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# Investigation of Quality Awareness, Developments and Factors Impeding Product Quality Improvement in Ethiopian Medium and Large Scale Manufacturing Industries

*Gebremeskel Kahsay, P.H.Osanna and N.M.Durakbasa*

## **Abstract**

*The quest for quality products together with the convergence of our globe into a village has forced manufacturing industries to run under highly competitive environment even to the most sophisticated western industries. The challenge is becoming twofold for manufacturing industries of developing countries in general and Ethiopian manufacturing industries in particular. They are rapidly losing the domestic market for imported products which are cheaper and better in quality in most cases. This empirical research examines quality awareness and developments as well as identifies factors affecting product quality based on a survey conducted in a total of 35 Ethiopian medium and large scale manufacturing industries. The study includes 18 public, 16 private and one joint venture manufacturing industries engaged in the production of food and beverage, Textile, leather & footwear, metal, non-metallic mineral products and chemicals.*

*The study revealed that, 72.8% of the surveyed industries have no incentive programs related to quality improvement, 62.8% have no established PDSA cycle, 57.1% have no information about the product quality of their competitors, while, 50% don't have long as well as short term quality policy. Moreover, it uncovers nine factors which are currently affecting the product quality of Ethiopian Medium and large scale manufacturing industries.*

**Keywords:** quality tools and techniques, product quality, Pareto-analysis, Ishikawa-diagram and quality competitiveness.

## **1. Introduction**

The quest for quality products together with the convergence of our globe into a village has forced manufacturing industries to run under highly competitive environment even to the most sophisticated western industries. The challenge is becoming twofold for manufacturing industries of developing countries in general and Ethiopian manufacturing industries in particular. They are rapidly losing the domestic market for imported products which are cheaper and better in quality in most cases. Therefore, there is an urgent need to work on way of improving product quality of Ethiopian manufacturing industries to enhance their market competitiveness.

Ethiopia, a country with long world history and a population of more than 70 million, still remains as one of the least developing countries in the world.

Industrialization has started late compared with some other African countries, mainly because of socio-political problems.

Formally, Ethiopia has introduced an investment incentive scheme in 1950, aimed at attracting foreign investment, technology, skills and management in the manufacturing industry. However, it was halted in 1974 by the Derg government, which nationalized enterprises and abolished the investment incentive scheme.

In 1992, the incumbent government launched an economic reform program and began moving towards a market economy. Progress in a liberalizing direction has been slow but it has been steady and the private sector in Ethiopia agrees that the pace has picked up sharply over the past year or two (UN, 2004).

The manufacturing sector contributes no more than 6.5% to GDP and 9.5% to employment (UN, 2004). The pace to maximize benefits from manufacturing industry is far below expectation due to (i) hindrances by government interventions both (past and present), (ii) stubbornness of existing industries to introduce appropriate manufacturing business models, developments in technology, techniques and/or philosophies and most importantly quality improvement strategies, which is the concern of this research paper, and (iii) failure of individual citizens to be entrepreneurs etc. Moreover, there are also recent challenges arising from globalization.

In today's increasingly competitive markets, quality has assumed a much larger role than its traditional meaning. Quality has been adopted as an organizational or corporate philosophy where it can no longer be the sole responsibility of the production floor worker to produce acceptable items. The meaning of quality has stretched to include all employees from the top organization's management through the entire organization as well as vendors.

Quality has become a tool of providing a continuous feedback to the organizational production and business systems with the objective of producing products with high quality and minimum cost, and thus increasing the organization's performance (Aly and Elshennawy, 2003). Quality refers not only to the quality of finished products, but also to the quality of the processes that go into those products. (Robert, 2000) found evidence that quality improvement practices do what they set out to do raise product quality.

Product Quality has been defined as value (Feigenbaum, 1951), as conformance to requirements (Crosby, 1979), as fitness for use (Juran, 1988), as meeting and/or exceeding customers' expectations (Buzzell & Gale, 1987), etc. Deming (1986: 172) defined Product Quality as arising from the interaction of three corners of a triangle: (1) the product, (2) the provision of training to customers in the use of the product, and (3) the way customers actually use the product. The interplay among these three elements determines the level of satisfaction that customers have about the product. Most recently, Stone- Romero, Stone, and Grewal (1997) defined Product Quality as a perception by consumers based upon their evaluations along the four dimensions of flawlessness, durability, appearance, and distinctiveness. Product quality is generally considered as being the ability of a firm to provide products that satisfy the customer and the market, and is often characterized in terms of eight dimensions, including performance, features, reliability, conformance, durability, serviceability, aesthetics, and perceived quality (Garvin, 1987).

