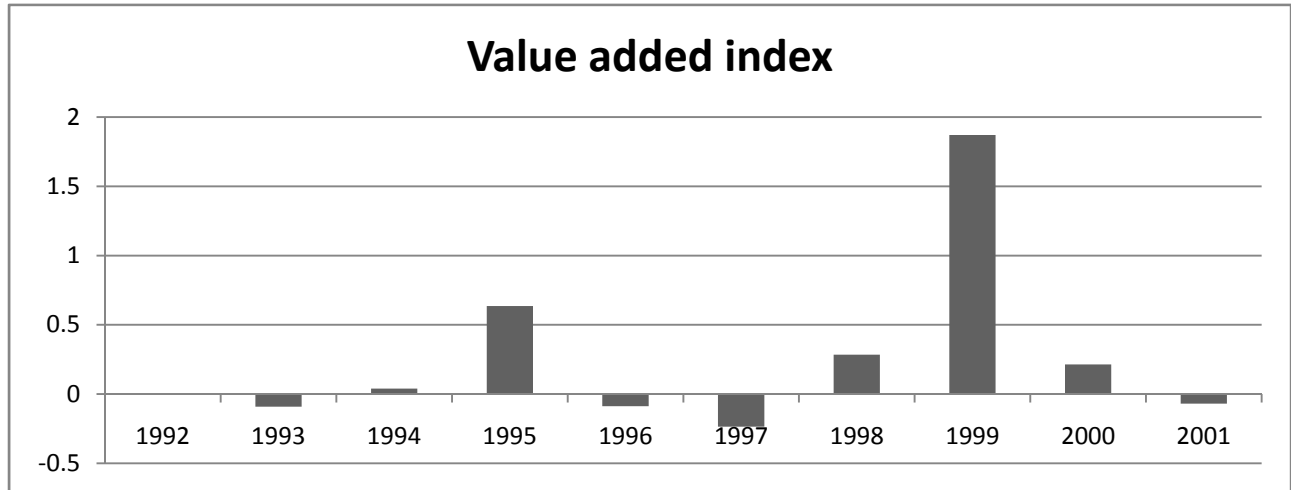


Figure 2-6 Ten year value added index of Ethiopian garment factories

From the above table and figure the negative value shows that the value added was decreased than the previous year. Therefore, productivity improvement program should be developed to have constant value added improvement.

Table 2-3 Number of employee for ten years (source: central statistical agency)

years	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
number of employee	3,752	3,720	3,681	4,278	3,806	2,606	4,099	7,604	7,613	7,793

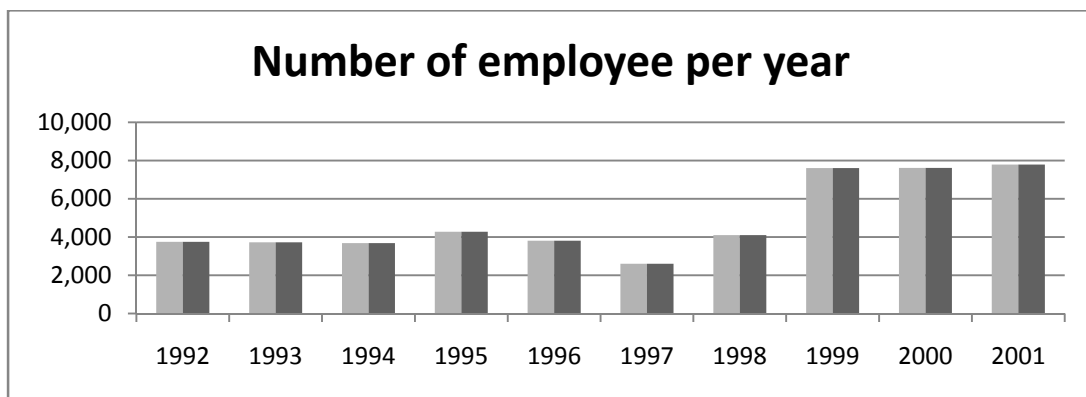


Figure 2-7 Ten year number of employee of Ethiopian garment factories

The above table and figure shows, the number of employees were a decreasing trend from 1992 to 1994 and from 1995E.C to 1997 E.C. But, it showed an increasing trend from 1998 to 2001.

Using the value added as the output and number of employee as labor input, the labor productivity in garment industries of Ethiopia was calculated from 1992 to 2001 E.C.

Table 2-4 Value added per employee for ten years (data source central statistical agency)

years	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
value added	14,964	13,613	14,148	23,144	21,114	16,129	20,712	59,459	72,169	67,130
number of employee	3,752	3,720	3,681	4,278	3,806	2,606	4,099	7,604	7,613	7,793
value added per employee	3,988	3,659	3,844	5,410	5,548	6,189	5,053	7,819	9,479	8,614

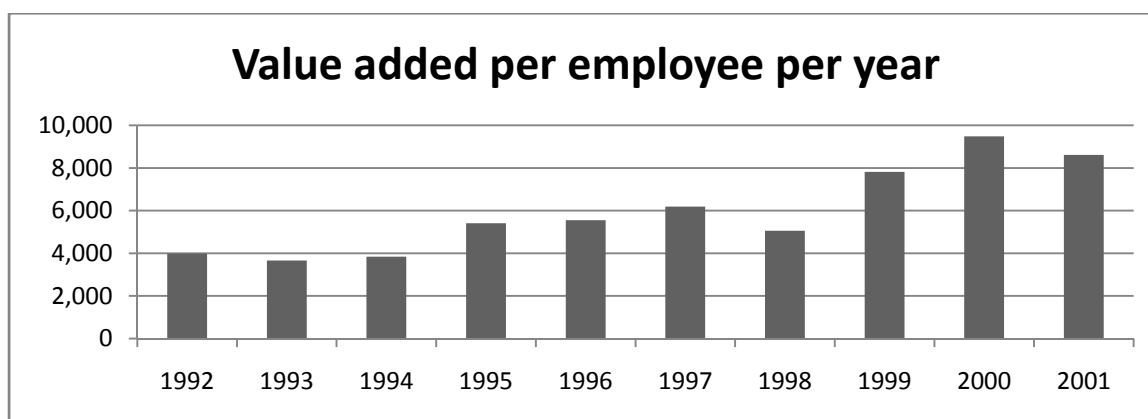


Figure 2.8 Ten year value added per employee of Ethiopian garment factories

From the above table and figure, the labor productivity of the garment factories did not show constant improvement trend.

To compare the labor productivity in garment industries of Ethiopia, the index number was calculated from 1992 to 2001 E.C.

Table 2.5 Labor productivity improvement index for ten years (data source central statistical agency)

years	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
value added	14,964	13,613	14,148	23,144	21,114	16,129	20,712	59,459	72,169	67,130
number of employee	3,752	3,720	3,681	4,278	3,806	2,606	4,099	7,604	7,613	7,793
value added per employee(productivity)	3,988	3,659	3,844	5,410	5,548	6,189	5,053	7,819	9,479	8,614
productivity index		-0.083	0.051	0.407	0.026	0.116	-0.184	0.547	0.212	-0.091

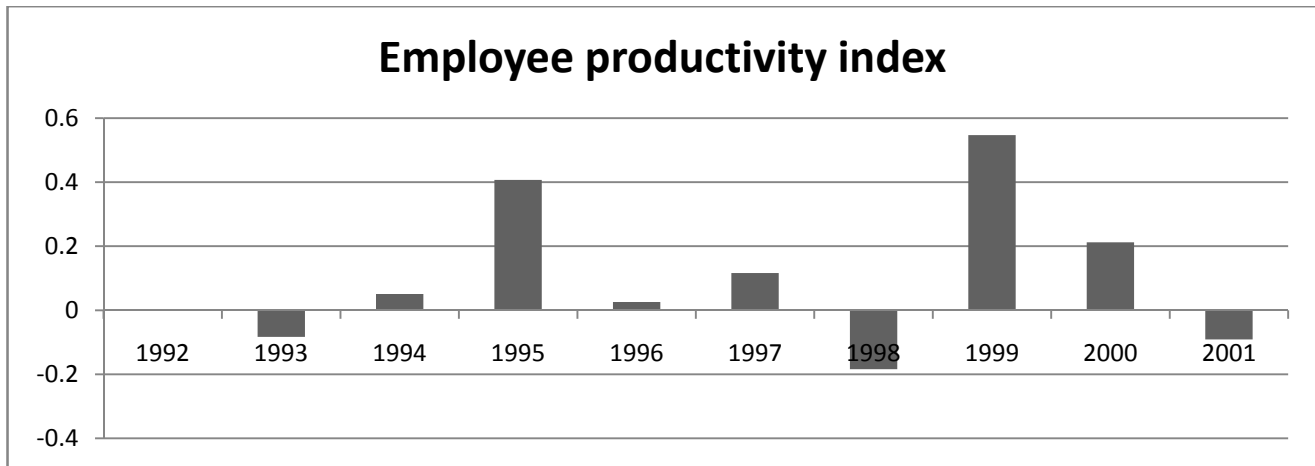


Figure 2.9 Ten year labor productivity index of Ethiopian garment factories

From the above figure the negative value shows that labor productivity was decreased than the previous year. Therefore, the labor productivity improvement model should be developed for the garment factories of Ethiopia.

2.16 Garment Production Process

Garment manufacturing processes include all activities from the point when fabric is received at the factory to when retail ready garments are shipped to the distributor. Some processes such as fabric relaxing, cutting, and sewing occur in the manufacturing of all garments. Other optional processes may also be performed as specified by the customer, including such things as embroidering, screen printing, and laundering. Depending on the size of the manufacturing facility, some garment manufacturers choose to subcontract those optional processes. (9)

Receiving: Garment factories receive fabric from overseas textile manufacturers in large bolts with cardboard or plastic center tubes or in piles or bags. The fabric typically arrives in steel commercial shipping containers and is unloaded with a forklift. Garment factories often have a warehouse or dedicated area to store fabric between arrival and manufacturing.

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. Most of Ethiopian garment industries are still using the traditional method because the cost of computerized systems is prohibitive.

Pattern Grading: Pattern pieces must be increased or decreased geometrically to create a complete range of sizes. 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 such as men, women, youth, children, etc.

Marker Making: Fabric is the most important basic material for apparel making and it accounts for around 50 per cent of the cost of a garment. Thus, material optimization or maximizing fabric utilization is the fundamental factor for every garment firm. 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. Although markers can be made manually or using CAD software, the computerized method is more efficient.

Fabric Relaxing: Relaxing refers to the process that allows material to relax and contract prior to being manufactured. This step is necessary because the material is continually under tension throughout the various stages of the textile manufacturing process, including weaving, dyeing, and other finishing processes. The relaxing process allows fabrics to shrink so that further shrinkage during customer use is minimized.

Garment manufacturers perform the relaxing process either manually or mechanically. Manual fabric relaxing typically entails loading the bolt of fabric on a spinner and manually feeding the material through a piece of equipment that relieves tension in the fabric as it is pulled through. Mechanical fabric relaxing performs this same process in an automated manner.

Many garment manufacturers will also integrate quality assurance into this process to ensure that the quality of the fabric meets customer standards. This step is performed by manually spot checking each bolt of fabric using a backlit surface to identify manufacturing defects such as color inconsistency or flaws in the material. Fabrics that fail to meet customer standards are returned to the textile manufacturer.

Spreading, Form Layout, and Cutting: After fabric has been relaxed, it is transferred to the spreading and cutting area of the garment manufacturing facility. The fabric is first cut into uniform plies and then spread either manually or using a computer controlled system in preparation for the cutting process. Fabric is spread to:

- ☞ Allow operators to identify fabric defects;
- ☞ Control the tension and slack of the fabric during cutting; and
- ☞ Ensure each ply is accurately aligned on top of the others.

The number of plies in each spread is dependent on the fabric type, spreading method, cutting equipment, and size of the garment order.

Next, garment forms or patterns are laid out on top of the spread, either manually or programmed into an automated cutting system. Lastly, the fabric is cut to the shape of the garment forms using either manually operated cutting equipment or a computerized cutting system.

Embroidery and Screen Printing: Embroidery and screen printing are two processes that occur only if directly specified by the customer; therefore, these processes are commonly subcontracted to offsite facilities. Embroidery is performed using automated equipment, often with many machines concurrently embroidering the same pattern on multiple garments. Customers may request embroidery to put logos or other embellishments on garments.

Screen printing is the process of applying paint based graphics to fabric using presses and textile dryers. Specifically, screen printing involves sweeping a rubber blade across a porous screen, transferring ink through a stencil and onto the fabric. The screen printed pieces of fabric are then dried to set the ink. This process may have varying levels of automation or may largely be completed at manually operated stations. Like embroidery, screen printing is wholly determined by the customer and may be requested to put logos or other graphics on garments or to print brand and size information in place of affixing tags.

Sewing: Garments are sewn in an assembly line, with the garment becoming more complete as it progresses down the sewing line. Sewing machine operators receive a bundle of cut fabric and repeatedly sew the same portion of the garment, passing that completed portion to the next operator. For example, the first operator may sew the collar to the body of the garment and the next operator may sew a sleeve to the body. Quality assurance is performed at the end of the sewing line to ensure that the garment has been properly assembled and that no manufacturing defects exist. When needed, the garment will be reworked or mended at designated sewing stations. This labor intensive process progressively transforms pieces of fabric into designer garments.

Spot Cleaning and Laundry: In addition to identifying manufacturing defects, employees tasked with performing quality assurance are also looking for cosmetic flaws, stains, or other spots on the garment that may have occurred during the cutting and sewing processes. Spots are often marked with a sticker and taken to a spot cleaning area where the garment is cleaned using steam, hot water, or chemical stain removers.

Some customers request that a garment be fully laundered after it is sewn and assembled; therefore, garment factories often have an onsite laundry or have subcontract agreements with offsite laundry operations. Commercial laundry facilities are equipped with at least three types of machines: washers, spinners, and dryers. Some facilities also have the capability to perform special treatments, such as stone or acid washing.

Ironing: After a garment is fully sewn and assembled, it is transferred to the ironing section of the facility for final pressing. Each ironing station consists of an iron and an ironing platform. The irons are similar looking to residential models, but have steam supplied by an onsite boiler. Workers control the steam with foot pedals and the steam is delivered via overhead hoses directly to the iron. In most facilities, the ironing platforms are equipped with a ventilation system that draws steam through the ironing table and exhausts it outside the factory.

Packaging and Shipping: In the last steps of making product retail ready, garments are folded, tagged, sized, and packaged according to customer specifications. Also, garments may be placed in protective plastic bags, either manually or using an automated system, to ensure that the material stays clean and pressed during shipping. Lastly, garments are placed in cardboard boxes and shipped to client distribution centers to eventually be sold in retail stores.

Chapter three

3. Case study on Akaki Garment Share Company

3.1 Introduction

Case studies emphasize detailed contextual analysis of a limited number of events or conditions and their relationships. Case studies can provide very engaging, rich explorations of a project or application as it develops in a real world setting.

The trend and factors for employee productivity was surveyed from different garment factories through questionnaires. To show the detailed contextual analysis of employee based productivity improvement techniques, case study was used. Akaki garment Share Company is an old and experienced company to be selected as the case study. Therefore this company was selected to see the current status of garment factories with respect to employee productivity improvement factors. The detailed analysis of the factors was performed and employee productivity improvement model was developed.

3.2 Background

Akaki Garment Share Company was established in 1971 by Japanese and Ethiopian shareholders. The company was nationalized in 1975 and has stayed in the hands of the government until 2005. Currently it is owned by private entrepreneurs. It is located in Akaki sub city, South East of Addis Ababa.

3.3 Product types and capacity

The factory produces different products like Uniforms, trousers, jackets, shirts, overcoat, skirts for both local and foreign markets. In addition, the company produces readymade quality woven garments for men, women and children.

Quality assurance is performed for all processes, which includes raw material delivery, design making, cutting, sewing, and packing. The average current Production capacity is 24,000 pieces per week. However, there is a possibility of increasing the capacity by introducing additional shift. The fabric used by the share company includes cotton, polyester, and cotton-polyester. Fabrics and accessories are obtained from local and international markets (such as China, Pakistan, and India).

3.4 Site, Equipments and Machinery

The company covers the area of 45,460 square meters, of which 41,009m² space was not utilized and available for farther investment. There are buildings for offices, warehouses both for raw materials and

finished items, for production processes, toilets and launch. The share company was equipped with the Japan manufactured sewing machines like JUKI, Brothers, Daewoo, and Pegasus which have high production capacity. In addition, Spreading, Cutting, and ironing machines were available. There were 137 different machines used by the company. The company has its own professionals for both corrective and preventive maintenance of machineries and also has stand by generator.

3.5 Organization Structure and Manpower

Akaki Garment has a well defined organization structure with less hierarchy to enable it both for quick decision making and market competitiveness. The company has close to 450 employees. The average age of the production personnel in the share company is 25 years, while the average education level is 8th grade, and eighty five percent of the whole employees are female. The average service year of employees is 7 years. Employees are organized through labor union.

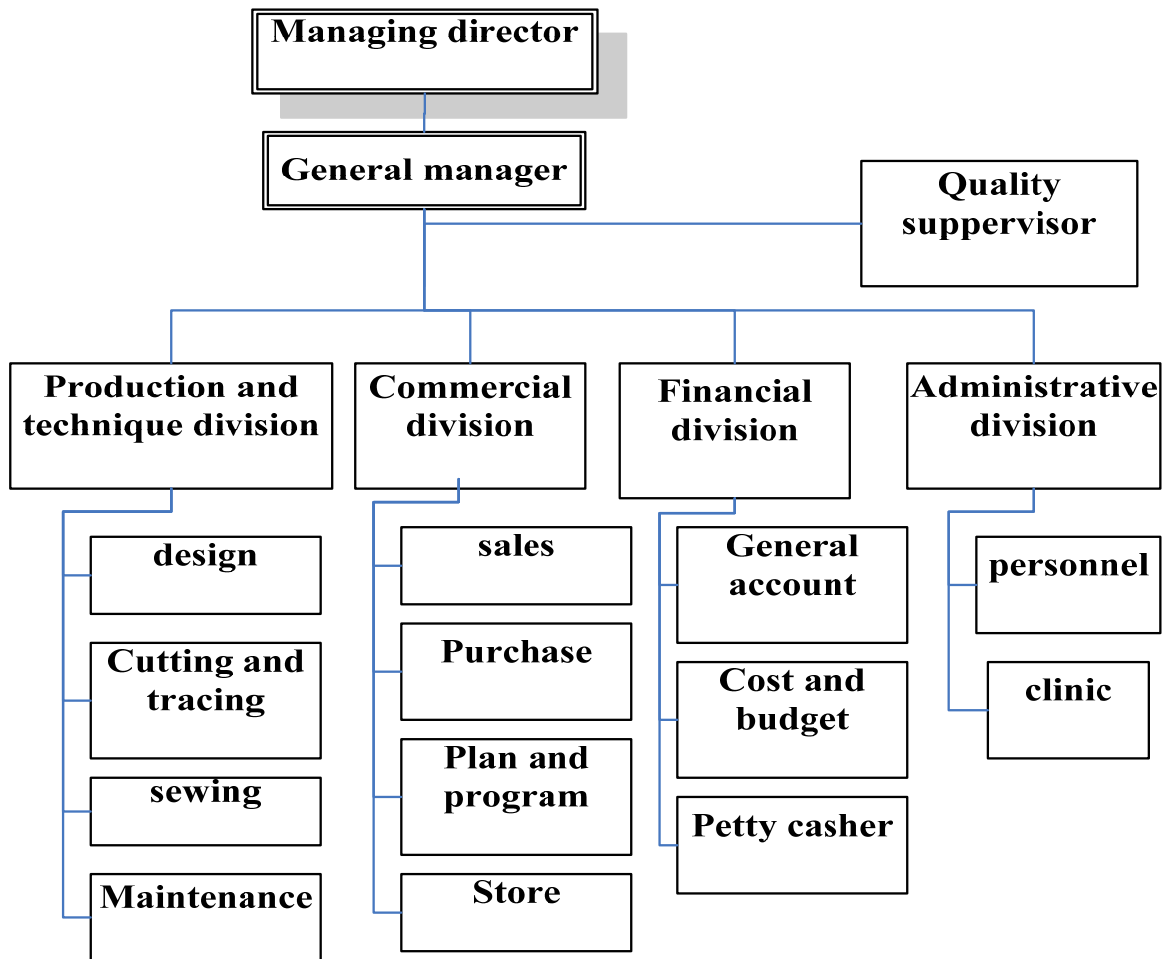


Figure 0-1 Organizational structure of Akaki garment Share Company

3.6 Sales and Marketing

The company has marketing department organized with professionals. It focuses on issues like operators and machine efficiency, minimization of reworks and wastes in order to be competitive both in the local and international market. The company had participated in the local trade and investment bazaar and also attended few international bazaars.

Akaki has local customers that range from Government to Private organizations Such as;

- Police force (example, Oromia police, Federal prison),
- Cement factories (example, Mugger),
- Sugar factories (example, Metehara, Fincha),
- Universities (example, Jimma, D/Markos),
- UN agencies (example, UNICEF), and
- Government Service organizations (example, Ethiopia Electric Power Corporation, Ethiopian Roads Authority)

Similarly, some of the share company's international customers/end users that are served successfully are;

- BONGUA – USA
- CINTAX – USA
- NTL – USA
- DVH – USA, a supplier to WALMART, through which our products are supplied to,
- SCHWELS – EU, and
- FATEH NOOR – UK, where orders are collected and started production.

3.7 Productivity measurement of Akaki garment for the last five years

Akaki garment produces different items such as Uniforms, trousers, jackets, shirts and others like overcoat, skirts for both local and foreign markets. For the last five years, it produces different amount of pieces and it have had different number of workers. Using secondary data (the last five year annual report) partial productivities of the company was calculated and the result is shown in tables and figures as follows.

Table 0-1 Partial productivity measurement data for the last five years

Production years	1998E.C	1999E.C	2000E.C	2001E.C	2002E.C
Number of employees	560	555	367	254	250
Number of total worked days	106,876	117,613	94,048	61,072	69,609
Total output of the company in pieces	90,091	247,643	215,891	98,226	76,875
Total output of the company in birr	2,747,947	5,176,859	4,722,176	2,736,357	2,421,385
Employee inputs in birr	1,746,430	1,692,690	1,578,631	1,096,206	1,140,547
raw material inputs	1,332,117	4,708,989	2,924,908	2,348,341	3,097,904
capital inputs	2,417,303	2,720,797	2,476,314	6,491,500	4,049,788
power and water inputs	63337	127588.54	96872.81	66088.5	69,737
Other miscellaneous goods and services inputs	1655204	1491762.5	1967387.1	2071364.7	2384011.9

Table 0-2 Employee productivity measurement result for the last five years

Production years	1998E.C	1999E.C	2000E.C	2001E.C	2002E.C
Number of employees	560	555	367	254	250
Number of total worked days	106,876	117,613	94,048	61,072	69,609
Total output of the company in pieces	90,091	247,643	215,891	98,226	76,875
Total output of the company in birr	2,747,947	5,176,859	4,722,176	2,736,357	2,421,385
Employee inputs in birr	1,746,430	1,692,690	1,578,631	1,096,206	1,140,547
Employee productivity	1.57	3.06	2.99	2.50	2.12
Employee productivity index		0.9437	-0.022	-0.166	-0.150

The above table can be shown diagrammatically as follows

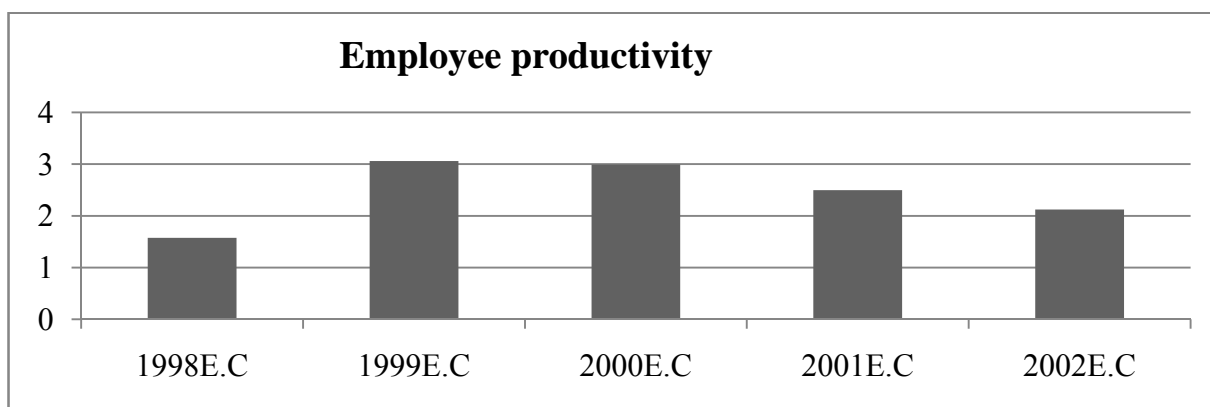


Figure 0-2 Employee productivity based on the output in pieces

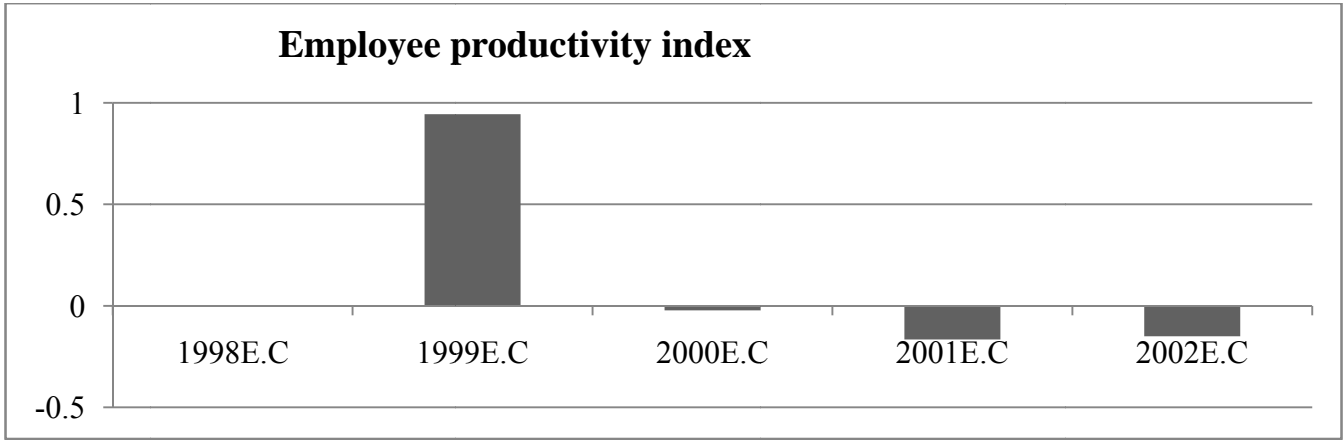


Figure 0-3 Employee productivity index

From the above table and figures the productivity trend was decreasing specially for the last three years. As the supervisors explained, the main reason for employee productivity decrement was turnover of more experienced employees. This great turnover was due to lack of employee productivity improvement model implementation.

Table 0-3 Material productivity measurement result for the last five years

Production years	1998	1999	2000	2001	2002
Total output of the company in birr	2,747,947	5,176,859	4,722,176	2,736,357	2,421,385
raw material inputs	1,332,117	4,708,989	2,924,908	2,348,341	3,097,904
output in birr per inputs of material	2.06	1.10	1.61	1.17	0.78
material productivity index		-0.47	0.47	-0.28	-0.33

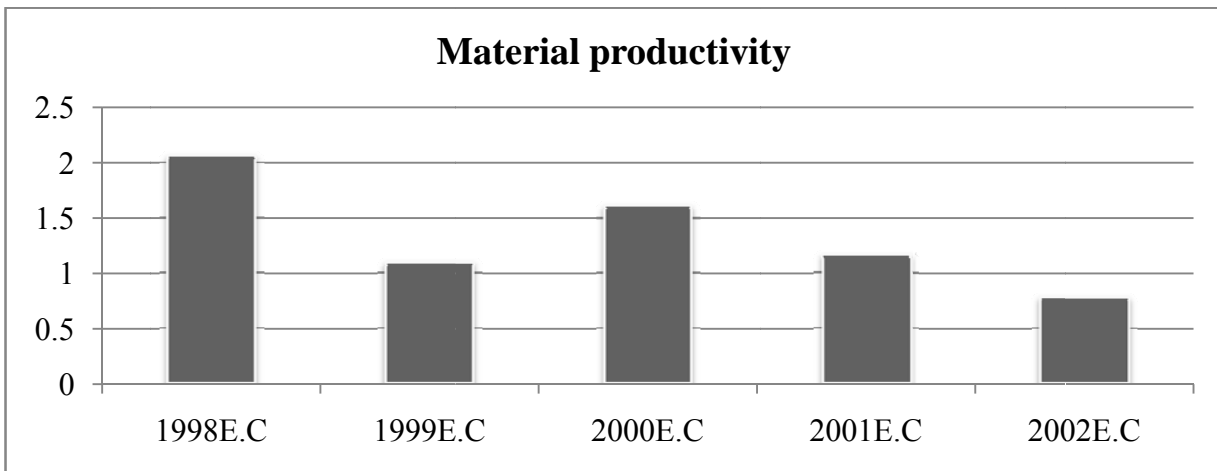


Figure 0-4 Material productivity measurement results for the last five years

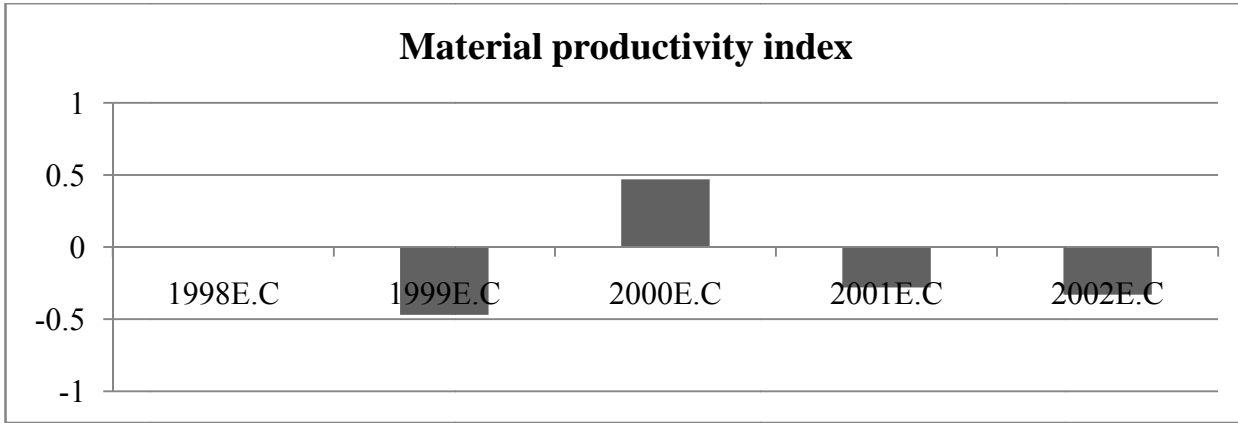


Figure 0-5 Material productivity indexes

Table 0-4 Capital productivity measurement result for the last five years

Production years	1998	1999	2000	2001	2002
Total output of the company in birr	2,747,947	5,176,859	4,722,176	2,736,357	2,421,385
capital inputs	2,417,303	2,720,797	2,476,314	6,491,500	4,049,788
output in birr per inputs of capital	1.14	1.904	1.904	0.424	0.60
capital productivity index		0.67	0.00	-0.78	0.42

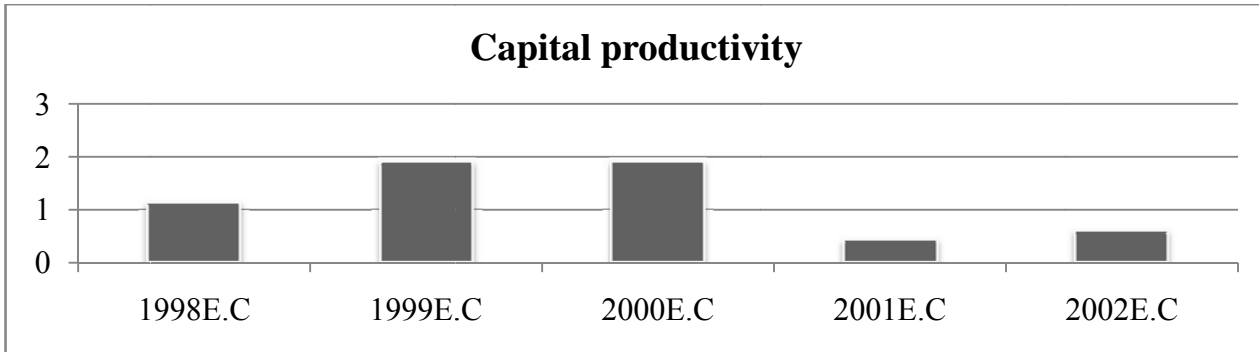


Figure 0-6 Capital productivity measurement result for the last five years

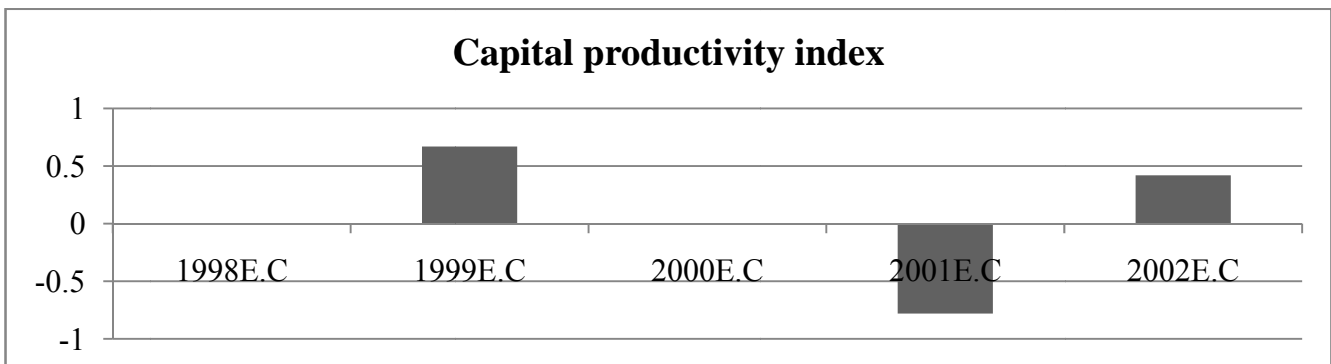


Figure 0-7 Capital productivity index

Table 0-5 Power and water productivity measurement result for the last five years

Production years	1998	1999	2000	2001	2002
Total output of the company in birr	2,747,947	5,176,859	4,722,176	2,736,357	2,421,385
power and water inputs	63337	127588.54	96872.81	66088.5	69,737
output in birr per inputs of power and water	43.39	40.57	48.73	41.40	34.72
power and water inputs productivity index		-0.065	0.201	-0.151	-0.161

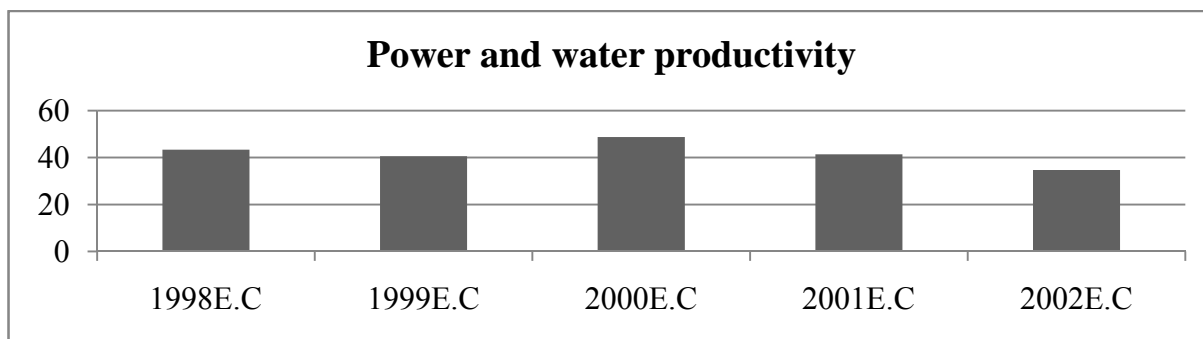


Figure 0-8 Power and water productivity measurement result for the last five years