The objective of this research is to examine quality awareness and developments as well as identify factors affecting product quality based on a survey conducted in a total of 35 Ethiopian medium and large scale manufacturing industries. The study includes 18 public, 16 private and one joint venture manufacturing industries engaged in the production of food and beverage, Textile, leather & footwear, metal, non-metallic mineral products and chemicals.

The paper is organized in such a way that section two provides literature review of developments in quality management while section three discuss characteristics of Ethiopian manufacturing industries. Section four highlights the methodology. Results of quality awareness and developments are discussed in section five while section six discusses factors impeding product quality improvement. Finally, concluding remarks are given in section seven.

## **2. Developments in Quality Management**

The quality management (QM) movement started in Japan during the 1950s. During the 1980s it became increasingly popular in the United States and Europe most likely as a result of the success of Japanese firms in a number of global markets (Lawler, 1994). Since 1990s, QM is fast becoming one of the main

issues in many organizations and is usually referred to as total quality management (TQM).

The quality movement has been widely accepted as a new way of thinking about management, a new strategy for competitive advantage and as a paradigm shift.

## **2.1 Quality revolution**

Deming and Juran were among the first American quality experts who studied “quality revolution” in the 1950s. In the early 1970s American business was surprised by the superior performance of Japanese products and realized that something must be done to profoundly change the way they did business in order to maintain competitiveness. It was after 1980, most industries recognized quality as a strategic weapon to win market competition.

Generally, 1980s can be considered as an era of quality revolution (see Fig.1) in which a remarkable change was observed towards quality with the introduction of Total Quality Management (TQM), ISO 9000, Six Sigma and self-Assessment models such as Malcolm Baldrige National Quality Award (MBNQA) and European Foundation for Quality Management (EFQM) (Gebremeskel *et al.*, 2005).

This revolution has started to show its impact on least developing countries manufacturing industries in support of what quality experts such as Deming (1986) have pointed out that only those companies which can adopt the modern quality philosophy can survive in the competitive global market. Moreover, Juran (1995) noted that where as the 20<sup>th</sup> century became famous for world productivity, the 21<sup>st</sup> century would become well known as the “century for quality”.

A survey of the literature and current practices of Ethiopian industries shows that even after two or so decades, no significant effort is going on to aggressively introduce such quality initiatives or even basic quality tools and techniques, except individual efforts here and there.

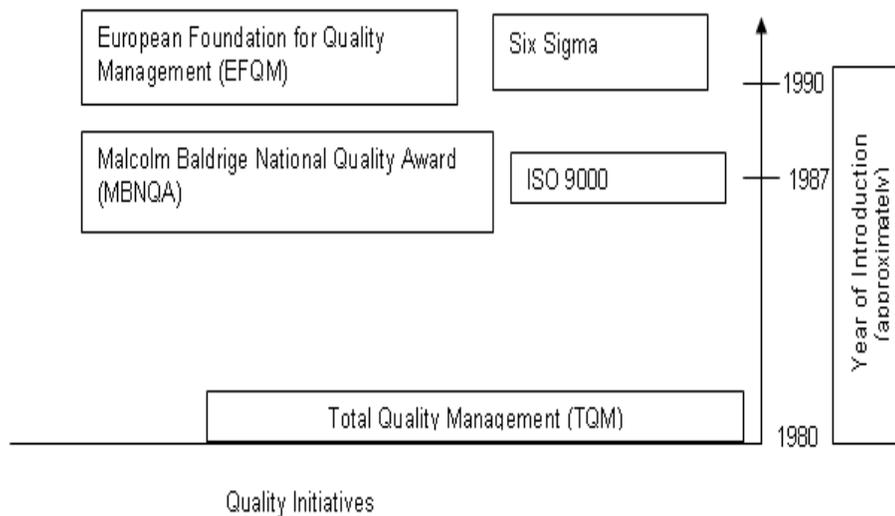


Fig. 1 Quality revolution

## 2.2 Quality and competitiveness

There is a strong underlying suggestion in the quality management literature that quality is the best and, in many instances, only dimension through which competitive advantage can be achieved (Crosby, 1979; Deming, 1986). Indisputably, quality as a competitive factor in the manufacturing sector has been largely enhanced over the past two decades. It is important to understand the role of quality to competitive position. The real magic formula of the seeming Japanese dominance simply lies in understanding the role of quality plays in their corporate strategy. Figure 2 below gives an insight on the link between quality effort and competitiveness.