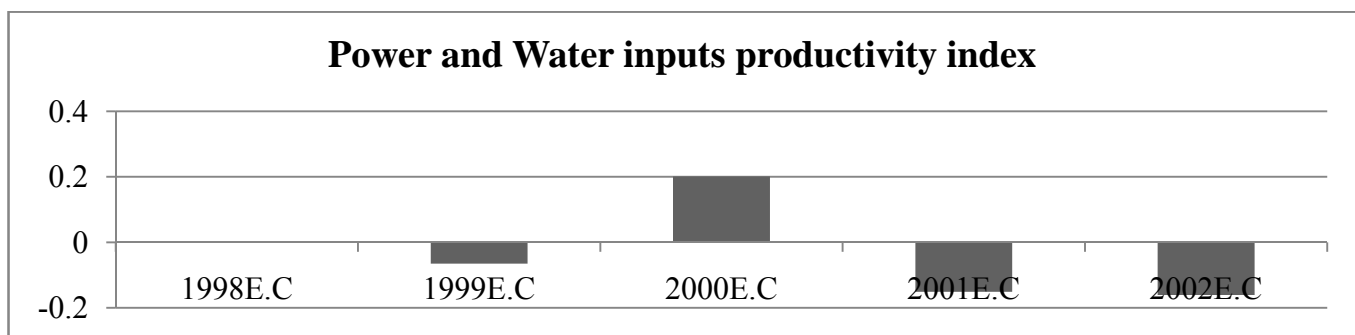


Figure 0-9 Power and water productivity index

Table 0-6 Other miscellaneous productivity measurement results for the last five years

Production years	1998	1999	2000	2001	2002
Total output of the company in birr	2,747,947	5,176,859	4,722,176	2,736,357	2,421,385
Other miscellaneous goods and services inputs	1655204	1491762.5	1967387.1	2071364.7	2384011.9
output in birr per inputs of Other miscellaneous	1.66	3.47	2.40	1.32	1.02
Other miscellaneous productivity index		1.090	-0.308	-0.449	-0.231

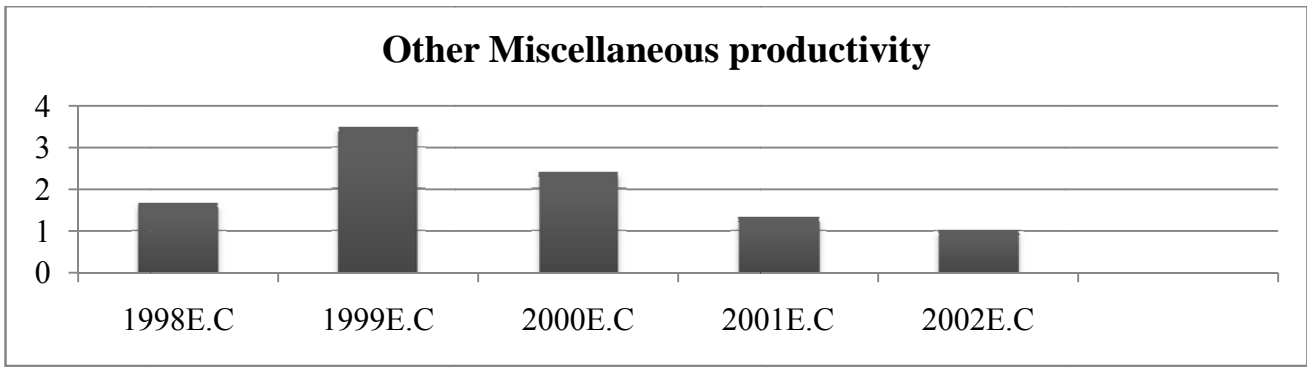


Figure 0-10 Other miscellaneous productivity measurement results for the last five years

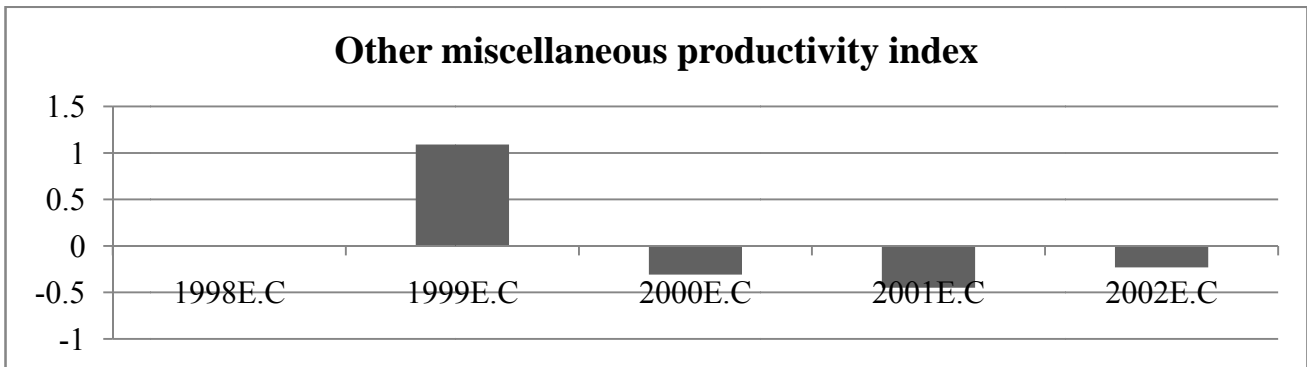


Figure 0-11 Other miscellaneous productivity indexes

When the last five years partial productivities were evaluated, the company performs better in the year 1999 and 2000 E.C relative to the other years in all partial productivity. But the general productivity trend of the partial productivity measurement was decreasing and needs attention for the productivity improvement.

From the above partial productivity index figures, the employee productivity index shows constantly a decreasing trend. But, other productivity index shows up and down trend and to improve all partial productivity employee productivity improvement is the key solution. Material and capital productivity improvement could be the next research area for the interested researchers for the Akaki garment share company.

With the 392 employees, the attained capacity was 20, 800 shirt equivalent per month. The average working day per month was 25 days. Therefore the attainable productivity was 2.13 shirts per employee worked days. This shows that the employee productivity of Akaki garment Share Company was very low and needs attention to be improved from the company and also from researchers.

3.8 Best practice or benchmark in the world of garment manufacturing

(Source: textile and garment industry development institute: unpublished document)

Cutting

- Knit open fabric best practice cutting room is able to process 12,000-15,000 pcs of T-shirts having 2 semiautomatic spreading machines, CAD system and 1 automatic cutting table and 20 workers
- Knit tubular fabrics mass production best practice cutting room is able to process 12,000-15,000 pcs of T-shirts having 2 semiautomatic spreading machines, manual marker, manual cutting and 15 workers
- Knit tubular fabrics best practice punch technology is able to cut 10,000 pcs of T-shirts/polo's with 4-5 persons having 1 punching cutting machine
- Woven denim fabrics best practice cutting room is able to process 8,000-10,000 pcs of denim trouser having 4 semiautomatic tables, 1 automatic cutting head, CAD system and 23 workers
- Woven casual fabrics best practice cutting room is able to process 4,000 pcs of casual complex trousers (short series, many sizes) having 4 semiautomatic spreading machines, 1 automatic cutting head, CAD system and 18 workers

Sewing

Sewing is the most complex activity of the garmenting; involving a big numbers of persons contributes to the same product. Depending of the types of the product, sewing lines can start from:

- Knits - 10 workers – basic tubular T-shirts / to 20 workers to regular knits products / or 25 workers to polo's
- Woven's trousers – 25-30 workers for denim 5 pockets / 35-40 workers for casual trousers / 60-70 workers for high efficient denim products
- Shirts – 30-50 workers

Measuring unit in sewing time is called SAM (Standard Allowed Minutes) which express the required amount of minutes necessary to complete 1 pcs. Worldwide there are international standards to perform those products considering state-of-the-art machines.

Layout of the sewing lines could be linear, U shapes or groups as the product profile required.

SAM international standards are presented below.

	Basic T-shirts	Basic polo's	Basic shirts	5 pockets trousers
SAM (best world practice) min/pcs	3.5 – 4.5	12 – 14	18 – 20	11 – 13

Achieving those standards requires:

- State-of-the-art machines equipped with the latest auxiliary devices, computer controlled
- Highly workstation engineering with additional tables and proper working conditions (humidity, temperatures, lights, air ventilation, etc)
- Highly engineered sewing handlings made by the operators – this is an important “know-how” affecting around 30-50% from the sewing time

Being competitive is a mix of having skills to perform low SAM's and being able to manage the workers to get high overall efficiency. Getting overall efficiency is a management related attitude, workers are using the existing tools and managers need to get out of it as much as possible.

Managing a production area with several sewing lines means a balance between:

- good management skills existing at the Line Supervisor level:
 - balancing the sewing lines,
 - organize the internal sewing line flow,
 - working with low efficient operators,
 - prepare and introduce new models without gaps between styles
 - get an overall efficiency more than target
 - manage bottlenecks
- layout set up correctly to avoid crossings within the process or unnecessary handlings of goods between departments
- good engineering support
 - preparing new models
 - monitor the workers efficiencies
 - working with low efficient operators in improving their performance
 - train and add new hired operators and insert them in the lines
- mechanical skills available for the lines (quick and reliable activity from mechanics side)
- preparation of the cut-parts need to be done in advance so the sewing lines have always a stock of at least 0.5 days in advance in front of their place

- preparation of the new machines, folders, devices, attachments and technologies need to be available in advance when new models are prepared
- each sewing line need to have a few spare machines to replaced quickly in case of machine break-down
- each line performance need to be closely monitor by the Production manager and corrective actions needs to be taken quickly

Workstation engineering is highly developed, as BEST PRACTICE worldwide based on International expertise, many types of devices are deisgn to help the workers to:

- reduce his sewing time
- reduce his handling time
- reduce the effort during work
- increase the level of automatisisation

Workers levels are:

- Not acceptable if overall efficiency is below 65%
- Acceptable if the overall efficiency is 65 – 75%
- Satisfactory if overall efficiency is 75-85%
- Good if overall efficiency is 85-95%
- Very good if overall efficiency is over 95% (could go up to 120% in case of extraordinary performances)

Efficiency levels are considered for average skills workers, working with average intensity during the whole day, knowing very well the handlings and machines. In practice there are operators which are able to perform 120% isolated cases.

Finishing

After products are process, the last part of the production is pressing and packing. Pressing could be done manual on the ironing tables, blown mannequins, and manual pressing equipments or automatic using latest technologies of pressing for T-shirts, shirts, trousers and jackets.

Productivity using automatic pressing devices is up to 50% bigger than using manual technology and quality is much better.

- Manual ironing for a T-shirt is 0.40-0.60 min, automatic ironing is 0.20 min/pcs
- Manual ironing for a trouser is 0.8-1 min/pcs, automatic ironing s 0.60 min/pcs

3.9 Evaluation of the current status of the case company with respect to the employee based productivity improvement techniques

Introduction

The data for the evaluation of the current status of the company was collected using self administered questionnaires prepared for the management body and the employees of the company, structured and unstructured interviews and direct observation. The employee based productivity improvement techniques were reviewed from different literatures basically from professor Sumanth book of productivity and management engineering. The status of the company based on the employee based productivity improvement techniques was discussed as follows:

1) Individual financial incentives

The company sets the target for each activity in each department. But, most of the time the workers perform below the target. The reason for this was unnecessary movement, talking each other, idleness and lack of proper training. As different supervisors of the company mentioned, there is no scheme of training for the employees. Training is given only when new workers hired. The company did not have any incentive system when the worker performs above the target. Similarly it did not have any punishment when the worker performs below the target.

2) Group financial incentives

The second type of financial incentive system is group incentive plan. Group incentive plan is a better technique to get a good team spirit. In Akaki garment Share Company, there was a possibility to design group financial incentive program. Because most of the activities are group works. For example, cutting, sewing and finishing activities need good team spirit and group efficiency to improve the total productivity of the company. But, there was no any type of group financial incentive program in the company.

3) Fringe benefits

Fringe benefits includes, medical insurance, disability insurance, entertainment expenses, relocation expenses, subsidies for buying or renting a home, free airfares for family and employees, free company car, telephone, newspaper, and/ or chauffeur, Marriage subsidy, free educational trips abroad, free or subsidized higher education. From the above fringe benefits the company has medical insurance, transportation, pension and retirement.

4) Employee promotion

Employee promotion is both financial and nonfinancial form of motivation to enhance human productivity. At this time, the Company performs non financial promotion system particularly for operators. That was assigning levels for employees depending on their performance. This promotion system might increase the productivity of employees.

The company also promotes the employee with financial incentives. For example, there were some employees who were worked in store and at this time working at supervisor position. But, the company did not have scientific scheme for financial employee promotion.

5) Job enrichment

Job enrichment is a nonfinancial motivation technique that provides variety in assigned tasks and it is the satisfaction of completing a whole or identifiable portion of work that can be associated with an end product or service.

Job enrichment is a term used often for the process of achieving and improving the quality of work life. Henberg describes job enrichment as type of improvement in the context of the job which may give a worker more of a challenge, a complete task, responsibility, opportunity for growth, and chance to contribute his or her ideas. The need for such an improvement in the job content is being stressed by the social and behavioral scientists. This is because excessive job specialization introduced by scientific management and advancing modern technology has been dehumanizing the work by making the workers job meaningless, routine, repetitive, removing all challenges from it and making the worker a part of the machine culture. The Company didn't have formalized job enrichment scheme.

6) Job enlargement

As job enrichment, job enlargement involves redesigning of the job and have the objective of humanizing work by introducing more variety in work, increasing responsibilities, and making work more interesting, challenging and motivating. But, job enlargement implies additions of more functions and increasing the variety of tasks and duties to reduce monotony. The additional responsibilities involved are of a horizontal nature, while job enrichment implies an improvement in the quality and variety of work, and the additional responsibilities are of a critical nature encompassing self-growth by introducing motivators. Again the job enlargement merely makes a job structurally bigger, while job enrichment provides the opportunity for the employees' psychological growth. As job enrichment, the company did not have the formalized job enlargement plan.

7) Job rotation

Job rotation involves the rotation of workers into different jobs for short periods of time. Job rotation was performed without any program for operators of single and double needle sewing machines. The operators rotate in these two types of machines randomly. But for the other machines like over lock sewing machine and chain sewing machines the operators were specialized for these machines and so there was no rotation.

8) Worker participation

Participation is an approach to overcoming resistance to change through employee involvement in planning and implementing the change. It is the mental and emotional involvement in a group situation that encourages the person to contribute to group goals and to share responsibility in them.

Worker participation was not as such developed as labor productivity improvement program in the company. As different supervisor explained, the planning and implementation of changes were performed by the management body excluding the lower level employees. And also there were no any employee participation approach like Quality-control (QC) circles, Productivity quality (PQ) teams, Productivity action teams, Productivity circles, Productivity maintenance groups and Employee participation groups (EPGs)

9) Skill enhancement

Skill enhancement is a formalized technique to increase the skills needed to perform a job. Skill training or coaching may be needed for an employee when the employee's attitude toward the job is positive but his or her abilities are low. Most of the workers had not positive attitude to the company. Because, the company paid low salary and didn't have incentives to motivate the employees. The company did not have skill enhancement system.

10) Management by objectives

Management by objectives (MBO) is a process aids motivation of all participants by having superior and subordinate managers jointly identify common goals, carefully define them, and together monitor progress toward achieving results. In the company, the goals were set only by the management body and the employees were forced to achieve the goal.

11) Learning curve

The basic assumption underlying the learning curve is that peoples either individually, or as members of a production team, gain proficiency with repetition of the same task or project. Learning is the process by which an individual acquires skill, knowledge and ability. When a new product or process is started, performance of workers is not at its best and learning phenomenon takes place. As the experience is gained, the performance of worker improves, time taken per unit reduces and thus productivity goes up. This improvement in productivity of workers is due to learning effect.

The learning effect exists during a workers start up or familiarization period on a particular job. After the limits of experimental learning are reached, productivity tends to stabilize and no further improvement is possible. The rate at which learning occurs is influenced by many factors including the relative unfamiliarity of workers with the task, the relative novelty and uniqueness of the job, the complexity of the process, the impact of incentive plans, supervision, etc.

Most of the employees specially machine operators in Akaki garment Share Company works more than ten years. Due to this reason, the effect of learning on employee productivity was stabled. Therefore there was no employee productivity improvement with the effect of learning curve in the company.

12) Communication

Communication refers to the adequate and timely flow of information with feedback mechanism. The employees explained that there is no enough communication system between the employee and the management body. The communication was limited up to supervisors and the supervisors were not much satisfied with the communication system. Because most of the time the management did not participate on decision making.

13) Working condition improvement

Working condition improvement technique involves a detailed audit of the working conditions at each of the operations designing improved conditions of working. There are different standards around the working areas. Ministry of labor and social affairs of Ethiopia had developed some occupational safety and health standards in 2008. For the illumination of garment factories, it had set the minimum standard of 2000lux. For washing and sanitary facility the following standard had been set. (25)

Table 0-7 Washing and sanitary standards

number of worker	number of toilets		urine bowls	number of showers, hand and face washings	
	male	female		hand and facing	showers
1-5	1	1	1	1	1
6 - 10	2	2	1	1	1
11 - 20	2	2	2	2	2
21 - 30	3	2	3	3	2
31 - 40	4	3	3	3	3
41 – 50	4	3	4	4	3
51 - 60	5	4	4	4	4
61-70	5	4	4	4	4
71- 80	5	4	4	4	4
81 - 90	6	5	5	5	5
91 - 100	6	5	6	6	5
Over 100	7	6	7	7	6

For the overcrowding of the work place it should not be less than 400 cubic feet per person. And also general ventilation, safety provision in case of fire, supply of drinking water, work clothing and accommodation, seating, and others had been set by the ministry. The company had 450 workers and it has 6 male toilets and 7 female toilets, three hand and facings and only two showers. This shows the company did not fulfill the standards

14) Training

Training seeks to achieve improved human productivity by increasing the ability levels of the workforce. The company gives training only for newly hired workers. Once one worker hired and starts the job, there was no programmed training scheme.

15) Education

Education refers to the level of high school, college, or vocational training acquired by an employee. Most of the workers of Akaki garment were in low grade level between grade five and grade ten. But the company did not have idea about the upgrading of workers educational level. From 68 respondent workers, 69.1 % of them need to upgrade their grade level.

16) Role perception

Role perception refers to the manner in which an individual defines his or her job. The type of effort the employee believes is essential for effective job performance. Most of the employee in Akaki garment did

not understand their role. Most of the time there was unnecessary talking out of the job, unnecessary movement, unnecessary idleness and the likes. This showed that, the employees did not understand their role on their work.

17) Quality of supervision

Supervision is concerned with the work of creating and maintaining environments in which people can accomplish goals efficiently and effectively. The company has different supervisors like production supervisor, line supervisor, quality supervisor, cutting supervisor etc. But there was more rework and defects of products. This showed that there was a problem on the quality of supervision. Actually, the defects were not only the problems of quality of supervision. Lack of proper training, unmotivated employees, and others were some other source of defects.

18) Recognition

Recognition is a process whereby management shows acknowledgement of an employee's outstanding performance. The company starts assigning levels for the employees depending on their performance as level 1, level 2 and level 3. This may be considered as recognition employees but there is no other recognition system.

19) Punishment

Although punishment may not appear like a productivity improvement technique because it sounds too harsh to deal with grown up employees, it can be effectively used to eliminate or suppress certain types of behavior or not to reinforce those types of behavior. The company did not have punishment system. But, at the end of the year, after evaluating the annual performance of the employees, the company fires those who had achieved low performance.

20) Quality circles

The quality-control (QC) circles, or quality circles, are groups of employees who voluntarily cooperate to solve problems related to production, quality, work environment, maintenance, scheduling, or anything that affects these areas. Akaki garment did not have any quality circle.

21) Productivity quality teams

Productivity quality (PQ) teams (short for productivity and quality teams) are small groups of people (doing similar tasks) that meet regularly to select, investigate, and solve problems related to the

workplace, products, and services. Akaki garment Share Company did not have any Productivity quality (PQ) teams.

22) Zero-defects programs

Zero-defects programs attempt to improve quality by changing workers' attitudes. Their theme, "do it right the first time," stresses error-free performance. Actually it is difficult to implement zero defect programs. Because in practical world it is impossible to eliminate defects but minimizes. The company did not have zero defect program rather most of the time there was more rework.

23) Time management

Time management involves the minimization of the wasteful elements of a person's administrative work. The company has standard time for each activity of the each process but there is problem on managing it. Most of the operators have daily target number of production in piece but they did not produce the target number. This was due to poor time management system.

24) Flexitime

Flexitime is a personnel scheduling system in which employees are given a certain amount of freedom and responsibility in determining their hours of work. Flex time may not be applicable for all types of job. For example, for garment factories, it is difficult to implement flex time. Garment factories need a team work and impossible to decide individual schedule of work. The company did not have flex time program.

25) Compressed workweeks

Compressed workweeks involve working for the same 40 hours a week, but for fewer days. For example, a common one is working 10 hours a day for four days. Compressed workweek is also having the same concept with flex time and it cannot be applicable for garment factories.

26) Harmonization

Harmonization involves the integration of the interests of the owners, board of directors, management at all levels, and all employees in a consistent manner both within and outside the physical boundaries of an organization. The company did not have any harmonization.

Chapter four

4. Data collection and analysis

4.1 Introduction

In order to improve employee productivity in garment industries of Ethiopia, the status of the existing employee productivity had been thoroughly analyzed for the case company. In order to attain the objectives of the research, different data collection methodology had been developed. The methodology used incorporates the advantages of most data collection techniques. Therefore, it was aimed to use open guided interview, structured questionnaire, document review and direct observation of the actual working environment and the condition of the shop floor at the case study.

4.2 Data collection

As the Ethiopian textile and garment industry development institute listed, the basic garment industries were 27 and the others were very small in size. These were MAA garment, Novastar Garment, Knit to finish, Addis Garment, Akaki garment, Ambassador Garment, Concept International P.L.C, Feleke Garment P.L., GMM Garment P.L.C, Haile Garment P.L.C, Mulat Garment P.L.C, Nazareth Garment Share Company, Oasis Abyssinia Garment P.L.C, Progress Garment Factory and G/Import PLC, Gullele Garment, Wossi Garment Factory, Yonis Garment Factory, Woinu Curtain, GG Super Garment, Birhanu Sahile Garment, Tariku Argaw textile and garment factory, Tuafi International Garment Factory, Sky Tex Garment, Rose Ethiopia Garment Factory, Rekeki Girma Garment Factory, Lusi Garment Industry and Abraham Mola Garment.

From those, akaki garment share company was selected for the case study. The survey questionnaire was distributed for twenty five factories. More over minstry of labor and social affiares, minstry of industry, Ethiopian textile and garment industry development institute, central statistic agency and Ethiopian garment association was visited to obtain the necessary information.

4.2.1 Survey questionnaire

Two types of questionnaire were prepared. One type of questionnaire was prepared for all Ethiopia garment factories. The questionnaire was distributed in two ways, directly by visiting the companies and using email. For most of the factories located in Addis Ababa the questionnaire was directly distributed and for those located out of Addis Ababa it was distributed using email. One questionnaire was distributed for one factory aimed to conduct managers or production department heads.

The questionnaire had five parts. The first one was preliminary information; it contained position of the conducted person, experience, qualification, name of the organization, establishment year of the company and number of employees.

The second one was Considerations and interpretations of productivity in the firm. It contained the working definition of productivity in the firm, the most accurate measurement of labour productivity and the importance of productivity with respect to the company.

The third one was factor affecting the employee productivity of the company. It contained whether the company have a well organized & equipped department to find out and introduce labor productivity improvement or not, the trend of the employee productivity of the company for the last five years, how do the company rate the effect of techniques on the labor productivity, which techniques have the company used for the last five years and how mach costs and saves each technique, and how long it takes to install the techniques and the payback periods.

The fourth one was labor productivity measurement and improvement practices. It contained whether the company introduced any method to measure labor productivity, worked hours, total output and value added of the company for the last five years.

The last one was compensation and benefits. It contained the availability of insurance, medical, pension or retirement, accident, vacation, maternity & sick leave, bonus and transportation.

The second type of questionnaire was prepared for the employee of the case company. The questionnaire had five parts. The first one was how did the employee understand the word employee productivity. The second one was on employees' assumption when the productivity of the company will improve. The third one was the consideration of employees on their productivity in the company. The fourth one was how did the employees see or what was the vision of employees for the company. The last one was which of the twenty six factors did the employees want to be fulfilled for them to improve their productivity.

The questionnaire was distributed for hundred employees of whom eighty of them were distributed for machine operators. From hundred questionnaires, sixty eight (68%) were collected.

4.2.2 Interview

Structured interview was conducted in the case company.

- ❖ To know the presence or absence of incentive schemes for the employee
- ❖ To know the criteria of assigning levels for the employees

- ❖ To assess the convention of labor union and the company
- ❖ To know the reason of unnecessary movement, talking and idleness of the employees.
- ❖ To assess the employee productivity trends of the company
- ❖ To assess the productivity measurement and improvement system of the company

4.2.3 Direct observation

The manufacturing processes of the case company (cutting, sewing, finishing and ironing activities) were observed. In addition, the infrastructure and facilities of the companies has been observed. The important documents of the company such as annual reports, quarter reports, and company profile brochures have been also used for the assessment.

4.3 Data analysis and sentences

4.3.1 Data analysis and sentences of questionnaire type one

As mentioned earlier, the questionnaires prepared to collect the necessary information and data were two types. The questionnaires were distributed for twenty five garment factories, of which nineteen were distributed by visiting the company and six of them using email. From the distributed questionnaires thirteen of them or 52% were collected.

The collected data was analyzed using SPSS 15.0 software and the result was presented as follows. The first part of the question was preliminary information which asks professional level, work experience and others. From the respondents, most of them were at the management position. When we came to the result of their professional, 3 (23.1 %) of them had college diploma, the other 9 (69.2%) had BSc and one respondent did not respond his profession. When we came to the working experience, 10 (76.9 %) of them have below two years experience, one (7.7 %) respondent had between 2 and 5 years experience, one (7.7 %) respondent had between 5 and 10 years experience and one (7.7 %) respondent had above 10 years experience.

The second part of the question was about considerations and interpretations of productivity in the firm. The first question asks about the working definition of productivity in the firm. The result is shown in the following table.

Table 4-1 Result of possible working definition of productivity in the garment factories

Possible working definition of productivity in the firm	Disagree (in %)	Undecided (in %)	Agree (in %)
Output per worker	7.7	23.1	69.2
Output per capital	53.8	23.1	23.1
Output per materials	46.2	30.8	23.1
Output per inputs of material, labor & capital (plant, equipment, technology, etc)	23.1	15.4	61.5
Sales per employee	38.5	38.5	23.1
Jobs completed per jobs scheduled	30.8	30.8	38.5
Output per work hours	23.1	38.5	38.5
Output per labor cost	7.7	30.8	61.5

The above result of the table can be shown with the following figures.

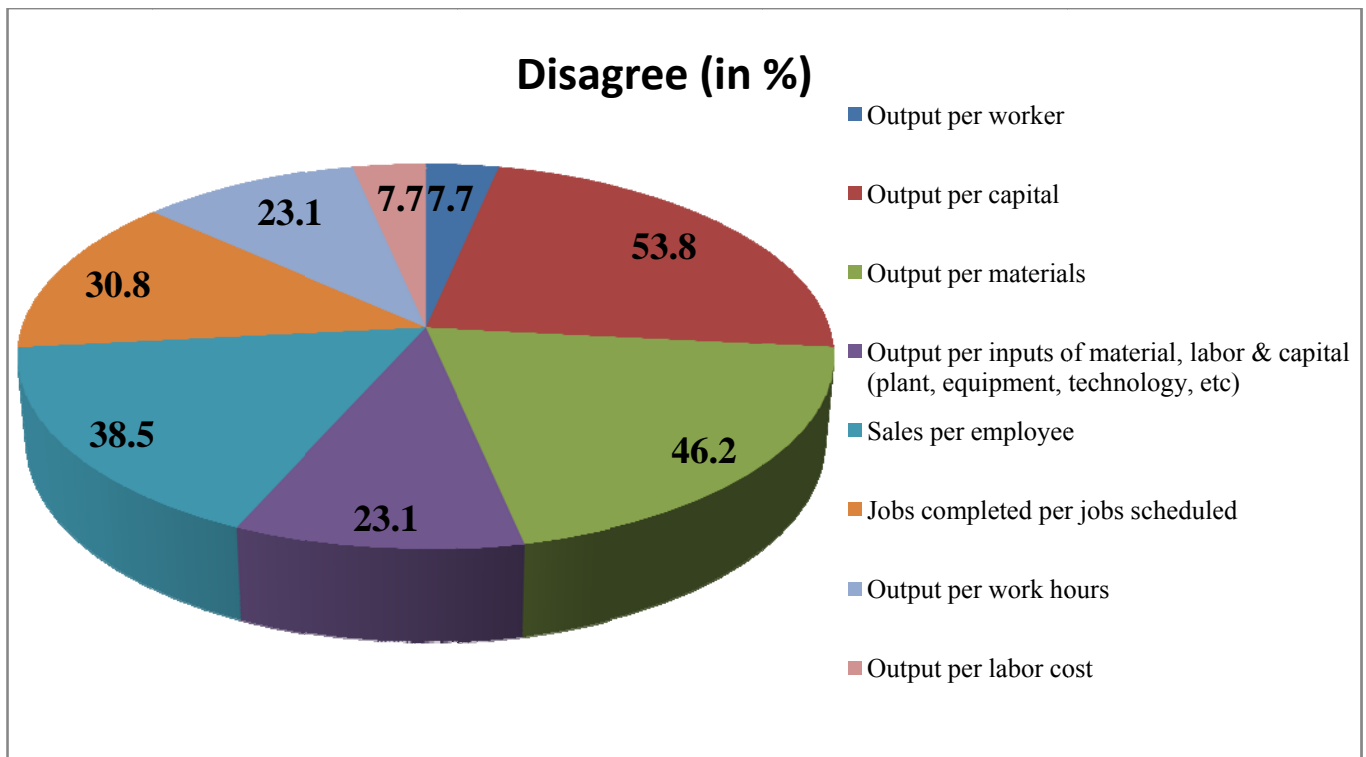


Figure 4-1 Disagreement result of possible working definition of productivity in the garment factories

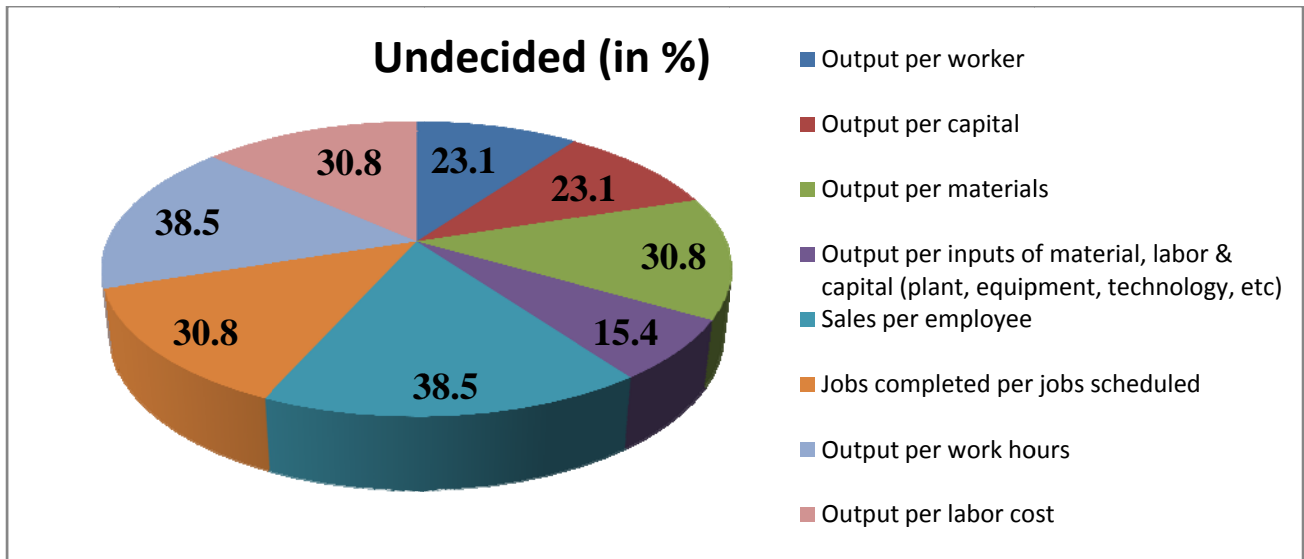


Figure 4-2 Undecided result of possible working definition of productivity in the garment factories

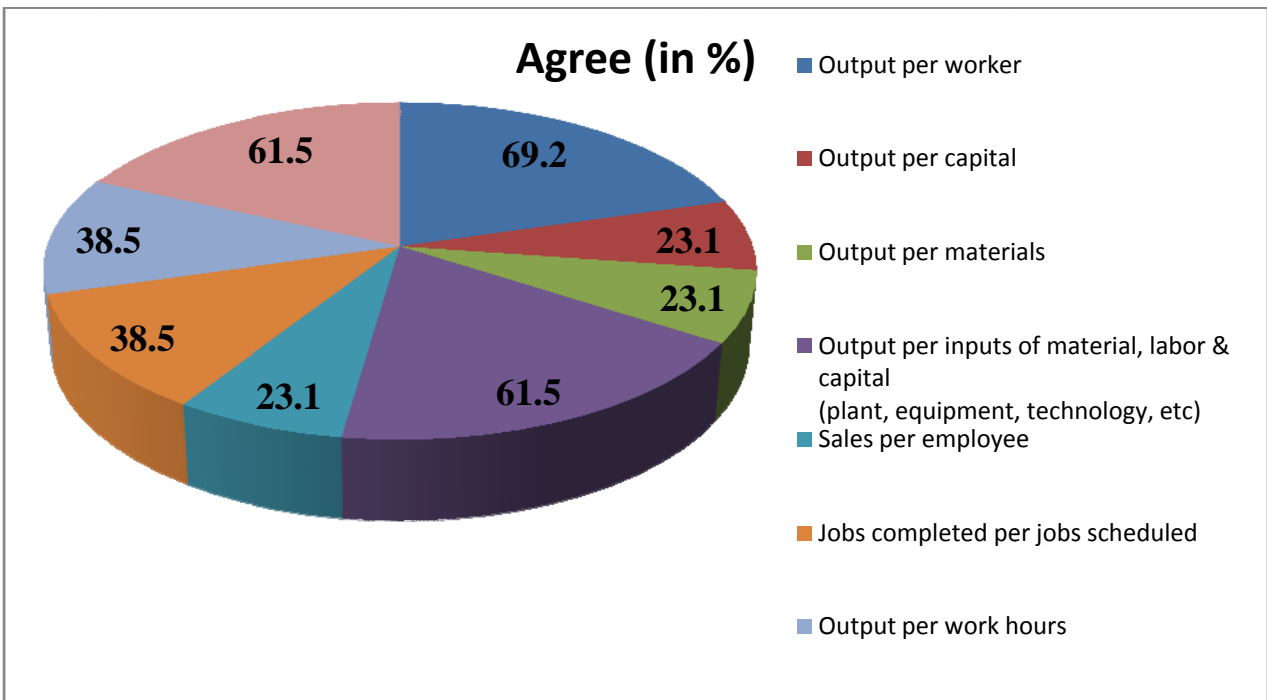


Figure 4-3 Agreement result of possible working definition of productivity in the garment factories

From table 4.1 and figures (4.1, 4.2 & 4.3), most of the respondents (above 60 %) agree in three possible definitions; output per worker, output per input of material, labor & capital (plant, equipment, technology, etc) and output per labor cost. Scientifically, the better definition of productivity is expressed mathematically as output per inputs of material, labor, energy & capital (plant, equipment, technology, etc). But from the table 4.1, 23.1 % of the respondents disagree and 15.4 % undecided with this definition. This shows that there was a problem on the scientific definition of productivity in 38.5 % of the respondent garment factories.

The second question assesses about the most accurate measurement of labour productivity. From the total respondent, 5 (38.5 %) of them responds number of units of output per hour worked, 3 (23.1 %) of them responds number of units of output divided by total number of employees, 1 (7.7 %) of them responds number of units sold divided by number of employee, 1 (7.7 %) of them responds both number of units of output divided by total number of employees and number of units sold divided by number of employee and 2 (14.4%) of them responds both number of units of output per hour worked and number of units of output divided by total number of employees.

The scientific and better measurement of employee productivity is output per hour worked. But from the above result 5 (38.5 %) of the respondent did not use this scientific employee productivity measurement system. Therefore, there should be a way of introducing the scientific employee productivity measurement system for the garment factories.

The third question asks about the importance of productivity improvement for the company. From the total respondent the result is shown in the following table.

Table 4-2 Result of possible importance of productivity improvement for the garment factories

Possible importance of productivity improvement for the company	Disagree (in %)	Undecided (in %)	Agree (in %)
❖ Higher productivity allows greater returns to the company owners	15.4	0	84.6
❖ Higher productivity allows the company to sustain higher wages to its employees	15.4	15.4	69.2
❖ It determines sustained improvements in the country's standard of living	15.4	15.4	69.2
❖ It supports spending on social programs, education, and the environment	15.4	7.7	76.9

From table 4.2, most of the respondents (above 70 %) agree with the listed possible importance of productivity improvements. Therefore, to have this importance, the companies should develop formal way of productivity improvement system.

The third part of the questions was about factors affecting the employee productivity of the company.

The first question was about the availability of a well organized & equipped department to find out and introduce improved labor productivity. From the total respondents, 7 (53.8 %) of them responds 'yes', 5 (38.5%) of them responds 'no' and one (7.7 %) respondent did not answer this question. From the result there were companies that did not have a specified department on productivity improvement. But now a days, most organizations and many countries in the world had productivity improvement center to

compete in the world market and to improve the standard of living of the employees. Therefore, these companies should have a specified department that concerned productivity improvement including employee productivity.

The second question was about the trend of the employee productivity of the company over the last five years. From the total respondents, 6 (46.2 %) of them responds decreasing and 7 (53.8 %) of them responded increasing. Almost in one half of the respondents of garment factories the employee productivity trend was decreasing. Therefore, there should be employee productivity improvement program to garment factories and the basic objective of the thesis was to develop employee productivity improvement model in garment factories of Ethiopia.

The third question was about rate of the effect of the employee based techniques on the labor productivity of the company. The result is tabulated as follows.

Table 4-3 Result of employee productivity improvement techniques of respondent garment factories

employee productivity improvement techniques	Low effect (%)	Medium effect (%)	High effect (%)	Most critical (%)
Financial Incentives (Individual)	7.7	23.1	38.5	30.8
Financial Incentives (Group)	7.7	23.1	61.5	7.7
Fringe Benefits (Medical insurance, Marriage subsidy, Free higher education, etc)	30.8	15.4	38.5	15.4
Employee Promotion (motivation, recognizing employee's skills, knowledge, proficiency,	7.7	7.7	61.5	23.1
Job Enrichment (assigned Variety tasks)	23.1	30.8	30.8	15.4
Learning curve (gain proficiency with repetition of the same task)	15.4	38.5	38.5	7.7
Communication(timely flow of information with a feedback mechanism)	7.7	23.1	61.5	7.7
Working condition improvement(Temperature, light, and humidity, Noise, etc)	7.7	30.8	38.5	23.1
Training (increasing the ability levels of employees. On job training, Internship training, etc)	0	0	76.9	23.1
Education (Education refers to the level of high school, college, vocational training, etc)	7.7	0	76.9	15.4
Role perception (refers to the manner in which an individual defines his or her job)	15.4	30.8	38.5	7.7
Quality of supervision	0	0	76.9	23.1
Recognition (acknowledgement of an employee's outstanding performance)	0	23.1	61.5	15.4
Job Enlargement (enlarging the responsibility of employees)	15.4	23.1	53.8	7.7
Job rotation(rotation of workers into different jobs for short periods of time)	15.4	23.1	46.2	7.7

Worker participation(employee involvement in planning and implementing the change)	0	30.8	61.5	7.7
Skill enhancement(technique to increase the skills of employee needed to perform a job)	0	7.7	84.6	7.7
Management by objective (motivation of all participants by having superior and subordinate managers jointly identify common goals, carefully define it, and together monitor progress toward achieving results)	0	15.4	76.9	7.7
Punishment (it can be effectively used to eliminate or suppress certain types of behavior)	30.8	30.8	30.8	7.7
Quality circle (QC) (groups of employees who voluntarily cooperate to solve problems)	0	23.1	53.8	23.1
Productivity quality teams (groups of people that solve problems related to the productivity)	0	23.1	61.5	15.4
Zero defects (do things right the first time, error free performance)	15.4	7.7	46.2	30.8
Time management (minimization of the wasteful elements of employee's work)	0	15.4	30.8	53.8
Flexitime (freedom and responsibility for employee in determining their hours of work)	23.1	23.1	38.5	15.4
Compressed workweek	30.8	23.1	38.5	7.7
Harmonization (the integration of the interests of the stockholders (owners), board of directors, management at all levels, and all employees in a consistent manner both within and outside the physical boundaries of an organization)	0	15.4	53.8	30.8

The result of table 4.3 was from the management side of the companies. In the case company, from the employees side also assessed. The response was approximately similar except on some techniques. As the developed model was employee productivity improvement, it was logical to give attention on the employees' response more than the management response. Therefore, the developed model for employee productivity improvement system was based on employees' response.

The fourth question was about techniques that the companies have used for the last five years and how much costs and saves each technique; how long it takes to install the techniques and the payback periods. But all companies did not install any types of techniques as formal way of productivity improvement techniques. Therefore, employee productivity improvement model was developed in garment factories of Ethiopia to be competent in the world market.

The last part of the question was about compensation and benefits. The result is tabulated as follows.

Table 4-4 Result of Compensation and Benefits of respondent garment factories

Compensation and Benefits	yes	no
Insurance	38.5	61.5
Medical	61.5	38.5
Pension or retirement	30.8	69.2
Accident	92.3	7.7
Vacation	46.2	53.8
Maternity & sick leave	100	0
Bonus	61.5	38.5
Transportation	76.9	23.1

Normally the above points were included in fringe benefits. From the result there were some companies that have some type of fringe benefits but others did not have. To improve employee productivity, fringe benefits were essential.

4.3.2 Data analysis and sentences of questionnaire type two

The second type of questionnaire was prepared to collect data and information from the employee of the case company. Hundred (100) questionnaires were distributed to the employee of Akaki garment Share Company and 68 (68%) were collected.

The first question was to assess how employees define “labor productivity”. From 68 respondents, 40 (58.8 %) of them had defined properly. The rest 28 (41.2 %) of them didn’t define it properly. This showed that there should be a means of creating awareness for employees about definition and concept of employee productivity. If all the employees didn’t know the basic definition and concept of employee productivity, it would be difficult to implement the developed model.

The second question was what the employees’ assumption when the productivity of the company would be improved. The result is tabulated as follows.

Table 4-5 Result of advantage of productivity improvement at Akaki garment factories

	Possible advantages of factory productivity improvement	Disagree In %	Partially agree In %	Definitely Agree In %	no response In %
1.	Higher productivity allows greater returns to the company owners	2.9	14.7	75	7.4
2.	Higher productivity allows the company to sustain higher wages to its employees	17.6	11.8	68.2	4.4
3.	It determines sustained improvements in the country's standard of living	17.6	22.1	48.5	11.8
4.	It supports spending on social programs, education, and the environment	10.3	19.1	60.3	10.3

The result of above table shows that, most of the employees did not have a clear understanding of productivity of the company. If the company productivity were improved, the above mentioned alternatives could be fulfilled. But more than 30% of the respondents disagree and partially agree.

The third question was to assess the assumptions of employees' productivity in the company. From 68 respondents, most of them responded both yes and no answer and mentioned their reasons. For yes factor, one employee (1.5%) responded presence good working condition, three employees (4.4%) responded their productivity satisfy them, thirteen employees (19.1%) responded productivity was their responsibility, forty six (67.6%) responded their productivity satisfy them and productivity was their responsibility and five (7.4%) responded as they were not productive in the company.

For no factors, 6 (8.8%) responded the company did not pay enough salary, 1 (1.5%) responded the working condition was not comfortable, 3 (4.4%) responded the company did not have incentives, 26 (38.24%) responded the company did not have incentive, the working condition was not comfortable, the company did not pay enough salary and working in this company did not satisfy. From the result we can conclude that some employees believe that as they are low productive.

The fifth question was to assess the employee based productivity improvement factors to be fulfilled from the company to improve employees' productivity. The result is presented as tubular form as follows

Table 4-6 Result of employee based productivity improvement factors at Akaki garment factories

	Techniques (Factors) affecting labor productivity	% of respondents				
		not essential	In some instance	Essential	Very Essential	missed
1	Financial Incentives (Individual)	19.1	5.9	16.5	50	8.8
2	Financial Incentives (Group)	4.4	8.8	23.5	51.5	11.8
3	Fringe Benefits (Medical insurance, Marriage subsidy, Free higher education, etc)	8.8	17.6	17.6	41.2	14.7
4	Employee Promotion (motivation, recognizing employee's skills, knowledge, proficiency, etc)	0	2.9	19.1	69.1	8.8
5	Job Enrichment (assigned Variety tasks)	0	10.3	33.8	42.6	13.2
6	Learning curve (gain proficiency with repetition of the same task)	55.9	11.8	10.3	8.8	13.2
7	Communication(timely flow of information with a feedback mechanism)	2.9	7.4	23.5	54.4	11.8
8	Working condition improvement(Temperature, light, and humidity, Noise, etc)	5.9	4.4	27.9	41.2	10.6
9	Training (increasing the ability levels of employees. On job training, Internship training, etc)	0	4.4	20.6	67.6	7.4
10	Education (Education refers to the level of high school, college, vocational training, etc)	2.9	0	20.6	69.1	7.4
11	Role perception (refers to the manner in which an individual defines his or her job)	0	0	27.9	67.6	4.4
12	Quality of supervision	1.5	4.4	35.3	44.1	14.7
13	Recognition (acknowledgement of an employee's outstanding performance)	1.5	5.9	25	61.8	5.9
14	Job Enlargement(enlarging the responsibility of employees)		4.4	22.1	64.7	8.8
15	Job rotation(rotation of workers into different jobs for short periods of time)	1.5	8.8	44.1	33.8	11.8
16	Worker participation(employee involvement in planning and implementing the change)	4.4	10.3	30.9	32.4	22.1
17	Skill enhancement(technique to increase the skills of employee needed to perform a job)	0	1.5	36.8	50	11.8
18	Management by objective (motivation of all participants by having superior and subordinate managers jointly identify common goals, carefully define it, and together monitor progress toward achieving results)	4.4	1.5	19.1	69.1	5.9
19	Punishment (it can be effectively used to eliminate or suppress certain types of behavior)	2.9	27.9	44.1	13.2	11.8

20	Quality circle (QC) (groups of employees who voluntarily cooperate to solve problems)	2.9	4.4	41.2	38.2	13.2
21	Productivity quality teams (groups of people that solve problems related to the productivity)	2.9	4.4	42.6	38.2	11.8
22	Zero defects (do things right the first time, error free performance)	5.9	8.8	44.1	35.3	5.9
23	Time management (minimization of the wasteful elements of employee's work)	0	0	23.5	69.1	7.4
24	Flexitime (freedom and responsibility for employee in determining their hours of work)	26.5	1.5	26.5	32.4	13.2
25	Compressed workweek	20.6	10.3	22.1	25	22.1
26	Harmonization (the integration of the interests of the stockholders (owners), board of directors, management at all levels, and all employees in a consistent manner both within and outside the physical boundaries of an organization)	33.8	10.3	14.7	16.2	25

From table 4.6, the employees need most of the improvement factors and there was no any implementation of the improvement techniques. The employees did not have information about the advantage or disadvantage of the techniques. Informally, some techniques were applied. Some of them were job rotation, employee promotion and time management. From table 4.6, techniques which are very essential for the employees are prioritized in the following table.

Table 4-7 Rank of employee based productivity improvement factors at Akaki garment factories

Techniques (Factors) affecting labor productivity	% of very essential	rank
Employee Promotion (motivation, recognizing employee's skills, knowledge, proficiency, etc)	69.1	1
Education (Education refers to the level of high school, college, vocational training, etc)	69.1	1
Management by objective (motivation of all participants by having superior and subordinate managers jointly identify common goals, carefully define it, and together monitor progress toward achieving results)	69.1	1
Time management (minimization of the wasteful elements of employee's work)	69.1	1
Training (increasing the ability levels of employees. On job training, Internship training, etc)	67.6	2
Role perception (refers to the manner in which an individual defines his or her job)	67.6	2
Job Enlargement(enlarging the responsibility of employees)	64.7	3
Recognition (acknowledgement of an employee's outstanding performance)	61.8	4
Communication(timely flow of information with a feedback mechanism)	54.4	5

Financial Incentives (Group)	51.5	6
Financial Incentives (Individual)	50	7
Skill enhancement(technique to increase the skills of employee needed to perform a job)	50	7
Quality of supervision	44.1	8
Job Enrichment (assigned Variety tasks)	42.6	9
Working condition improvement(Temperature, light, and humidity, Noise, etc)	41.2	10
Fringe Benefits (Medical insurance, Marriage subsidy, Free higher education, etc)	41.2	10
Quality circle (QC) (groups of employees who voluntarily cooperate to solve problems)	38.2	11
Productivity quality teams (groups of people that solve problems related to the productivity)	38.2	11
Zero defects (do things right the first time, error free performance)	35.3	12
Job rotation(rotation of workers into different jobs for short periods of time)	33.8	13
Worker participation(employee involvement in planning and implementing the change)	32.4	14
Flexitime (freedom and responsibility for employee in determining their hours of work)	32.4	14
Compressed workweek	25	15
Harmonization (the integration of the interests of the stockholders (owners), board of directors, management at all levels, and all employees in a consistent manner both within and outside the physical boundaries of an organization)	16.2	16
Punishment (it can be effectively used to eliminate or suppress certain types of behavior)	13.2	17
Learning curve (gain proficiency with repetition of the same task)	8.8	18

From table 4.7, 16 factors were most essential by more than 40 % of the respondents. Even if all factors were important for the improvement of labor productivity, these factors were selected to develop employee productivity improvement model.

Chapter five

5. Employee productivity improvement model development for Akaki garment Share Company

5.1 Introduction

Productivity improvement, in the modern sense, has been a topic of increasing interest to researchers in the post-industrialization period. For example, the well-known Hawthorn experiments (1929 - 1932) led Mayo to the conclusion that, working environment, working time, and other conditions alone do not serve to change the efficiency of operations performed by human beings. He discovered that the values of individual workers and of groups to which they belong as well as their relationships with superiors and colleagues have a very strong influence on their morale, which in turn influences their work efficiency. (1)

According to Hutton (1953): one of the most important facts - yet the most obscure in its nature - is the psychological factor: the climate of opinion, the social environment and the morale of the people. Clearly this is a bigger factor than anything purely economic or technological - though it acts on the economic and technological and is acted upon by them. (1)

Brinkerhoff and Dressier (1990), as well as many other researchers and practitioners, have noted that measuring productivity itself leads to productivity improvement. A study of over 400 plants in the United States revealed that work measurement programs alone increased productivity by an average of 14.6 percent. When wage incentives were added to work measurement, productivity rose another 42.9 percent. The average increase from baseline due to work measurements and incentives was 63.8 percent.

There has been a great deal of research on the direct relationship between pay and productivity. A study by Davison et al. (1958) examined the results of wage incentive plans on 15 operations in five different factories. Davison and his colleagues selected cases where all conditions were held constant except that a wage incentive plan was introduced; this plan paid higher wages for higher productivity. In all 15 cases, productivity improved from 7.5 to 291 percent, with half the cases falling between 43 and 76 percent improvement. These productivity increases were not temporary but were sustained over a long period of time. (1)

5.2 Most critical employee productivity improvement factors of Akaki garment Share Company

As discussed in the data collection, questionnaire was prepared to collect data from the employee of the case company on employee productivity factors. 100 questionnaires were distributed to the employee of Akaki garment Share Company. From those, 68 (68%) questionnaires were collected.

The result is presented by column charts as follows.

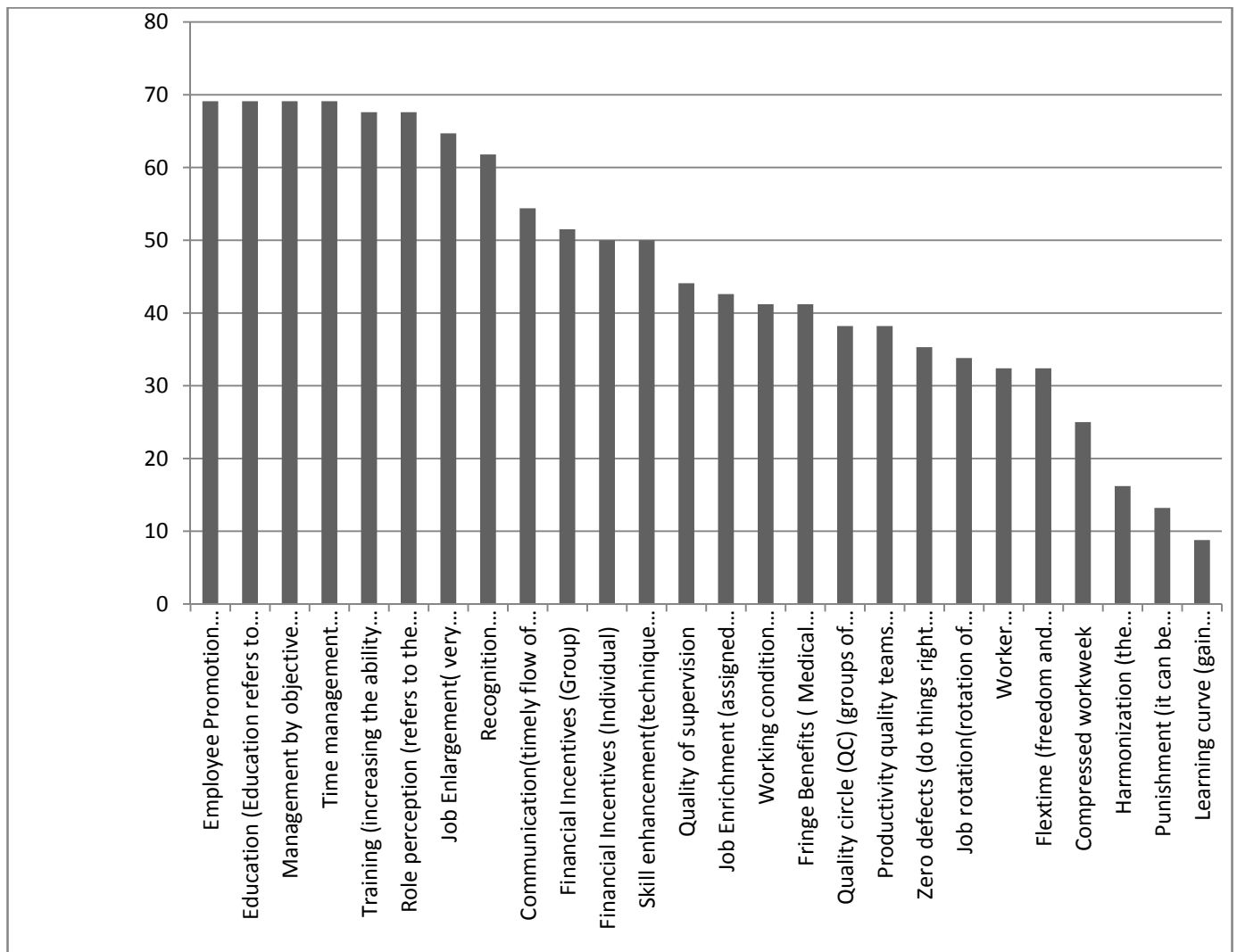


Figure 5-1 Percentage of 26 employee based productivity improvement techniques

From 26 employee based productivity improvement techniques, 12 of them were most essential by 50 % of the respondent. But to include some essential techniques, additional four techniques were selected. From the above chart 16 techniques are very essential by 40 % of the respondent. It is known that all 26 techniques were very important to improve labor productivity. But for the first phase of implementing

labor productivity improvement model, it is logical to prioritize the most critical techniques. After implementing the developed model, evaluating and revising is possible to include the other techniques.

The sixteen techniques with order of priority are

1. Employee Promotion (motivation, recognizing employee's skills, knowledge, proficiency, etc),
2. Education (Education refers to the level of high school, college, vocational training, etc),
3. Management by objective (motivation of all participants by having superior and subordinate managers jointly identify common goals, carefully define it, and together monitor progress toward achieving results),
4. Time management (minimization of the wasteful elements of employee's work),
5. Training (increasing the ability levels of employees, on job training, Internship training, etc),
6. Role perception (refers to the manner in which an individual defines his or her job),
7. Job Enlargement (very specialized and specific for jobs),
8. Recognition (acknowledgement of an employee's outstanding performance),
9. Communication (timely flow of information with a feedback mechanism,
10. Financial Incentives (Group),
11. Financial Incentives (Individual),
12. Skill enhancement (technique to increase the skills of employee needed to perform a job),
13. Quality of supervision,
14. Job Enrichment (assigned Variety tasks),
15. Working condition improvement (Temperature, light, and humidity, Noise, etc), and
16. Fringe Benefits (Medical insurance, Marriage subsidy, Free higher education, etc)

The above selected techniques can be categorized into four groups depending on their similarity of applications for employee productivity improvement.

- ❖ **Economical factors**
- ❖ **Technical factors**
- ❖ **Psychological factors and**
- ❖ **Information flow factors**

Under economical factors the following techniques can be included

- group financial incentives
- individual financial incentives
- fringe benefits

Under Technical factors the following techniques can be included

- education
- training
- skill enhancement
- job enlargement
- job enrichment

Under Psychological factors the following techniques can be included

- recognition
- role perception
- employee promotion
- working condition improvement

Under Information flow factors the following techniques can be included

- communication
- quality of supervision
- management by objective
- time management

The above factors can be represented by cause and effect or fish bone diagram. Because cause and effect diagram has the following benefits (5)

- ☞ The diagram graphically illustrates the relationship between a given outcome and all the factors that influence the outcome.
- ☞ Identify the possible root causes, the basic reasons, for a specific effect, problem, or condition.
- ☞ Sort out and relate some of the interactions among the factors affecting a particular process or effect.
- ☞ Analyze existing problems so that corrective action can be taken.

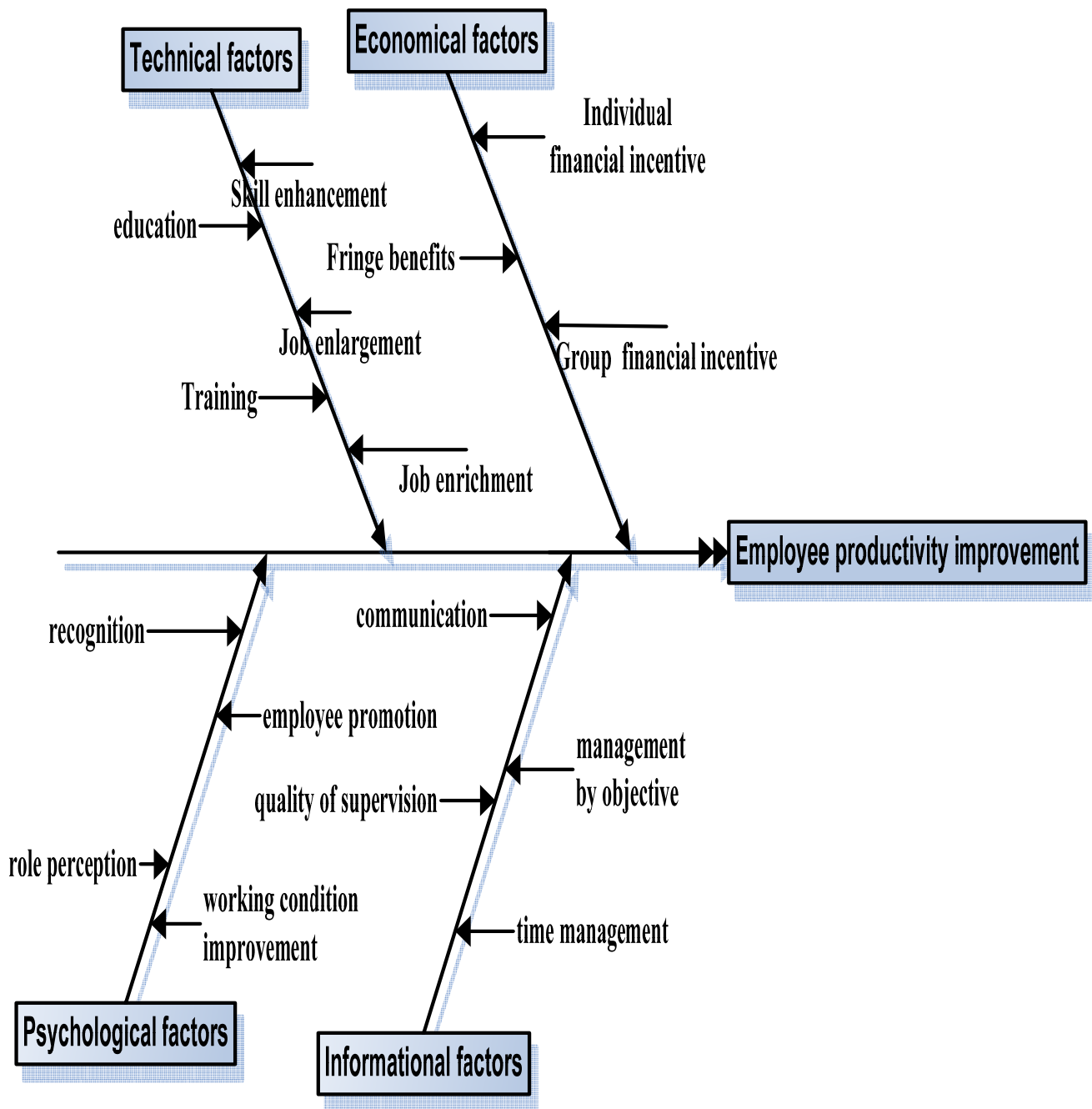


Figure 5-2 Fish bone diagram representation of selected employee based productivity improvement techniques

Depending on these four category employee based labor productivity improvement factors, the following model is developed.

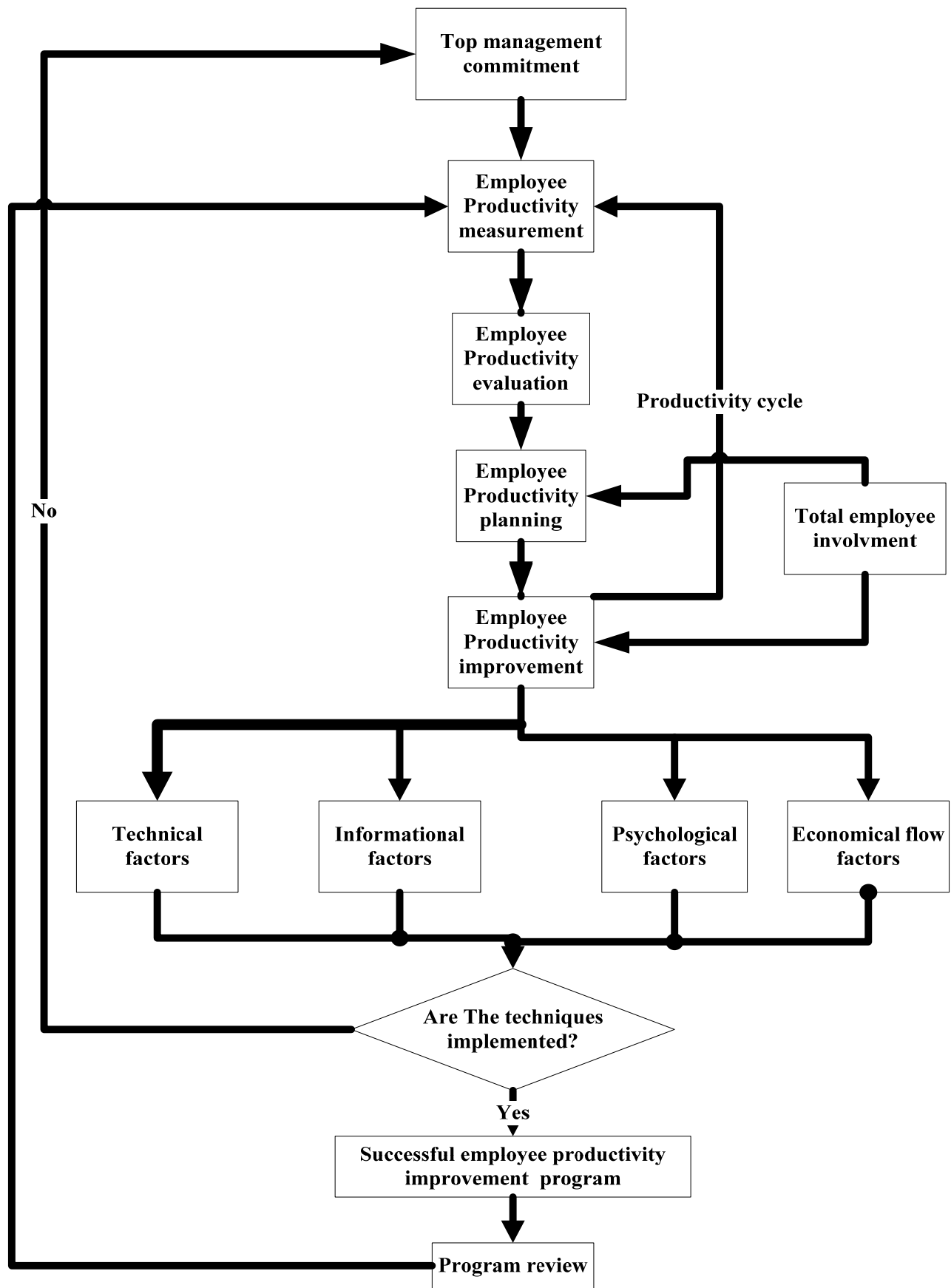


Figure 5-3 Conceptual employee productivity improvement model (adapted from Sumanth, and journal of applied quality management vol.2/number 2/1999)

Procedures to implement the model

To implement the developed model, management commitment is very important. The model needs budget, time, knowledge, space, and others.

To put implementation procedure of the model, different things was considered like the capacity and experience of the company and the government concern on the sector. By considering the above points, the implementation procedure has proposed as follows.

The model should start from productivity measurement. Productivity measurement is the quantification of both the output and input resources. Next to productivity measurement, employee productivity should be evaluated with different time of reference. After evaluation, employee productivity should be planed. Productivity planning is concerned with the setting up of target levels of employee productivities. So that these levels can be used as bench marks for comparison in the evaluation stage of productivity cycle, as well as for mapping the strategies of improving employee productivity in the improvement phase of the productivity cycle. Finally employee productivity improvement program should be implemented. For the employee productivity planning and improvement phase, total employee involvement is very essential. At the improvement phase, the implementation is totally applied on the employees. In the employee productivity improvement phase, different employee productivity factors were selected from the literature and prioritized using the collected data. The implementation procedure of the selected employee productivity improvement techniques is discussed in detail as follows.

To implement the overall employee productivity improvement model, the first model to be implemented should be technical factors. Technically incapable employees cannot improve the productivity. This is because technical factors directly influence on the job. Therefore technical factors are the base of labor productivity improvement and should be implemented first. After implementing technical factors, to gain more employee productivity, informational factors should be implemented. Technically capable and informed labor can improve the productivity more when psychological factors improved. After the other factors were implemented, economical factors are very essential to motivate the employees and to be productive.

When the implementation of the techniques encountered a problem, which may be lack of management commitment or technical capability needs to be revised. When the developed model is implemented correctly, the company gains good employee productivity improvement program and great profit from the model. But this employee productivity improvement program is not the best of all. There is always a

room for improvement in any program. Starting from the measurement phase, it is possible to improve the program for the future.

Generally the above procedure can be rearranged depending on the organization culture and the employees' attitude. But, for Akaki garment Share Company, the appropriate procedure was proposed as the above.

5.3 Employee Productivity improvement implementation frame work

5.3.1 Technical factors implementation frame work

As discussed in the previous section technical factor includes education, training, skill enhancement, job enlargement and job enrichment. These factors are shown diagrammatically as follows.

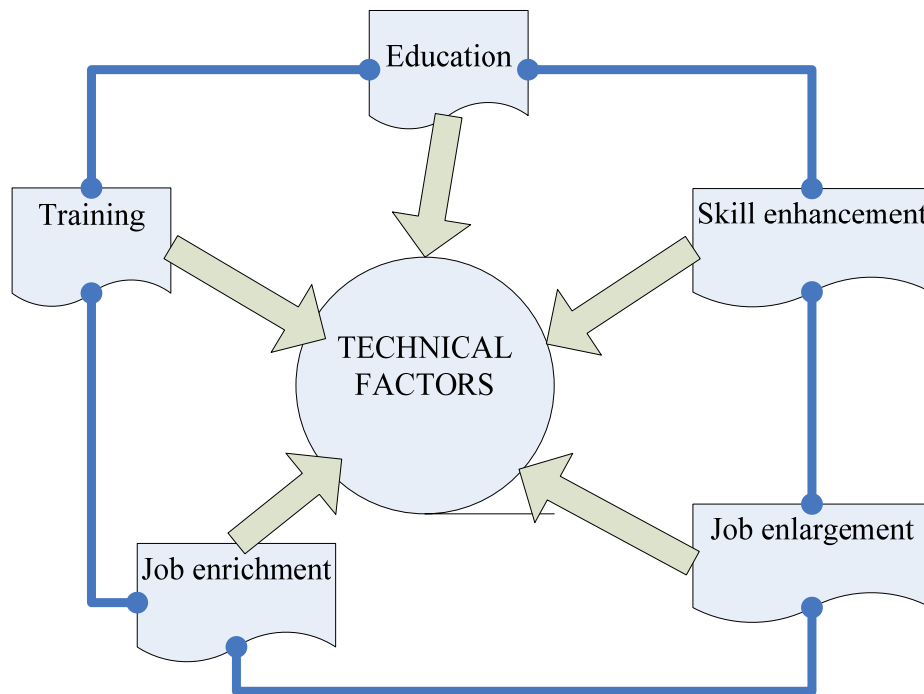


Figure 5-4 Implementation frame work of technical factors for employee productivity improvement

Education

Education refers to the level of high school, college, or vocational training acquired by an employee. It is believed that a worker who has acquired a good and sufficient education, and is able to apply it, is more capable of effecting a positive change in productivity. The educational level of 68 respondents of Akaki garment Share Company is tabulated as follows

Table 5-1 Education level of 68 respondent of Akaki garment Share Company

Grade level	Number of respondents	% of respondents
Grade 5 and below	6	8.82
Grade 6	13	19.11
Grade 7	0	0
Grade 8	18	26.47
Grade 9	5	7.35
Grade 10 complete	12	17.65
Grade 12 complete	3	4.41
degree	3	4.41
diploma	2	2.94
certificate	1	1.47
Non respondent	5	7.35

From the above table, more than 60 % of the respondents did not complete grade 10 and more than 80 % of the respondents did not have any certificate. Therefore, education was very essential for the employees of Akaki garment Share Company.

The company works in one shift, only day time starting from 2:00 to 10:30 0'clock. All of the employees are living in Addis Ababa around the company area, Akaki sub city. There are sufficient schools in Addis Ababa. Monthly fee for one night student is not more than 40.00birr. If 100 employees did not complete grade 10, the company could sponsor to get at least grade 10 completed employees since the monthly fee would not be more than 4000.00birr. This result an educated and psychologically built employees.

To avoid employee turnover after completing their education, the company can get guarantee by signing the employees to work in the company for a certain period of time.

Training

Training seeks to achieve improved human productivity by increasing the ability levels of the workforce. In Akaki garment Share Company, most workers stayed for many years and they know the basic technical skill. From the existing common forms of trainings, on job training was preferable than others for most operators. The work experience of the respondents is shown in the following table.

Table 5-2 The work experience of the respondent's employees at Akaki garment Share Company

Work experience	Number of respondents	% of respondents
Below 5 year	15	22.06
Between 5 and 10 year	1	1.47
Between 10 and 15 year	0	0
Between 15 and 20 year	7	10.29
Between 20 and 25 year	14	20.59
Between 25 and 30 year	21	30.88
More than 30 years	4	5.88
Non respondent	6	8.82

From the above table, 70 % of the respondents have more than 5 years experience. For newly hired workers the other types of training scheme might be essential by assessing the gap of skill.

Skill enhancement

Skill enhancement is a formalized technique to increase the skills needed to perform a job. Skill training or coaching may be needed for an employee when the employee's attitude toward the job is positive but his or her abilities are low. Skill enhancement program needs a critical diagnosis of skill of individual workers. In Akaki garment Share Company, there was more defective work and rework.

To implement skill enhancement program in Akaki garment Share Company, the supervisor should have sufficient technical skills and should identify the gap of skills and the attitude of employees on the job. For the employees, who have good attitude for the job but needs extra skill, the company should train to enhance the skill.

Job enlargement

Job enlargement involves the enlargement of responsibilities associated with a job. The proponents of job enlargement argue that; jobs when made very specialized and specific, become routine that they get to be boring and monotonous, causing high absenteeism, high turnover, and low morale, with consequent low productivity.

In Akaki garment Share Company, most of the employees perform routine activities like cutting, sewing and finishing for a long period of time. So to increase labor productivity, the company should increase the

responsibility of employees by assigning at different positions. For example to improve employee productivity, it was possible to train cutting operators to perform on sewing machines and vice versa.

Job enrichment

Job enrichment is a nonfinancial motivation technique that provides variety in assigned tasks and completing a whole or identifiable portion of work that can be associated with an end product or service.

In Akaki garment Share Company, employees perform specific and routine jobs. Line supervisors worried only for the completion of sewing operations. Cutting supervisor worried only for the cutting of fabrics. But by trained line and cutting supervisors, quality and finishing supervision could be performed. This assists the employees to have an additional task and experience.

5.3.2 Informational factors implementation frame work

Informational factors are the other employee productivity improvement factors that should be implemented at Akaki garment Share Company. The frame work of implementation is presented as the following figure

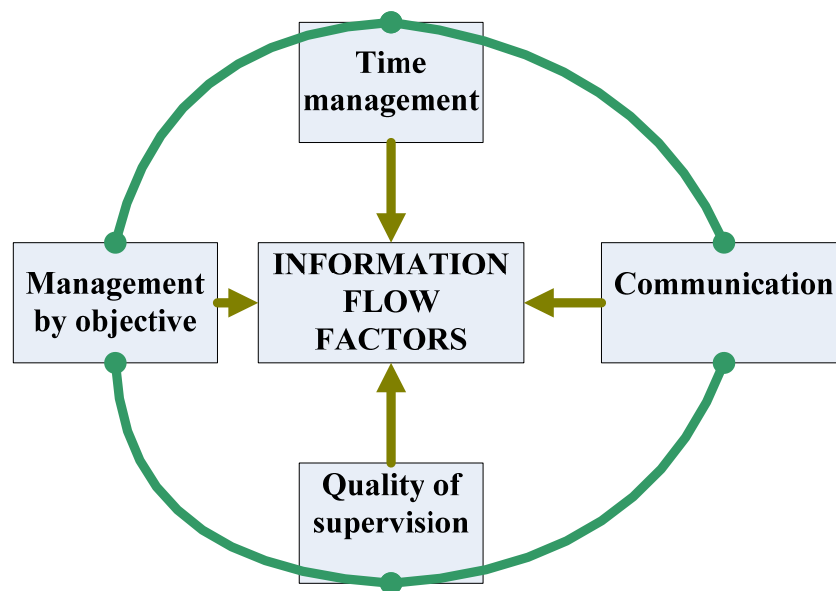


Figure 5-5 Implementation frame work of information flow factors for employee productivity improvement

Communication

Communication refers to the adequate and timely flow of information with feedback mechanism. The purpose of effective communication is to achieve mutual understanding between the employees and

management, and to help establish the social conditions that will motivate the employee to improve productivity.

When the employees and management of an organization communicate consistently, openly, and with mutual trust, a certain amount of loyalty develops, and this loyalty is not something that can be purchased simply by paying higher salaries or wages.

Akaki garment Share Company did not have a clear communication scheme between the employee and management. As supervisors explained, the basic problem for employees was lack of communication between the employees and the management. The employees raised different questions like salary problems, incentive problems, on assignment of their levels and others. But they did not have a chance to communicate freely with the management. The communication problem affects on the employees productivity negatively. Most of the respondents were not happy with their job and stays in the company until they get other job opportunities.

Therefore, to improve employee productivity, the company should arrange a clear and responsive communication scheme like suggestion box.

The company should place the suggestion boxes at a clear area for each department to address for all employees and should assign responsible body to collect the questions and suggestions. The questions could be answered with scheduled meeting.

Finally, the important suggestions and ideas should be implemented and the unnecessary suggestions and ideas should be responded for the employees properly.

This way of communication has different advantages; its saves time on collecting the ideas and suggestions, can give employees any type of idea with freedom and at any time as they have ideas in their mind.

The company should also communicate with the employees about goals, programs, and plans of the company to contribute their ideas on it. This result the employees consider the goal, program and plan of the company as their own goal and they would try the successful completion of it.

Quality of supervision

Supervision is concerned with the work of creating and maintaining environments in which people can accomplish goals efficiently and effectively. If the job is performed efficiently and effectively, the rework

will be minimized, quality of product will be improved and resource utilization including labor will be improved and generally productivity of employees will be improved.

At Akaki garment Share Company, there was defective products and reworks on work. That was due to lack of efficient supervision. When the quality of supervision improved, the defective works would be minimized and rework would be eliminated. The defective works might not be only due to the problem of quality of supervision. It might be lack of proper training.

The company should work on quality of supervision. The supervisors should get the essential trainings to increase their skill and quality of supervision.

Management by objective

Management by objectives (MBO) is a managerial motivation technique that has received worldwide attention. The MBO process aids motivation of all participants by having superior and subordinate managers jointly identify common goals, carefully define them, and together monitor progress toward achieving results

The goals set by the MBO strategy are of four basic types: routine goals, problem solving goals, innovative goals, and personal development goals.

For Akaki garment Share Company all of the goals are essential at different conditions as required. Routine goals is essential for daily routine activities like cutting operation, sewing operation, etc; problem solving goals is essential for different problems like skill problems, training problems, education problems, incentive problems, working condition problems, etc; innovative goals is essential for different activities like designing operation; and personal development goal is very essential to improve employee productivities. Therefore management by objective should be implemented in this company according to the MBO strategy types.

Time management

Time management involves the minimization of the wasteful elements of a person's administrative work. From many elements of time management problems, the following were observed around the cutting and sewing machine operators during shop floor survey.

- ☞ Lack of determination to complete tasks assigned
- ☞ Lack of organization on and around the desk
- ☞ Making unnecessary trips to people, departments, toilet, etc.

☞ Excessive conversation time

To minimize the above unnecessary wastage of time, the company should arrange accurate time management system. Excessive conversation time and unnecessary trips can be minimized by arranging incentive system. This incentive might be individual who performed above the target or group incentive depending on the line performance.

For the other elements, the company should discuss with the employees about solution and design an accurate time management system.

5.3.3 Psychological factors implementation frame work

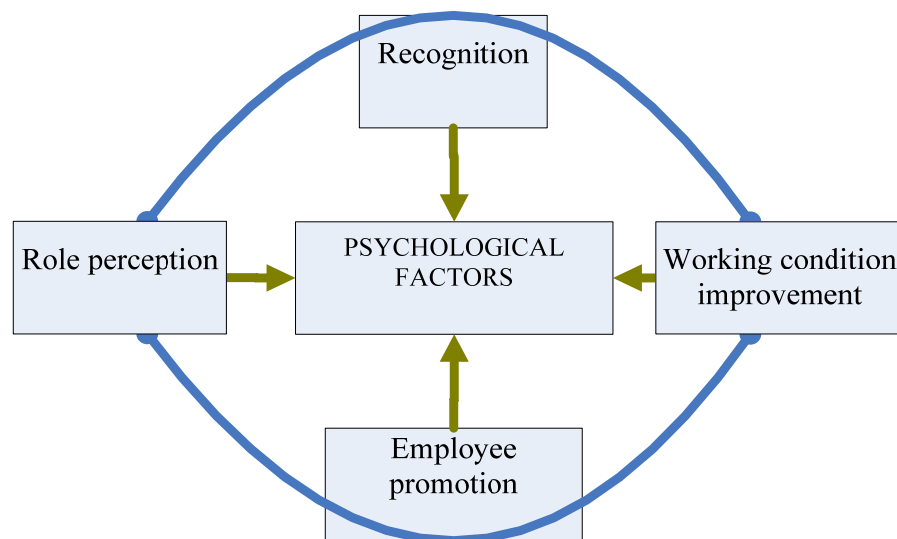


Figure 5-6 Implementation frame work of psychological factors for employee productivity improvement

Recognition

Recognition is a process whereby management shows acknowledgement of an employee's outstanding performance (in terms of improved productivity, ideas, or any act of good workmanship). It can take several forms: pay raise, bonus, award, certificate of appreciation, special highlights in the company newsletter, special parking provisions, engraving on a plaque in the cafeteria. In fact recognition can take any form of fringe benefit Positive reinforcement is an effective form of recognition, since it promotes and perpetuates improved individual and group performance.

Akaki garment Share Company did not have recognition scheme and could start by special highlights on notice board and giving appreciation certificate. But for the long run, the company could increase salary and gives bonus.

Role perception

Role perception refers to the manner in which an individual defines his or her job. The type of effort the employee believes is essential for effective job performance. This statement reinforces the importance of the congruence of corporate and employee goals. Unfortunately, organizational and employee goals do not coincide, causing friction between management and employees.

In Akaki garment Share Company, most of the time employees did not understand organizational goals. This was because absence of discussion between the employee and the management about the goal of the organization. To make the goal understandable for the employees, the management should install a discussion scheme about plan and goal of the organization and show the role of the employees.

Employee promotion

Employee promotion is both a financial and nonfinancial form of motivation to enhance human productivity. It involves the upgrading of an employee's status, and is a natural way of recognizing an employee's skills, knowledge, proficiency, and effort at his/ her present job.

In Akaki garment Share Company most of the employees have above five years work experience. To improve employees' productivity, the company should have employee promotion schemes based on efficiency and performance level. The company could promote employees from cutting machine operator to cutting supervisors and from sewing machine operator to sewing line supervisors.

Working condition improvement

Working condition improvement is another employee based productivity improvement technique that is often emphasized but rarely applied consistently. This technique involves a detailed audit of the working conditions at each of the operations designing improved conditions of working.

The factors that must be audited to assess the present working conditions at each workplace area are

- Temperature, light, and humidity
- Noise
- Colors of the surroundings
- Extent of handling hazardous materials, parts, or products
- Extent of manual handling of heavy items

In Akaki garment Share Company, the work place was very crowded and the semi finished products handling system was not properly arranged. As the occupational safety and health directive prepared by

ministry of labor and social affairs, the minimum work space should not be less than 400 cubic feet per person. But the work space of Akaki garment Share Company was less than this standard especially for machine operators. For sewing machine operator the working area was 1.2 meter by 1.00 meter (4ft by 3.28ft) and there was no proper ventilation system in the production room. Therefore the company should arrange the work place depending on standard and proper ventilation system for the production room to improve employee productivity.

5.3.4 Economical factors implementation frame work

Economical factors are the other employee productivity improvement factors that should be implemented at Akaki garment Share Company. The frame work of implementation is presented in the following figure

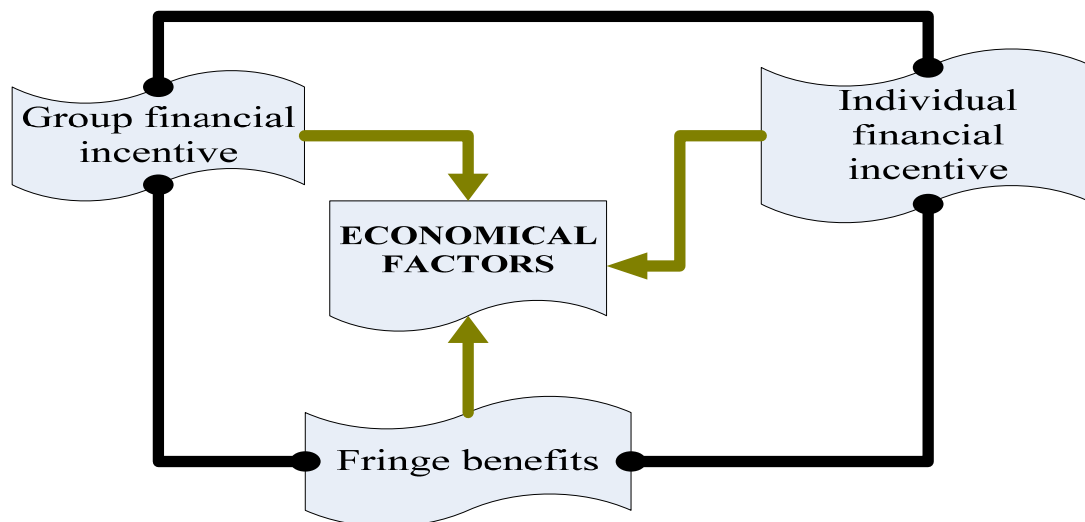


Figure 5-7 Implementation frame work of economical factors for employee productivity improvement

Group financial incentives

One of financial incentive system is the group incentive plan. From different group financial incentive plans the Rucker plan is similar to the Scanlon plan. Scanlon plan is popular and has different advantages except introduction of automation system in the production system. As Akaki garment is labor intensive company, this plan is preferable than others for its advantages.

The Scanlon plan was developed by Joseph Scanlon, a trade union official who worked for a steel mill in the late 1930s. His plan, which encourages employee participation in solving production problems, received a tremendous amount of publicity. This plan has been used by many companies over the years. Trans Matic, Midland Ross, Herman Miller, Atwood Vacuum, and American Valve and Hydrant are a few users of the Scanlon plan. This plan works as follows:

- a) Set up a target ratio (or norm),

$$TR = \text{labor cost or wage bill} / SVOP$$

By estimation using past data

Where

SVOP = sales value of production

= value of receipts for goods sold + value of goods in stock

- b) Each month, compute the sales value of production (SVOP) at the selling price.
- c) Compute allowable labor cost: (TR) (SVOP).
- d) Compile actual labor cost.
- e) Compute savings in labor cost: Allowable labor cost - actual labor cost.
- f) Share the labor cost savings in an agreed proportion. (A common proportion used is 25/75; that is, 25 percent to the company and 75 percent to the workers.)

Out of the share to workers, usually 75 percent is paid to them as a cash bonus.

The remaining 25 percent is set aside in what is called the employee bonus reserve fund.

- g) At the end of a year, if the reserve balance is positive, pay it to the employees; if not, wipe out the deficiency by using the reserve fund.

Individual financial incentives

Several individual financial incentive plans have been used in companies, businesses, and other organizations to increase labor productivity.

From different individual financial incentive plans, standard hour plan is better than the other including piecework plan because the standard hour plan overcomes the problems with the piecework plan by using standard hours per piece instead of dollars per piece.

The earnings in this plan are given by

$$Esh = \sum_i (SHE) * (WRi)$$

Where SHE_i = standard hours earned for item type i

WR_i = wage rate for type i item (dollars per hour)

N_i = number of pieces of type i produced

SPR_i = standard production rate for type i item (pieces per hour)

$$SHE_i = N_i / SPR_i$$

The advantage of SHP

- Standards are never changed (as long as the methods have not changed), even if the base wage rates are changed.
- The earnings are easy to compute; also this plan helps to provide merit differential since for the same standard, there may be different wage rates.

Therefore the company can implement this standard hour plan for individual financial incentive plans.

Fringe benefits

Many organizations find it necessary to provide incentives to management and supervisory people just as in the case of blue collar workers. However, in many cases, apart from the regular bonuses, or profit sharing, companies come up with some intangible means of rewarding and encouraging a management employee.

From different fringe benefits, the company could implement by assessing the interest of employees and by considering the capacity of the company.

Fringe benefits attract and retain better, qualified employees; provide high risk coverage at low costs easing the employer's financial burden; improve efficiency and productivity as employees are assured of security for themselves and their families. And this guarantees peace of mind for the employees leading to boost of staff morale.

Chapter six

6. Conclusion and recommendation

6.1 Conclusions

Economists, engineers, managers, and accountants have taken different approaches in measuring productivity at the firm level. The most common approaches are index approach, production function approach, input output approach, utility approach, servo system approach, array approach, financial ratios approach, capital budgeting approach and unit cost approach. From these approaches ratio approach was selected for this research.

From the result of the survey questionnaire, there were no garment factories that implement the employee productivity measurement and improvement techniques as a formal way. But using their measurement system of employee productivity, the trend was decreasing in most garment industries of Ethiopia for the last five years.

The partial productivities of Akaki garment Share Company has been measured and evaluated from the documents of the last five years annual report. From the result, the employee productivity of the company was very low and the trend of the last five years starting from 1998 to 2002 was decreasing. The cause of low employee productivity was basically due to a great turnover of experienced employees. In addition the company had no employee productivity improvement program to prevent the turnover of employees.

From different literature, twenty six employee based productivity improvement techniques were identified. Of which, sixteen techniques were selected to be implemented in Akaki garment Share Company.

Using the selected techniques, employee productivity improvement model was developed and implementation frame work also proposed. If the developed model could implement properly, turnover of employees would be minimized.

Generally, the thesis defines what employee productivity really mean; shows how it is vital to garment factories; how to measure and analyze it; what factors affect it; and how it can be improved significantly.

6.2 Recommendation

The following points have been recommended for the garment factories of Ethiopia depending on the identified problems and analyzed results of collected data.

- ☞ As the garment factories are labor intensive, it should focus on the improvement of employee productivity to compete with both national and international markets.
- ☞ There is good practice on the employee productivity in different countries and the Ethiopian garment factories should take the best practice and experience.
- ☞ It has been recommended that the factories should implement the developed model in this research by modifying it according to the company working culture.

Specifically for Akaki Share Company the following points have been recommended:

- ☞ The company should consider the employees as the basic and vital resources and should manage properly.
- ☞ The company should allow the employees to participate on the setting of the plan, goals and strategy of the company
- ☞ The company should follow the productivity cycle; productivity measurement, productivity evaluation, productivity planning and productivity improvement to get full and sustainable company development.
- ☞ The company should implement the developed model

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Appendix A: survey questionnaire for Ethiopian garment factories



ADDIS ABABA INSTITUTE OF TECHNOLOGY

DEPARTMENT OF MECHANICAL ENGINEERING

(Industrial Engineering stream)

Title: Productivity improvement through employee based technique for Ethiopian garment industries

By: Seleshi Tilahun

Mobile: +251913066022

Email: tilahunseleshi@gmail.com

Mechanical Engineering (industrial engineering stream)

Productivity measurement and improvement system survey questionnaire for Ethiopian garment industries

Acknowledgement to the respondent

I would like to express my appreciation for your dedicated cooperation. Had it not been your genuine cooperation of filling this questionnaire, it would have not been to conduct this thesis.

May, 2011

2. Which of the following is the most accurate measure of labour productivity (mark X):

- a) number of units of output per hour worked
- b) number of units of output divided by total number of employees
- c) Number of units sold divided by number of employee

Others (if any)

3. How does your company characterize the importance of productivity?

Rating scale:

Disagree	Undecided	Agree
1	2	3

	Higher productivity allows greater returns to the company owners	1	2	3
1.	Higher productivity allows the company to sustain higher wages to its employees	1	2	3
2.	It determines sustained improvements in the country's standard of living	1	2	3
3.	It supports spending on social programs, education, and the environment	1	2	3

Others, (if any).....

III. Factors affecting the employee productivity of the company

1. Does your company have a well organized & equipped department to find out and introduce that can improve labor productivity?

No **Yes**

If the answer is 'yes' write the name of the department.....

.....

2. Over the last five years(1998 – 2002E.C) the trend of the employee productivity of your company with (X mark):

Decreasing constant increasing

3. How do you rate the effect of the following techniques (factors) on the labor productivity of your company [put X mark on the number that applies]?

Rating scale:

Low effect	Medium effect	High effect	Most critical
1	2	3	4

	Techniques (Factors) affecting labor productivity				
1	Financial Incentives (Individual)	1	2	3	4
2	Financial Incentives (Group)	1	2	3	4

3	Fringe Benefits (Medical insurance, Marriage subsidy, Free higher education, etc)	1	2	3	4
4	Employee Promotion (motivation, recognizing employee's skills, knowledge, proficiency, etc)	1	2	3	4
5	Job Enrichment (assigned Variety tasks)	1	2	3	4
6	Learning curve (gain proficiency with repetition of the same task)	1	2	3	4
7	Communication(timely flow of information with a feedback mechanism)	1	2	3	4
8	Working condition improvement(Temperature, light, and humidity, Noise, etc)	1	2	3	4
9	Training (increasing the ability levels of employees. On job training, Internship training, etc)	1	2	3	4
10	Education (Education refers to the level of high school, college, vocational training, etc)	1	2	3	4
11	Role perception (refers to the manner in which an individual defines his or her job)	1	2	3	4
12	Quality of supervision	1	2	3	4
13	Recognition (acknowledgement of an employee's outstanding performance)	1	2	3	4
14	Job Enlargement(enlarging the responsibility of employees)	1	2	3	4
15	Job rotation(rotation of workers into different jobs for short periods of time)	1	2	3	4
16	Worker participation(employee involvement in planning and implementing the change)	1	2	3	4
17	Skill enhancement(technique to increase the skills of employee needed to perform a job)	1	2	3	4
18	Management by objective (motivation of all participants by having superior and subordinate managers jointly identify common goals, carefully define it, and together monitor progress toward achieving results)	1	2	3	4
19	Punishment (it can be effectively used to eliminate or suppress certain types of behavior)	1	2	3	4
20	Quality circle (QC) (groups of employees who voluntarily cooperate to solve problems)	1	2	3	4
21	Productivity quality teams (groups of people that solve problems related to the productivity)	1	2	3	4
22	Zero defects (do things right the first time, error free performance)	1	2	3	4
23	Time management (minimization of the wasteful elements of employee's work)	1	2	3	4
24	Flextime (freedom and responsibility for employee in determining their hours of work)	1	2	3	4
25	Compressed workweek	1	2	3	4
26	Harmonization (the integration of the interests of the stockholders (owners), board of directors, management at all levels, and all employees in a consistent manner both within and outside the physical boundaries of an organization)	1	2	3	4

Others, (If there are other factors that affect labor productivity).....

.....

4. Which of the above techniques have your company used for the last five years and how much costs and saves each technique? And also how long it takes to install the techniques and the payback periods?

	techniques used by the company(k)	1998	1999	2000	2001	2002	f_k	F	s_k	S	b_k	B	m_k	M
1														
2														
3														
4														
5														
6														
.														

Where (in '000birr),

(in month)

f_k is the funds required for technique k

b_k is the payback period for technique k ,

F is the maximum available total funds,

B is the maximum allowable payback period

s_k is the saving achieved using technique k ,

m_k is the time required to install technique k ,

S is the minimum acceptable total savings,

M is the maximum allowable installation time,

IV. labor productivity measurement and improvement practices

1. Have you introduced any method (model) **to measure labor** productivity?

If **Yes** which one (mark X that you have used)

a) number of units of output per hour worked

b) number of units of output divided by total number of employees

c) Number of units sold divided by number of employee

Others (if any)

If **No** what is the reason?

.....

2. Worked hours, total output and value added of the company for the last five years.

	2002E.C	2001E.C	2000E.C	1999E.C	1998E.C
Number of employees					
Number of total worked hours					
Total output of the company					
Value added of the company					

V. Compensation and Benefits

	Yes	No
Insurance	<input type="checkbox"/>	<input type="checkbox"/>
Medical	<input type="checkbox"/>	<input type="checkbox"/>
Pension or retirement	<input type="checkbox"/>	<input type="checkbox"/>
Accident	<input type="checkbox"/>	<input type="checkbox"/>
Vacation	<input type="checkbox"/>	<input type="checkbox"/>
Maternity & sick leave	<input type="checkbox"/>	<input type="checkbox"/>
Bonus	<input type="checkbox"/>	<input type="checkbox"/>
Transportation	<input type="checkbox"/>	<input type="checkbox"/>

Other, please explain:

.....

Appendix B: Amharic language questionnaire for Akaki garment share company employees



አዲስ አበባ ዩኒቨርሲቲ ቴክኖሎጂ ኢንስቲትዩት

መካኒካል ምህንድስና ትምህርት ክፍል

ኢንዱስትሪያል ምህንድስና ስትሪም

ርዕስ: የሰራተኛን ምርጫ ስርዓት በማሻሻል የኢትዮጵያ ልብስ ስፌት ፋብሪካዎችን ምርጫ ስርዓት መጨመር

አዘጋጅ ስለሺ ጥላሁን

ኢሜል tilahunseleshi@gmail.com

ለአቃቂ ልብስ ስፌት ፋብሪካ የሰራተኛዎን ፍላጎት ለማወቅ የተዘጋጀ መጠይቅ።

ጊዜአችሁን ሰጧችሁ ይህንን መጠይቅ ስለሞላችሁልኝ ከልብ አመሰግናለሁ።

ማሳሰቢያ መጠይቁን ሲሞሉ ስም መጻፍ አያስፈልግም። የሚሞሉት መረጃ ከእርስዎና ከሚያስሞላው ሰው ውጭ ለማንም እንደማይሰጥ እርግጠኛ ይሁኑ። በመሆኑም ትክክለኛ መረጃ በመስጠት ይተባበሩን።

በተጨማሪ ከተዘረዘሩት አማራጮች ውስጥ ከአንድ በላይ ወይንም ሁሉንም መምረጥ ይቻላል።

ግንቦት 2003 ዓ.ም

በሰራተኛው የሚሞላ

የስራ ድርሻ.....

የትምህርት ደረጃ.....

በፋብሪካው ተቀጥረው የቆዩበት ጊዜ.....

I. የሰራተኛን ምርታማነት እንዴት ይረዱታል ወይም የአንድ ሰራተኛ ምርታማነት ማለት ምን ማለት ነው?

1. .
2. .
3. .
4. .
- 5.

II. የፋብሪካው ምርታማነት መጨመር ጥቅሙ ምንድን ነው ብለው ያስባሉ?(መልስዎን በባዶ ቦታው ላይ በ X ምልክት ያመልክቱ)

ተ.ቁ		አልስማማም	በከፊል እስማማለሁ	ሙሉ በሙሉ እስማማለሁ
1.	ለፋብሪካው ባለቤት የተሻለ ትርፍ ያስገኛል			
2.	ፋብሪካው ለሰራተኞቹ የተሻለ ደመወዝ አንዲከፍል ያስችለዋል			
3.	በሀገራችን ዜጎች የተሻለ ኑሮ እንዲኖሩ ያግዛል			
4.	ፋብሪካው የተለያዩ የልማት ስራዎችን እንዲሰራ ያድርገዋል			

ሌላ ጥቅም ካለው ይጥቀሱ

III. እርስዎ በፋብሪካው ውስጥ ውጤታማ(ምርታማ) ነኝ ብለው ያስባሉ?(መልስዎን በባዶ ቦታው ላይ በ X ምልክት ያመልክቱ)

1. አዎ
2. አይደለሁም

መልስዎ አዎ ከሆነ ውጤታማ እንዲሆኑ ያገዝዎት ነገሮች ምን ምን ናቸው?

ሀ. ፋብሪካው በቂ ደመወዝ ስለሚከፍለኝ.....

ለ. የስራ ቦታው ምቹ ስለሆነ.....

ሐ. ፋብሪካው የተለያዩ ማበረታቻዎች ስላሉት.....

መ. ምርታማነቴ ለራሴ ስለሚያረካኝ.....

ሠ. ሀላፊነቴን መወጣት ስላለብኝ.....

ሌሎች ምክንያቶች ካሉ ይጥቀሱ

- 1. .
- 2. .
- 3. .
- 4. .

መልስዎ አይደለሁም ከሆነ ውቴታማ እንዳይሆኑ ያደረገዎት ነገሮች ምን ምን ናቸው?

ሀ. ፋብሪካው በቂ ደመዎዝ ስለማይከፍለኝ.....□

ለ. የስራ ቦታው ምቹ ስላልሆነ.....□

ሐ. ፋብሪካው ምንም አይነት ማበረታቻ ስለሌው.....□

መ. ፋብሪካው ውስጥ መስራቴ ስለማያስደስተኝ.....□

ሠ. ቤተሰብ አካባቢ ሌሎች ጫናዎች ስላሉብኝ.....□

ሌሎች ምክንያቶች ካሉ ይጥቀሱ

- 1. .
- 2. .
- 3. .
- 4. .

IV. ስለፋብሪካው ምን አይነት ስሜት አለዎት?(መልስዎን በባዶ ቦታዉ ላይ በ X ምልክት ያመልክቱ)

ሀ. ለፋብሪካው የባለቤትነት ስሜት ይሰማኛል.....□

ለ. ለፋብሪካ ምንም አይነት ስሜት የለኝም □

ሐ. ከአሱት ልብስ ስፊት ፋብሪካዎች የተሸለ ሆኖ ማየት እፈልጋለሁ.....□

ሐ. ፋብሪካውን ሌላ ስራ እስከማገኝ እንደ ጊዜ ማሳለፊያ አጠቀምበታለሁ.....□

ሌላ የሚሰማዎት ካለ ይጥቀሱ

- 1. .
- 2. .
- 3. .
- 4. .

V. ከሚከተሉት ዉሰጥ የትኞቹ ቢደረግልዎት ከአሁኑ በተሻለ ሥራዎን አከናወናለሁ (ምርታማ እሆናለሁ) ብለዉ ያስባሉ? (መልስዎን በባዶ ቦታዉ ላይ በ X ምልክት ያመልክቱ)

ተ. ቁ	እንዲደረግልዎት የሚፈልጉት	አያስፈልግም	በመጠኑ ያስፈልጋል	ያስፈልጋል	በጣም ያስፈልጋል
1	በሰሩበት የስራ መጠን የገንዘብ ጥቅማጥቅም ማግኘት (በግልጽ)				
2	በሰራችሁበት የስራ መጠን የገንዘብ ጥቅማጥቅም ማግኘት (ከሌሎች ሰራተኞች ጋር)				
3	ሌሎች ጥቅማጥቅሞች (የትምህርት እድል፣የጤና ዋስትና፣የሰርግ ወጪ፣ወዘተ)				
4	የስራ አድገት				
5	የተለያዩ ስራዎችን መስራት				
6	አንድ ስራ ላይ ለብዙ ጊዜ መቆየት (መስራት)				
7	ከአስተዳደሩ ጋር በሚፈልጉበት ስአት በነፃነት መወያየት				
8	የስራ ቦታዉን ማሻሻል (ለምሳሌ መብርት፣ ነፋስ፣ድምጽ፣ወዘተ)				
9	ለስራዎ የሚያግዝዎ ስልጠና ማግኘት				
10	የትምህርት ደረጃዎን የሚያሻሽል ትምህርት				
11	ለስራ ድርሻዬ ባላቤት መሆን				
12	የሱፐር ቫይዘር የማስራት ብቃትን ማሻሻል				
13	ለስራዬ እዉቅና ማግኘት				
14	ለአንድ ስራ ጥልቅ የሆነ እዉቀት ማግኘት				
15	የተለያዩ ስራዎችን በመቀያየር መስራት				
16	በተለያዩ ዉሳኔዎች ላይ መሳተፍ				
17	የተሻሻለ የአሰራር ዘዴ ማግኘት				
18	ሰርቶ የሚያሰራ አስተዳደር መኖር				
19	ላጠፋሁት ሥህተት ተገቢዉን ቅጣት መቀጣት				
20	ችግሮችን ለመፍታት መደራጀት				
21	በስራ ላይ ምንም አይነት ስህተት አለመስራት				
22	ጊዜን በአግባቡ መጠቀም				
23	የስራ ስአትን በራስ መወሰን				
24	የሳምንቱን ስራ በተወሰኑ ቀናት መስራት				
25	ከፋብሪካዉ አስተዳደርና ባለቤት ጋር የተለያዩ ስምምነቶችን ማድርግ (ለምሳሌ የእድሜ ልክ የስራ ቅጥር ስምምነት ወዘተ)				

ሌላ እንዲደረግልዎ የሚፈልጉት ነገር ካለ ይጥቀሱ

1. .
2. .
3. .
4. .

በጣም አመሰግናለሁ!

Appendix C: The translation of Amharic questionnaire



ADDIS ABABA INSTITUTE OF TECHNOLOGY

DEPARTMENT OF MECHANICAL ENGINEERING

(Industrial Engineering stream)

Title: Productivity improvement through employee based technique for Ethiopian garment industries

By: Seleshi Tilahun

Email: tilahunseleshi@gmail.com

Mechanical Engineering (industrial engineering stream)

Employee needs and interests questionnaire survey in Akaki garment factory

Acknowledgement to the respondent

I would like to express my appreciation for your dedicated cooperation.

Note: it is not necessary writing your name on it and the questionnaire is collected only by the researcher so have confidence to give the real information.

From the listed choices you can choose more than one for one question.

May, 2011

Filed by the employee

Position.....

Education level.....

Your work experience in this company.....

I. How do you understand the word employee productivity

- 1. .
- 2. .
- 3. .
- 4. .
- 5.

II. What is your assumption if the productivity of the company will improve?

Rating	Disagree	Partial agree	Definitely Agree
	1	2	3

1.	Higher productivity allows greater returns to the company owners	1	2	3
2.	Higher productivity allows the company to sustain higher wages to its employees	1	2	3
3.	It determines sustained improvements in the country's standard of living	1	2	3
4.	It supports spending on social programs, education, and the environment	1	2	3

Others, (if any).....

III. Do you consider that you are productive in the company? (X mark)

- 1. Yes
- 2. No

If your answer is yes what are the factors to be productive?

- a. Since the company earns good salary to me
- b. Since the working condition is good
- c. Since the company gives different incentives
- d. Since my productivity satisfy me

- e. To my responsibility

Others, (if any).....

If your answer is no, what are the factors not to be productive?

- a. Since the company does not earns enough salary to me
- b. Since the working condition is not comfortable
- c. Since the company does not have any types incentives
- d. Since working in this company does not satisfied me
- e. Since I have different load around my family

Others, (if any).....

IV. How do you see the company?

- a. Like it is mine or as owner ship
- b. I haven't any feeling about the company
- c. I wish it will better garment factory than other garment factories in all respect
- d. I use this company up to I will get other better work.

Others, (if any).....

V. Which of the following factors do you want to be fulfilling for you from the company to improve your productivity?

Rating scale:

Not essential	In some instance	Essential	Very Essential
1	2	3	4

Techniques (Factors) to be fulfilling					
1	Financial Incentives (Individual)	1	2	3	4
2	Financial Incentives (Group)	1	2	3	4
3	Fringe Benefits (Medical insurance, Marriage subsidy, Free higher education, etc)	1	2	3	4
4	Employee Promotion (motivation, recognizing employee's skills, knowledge, proficiency, etc)	1	2	3	4

5	Job Enrichment (assigned Variety tasks)	1	2	3	4
6	Learning curve (gain proficiency with repetition of the same task)	1	2	3	4
7	Communication(timely flow of information with a feedback mechanism)	1	2	3	4
8	Working condition improvement(Temperature, light, and humidity, Noise, etc)	1	2	3	4
9	Training (increasing the ability levels of employees. On job training, Internship training, etc)	1	2	3	4
10	Education (Education refers to the level of high school, college, vocational training, etc)	1	2	3	4
11	Role perception (refers to the manner in which an individual defines his or her job)	1	2	3	4
12	Quality of supervision	1	2	3	4
13	Recognition (acknowledgement of an employee's outstanding performance)	1	2	3	4
14	Job Enlargement(enlarging the responsibility of employees)	1	2	3	4
15	Job rotation(rotation of workers into different jobs for short periods of time)	1	2	3	4
16	Worker participation(employee involvement in planning and implementing the change)	1	2	3	4
17	Skill enhancement(technique to increase the skills of employee needed to perform a job)	1	2	3	4
18	Management by objective (motivation of all participants by having superior and subordinate managers jointly identify common goals, carefully define it, and together monitor progress toward achieving results)	1	2	3	4
19	Punishment (it can be effectively used to eliminate or suppress certain types of behavior)	1	2	3	4
20	Quality circle (QC) (groups of employees who voluntarily cooperate to solve problems)	1	2	3	4
21	Productivity quality teams (groups of people that solve problems related to the productivity)	1	2	3	4
22	Zero defects (do things right the first time, error free performance)	1	2	3	4
23	Time management (minimization of the wasteful elements of employee's work)	1	2	3	4
24	Flextime (freedom and responsibility for employee in determining their hours of work)	1	2	3	4
25	Compressed workweek	1	2	3	4
26	Harmonization (the integration of the interests of the stockholders (owners), board of directors, management at all levels, and all employees in a consistent manner both within and outside the physical boundaries of an organization)	1	2	3	4