Robert (1995:51) stated that high quality not only puts a company on a much different competitive plane than its counterparts but it also makes a wider variety of strategic options accessible to the company. Moreover, Johannes (2005) indicated that quality improvements benefit a company both in terms of costs and revenues. Quality has been cited as a competitive priority (Hayes & Wheelright, 1984), an issue of strategic importance (Garvin, 1987), and an "order qualifier"- a means of survival (Hill, 1994). Moreover, (Hung & Lu, 2006) indicated that firms producing high-quality products are active in product innovation and Robert (2000:58) indicated that quality management is a promising innovation, more accurately, it is a meta-innovation. In a world of imperfect information and understanding, latent opportunities for performance improvement are always abundant. Quality management methods provide some novel ways of converting

a portion of these latent opportunities into recognized opportunities and recognized opportunities into actual improvement. Over the years, managers have witnessed it in different forms - statistical quality control (SQC), total quality control (TQC), total quality management (TQM), etc.

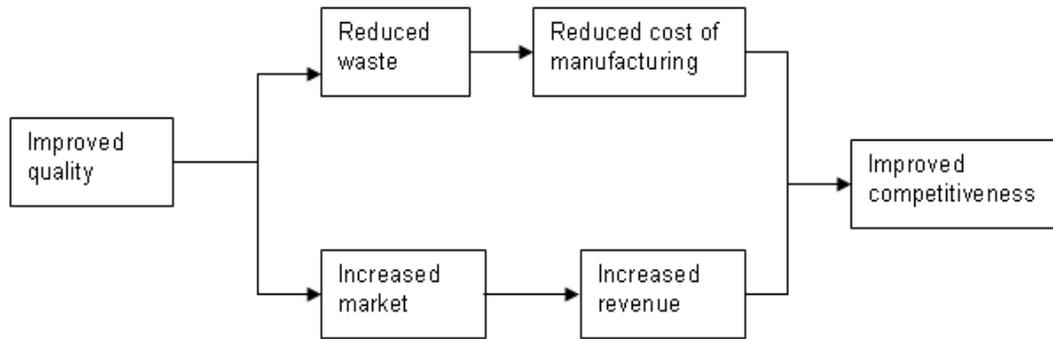


Figure 2 relationships between quality and competitiveness

There fore, quality is not only one of the major determinants of competitiveness in today's global market, but also a highway for innovation in which companies can't afford to ignore it.

### 3. Characteristics of Ethiopian manufacturing industries

During the last two decades a considerable effort has been put on the issue of quality and much literature has been produced outlining how organizations should set about its improvements both in developing and developed countries. This is far beyond reality in the context of least developing countries in general and Ethiopian manufacturing industries in particular. It is only in the last two years that we have witnessed efforts towards implementation of quality initiative such as ISO 9000 and to some extent ISO 1400. So far, only ten industries across the country have implemented ISO 9000, while nine more industries are working towards ISO 9000 certification (QSAE, 2006)<sup>1</sup>. Of course, implementation of ISO 9000 alone does not contribute much to quality improvement as stated by (Sun, 1999). Details on status of quality tools, techniques and initiatives in Ethiopian medium and large scale manufacturing industries will be presented in the future.

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<sup>1</sup> Quality and Standardization Authority of Ethiopia

Many of Ethiopian manufacturing industries are still under the ownership of the government, an effort is going on to privatize many of them, but that does not seem feasible at least in the short term due to huge privatization cost. Most firms were established with huge capital and are having abundant machines which have no importance at the moment.

Most public companies were built with out proper feasibility study, just only on personal demands of government officials; the same is true for some private firms. Important factors such as location and future expansion were never considered during the establishment. Even now, most of them run based on government demands and have no clue what will be the order from the government in three or five years time. Managers are totally out of touch with the tasks at the shop floor and are busy with meetings and administrative paper work. Majority of their employees lack motivation and have no plan to stay any more if they find another job.

Coming to shop floor, majority of the firms does not look industries of the 20<sup>th</sup>, let alone 21<sup>st</sup> century. It is a highly disordered floor and the concept of housekeeping remains immune for the industries. The lack of good housekeeping indicates inefficiency, insufficient self-discipline, low morale, poor quality, high costs and inability to meet delivery terms. In majority of the companies, it is common to see activities that do not add value to the industrial product or the system.

Most public companies are in a better position in terms of managerial standards, where as almost all companies lack operational standards, which deal with the safest, easiest and cost effective way of doing the job. It is only when you standardize your process that you can take an initiative to improve the process. It is not uncommon to see visual materials which need higher level of understanding which is beyond the operators and supervisors in the shop floor. We exactly don't know for whom it is displayed.

More over, Ethiopian manufacturing industries are staffed with low level educated employees. Changing the existing technological backwardness and low level of education may be difficult in a short period as progress in both factors requires capital, which is not easily available in the Ethiopian situation.

#### 4. Methodology

The objective of the study was to investigate quality awareness, developments and factors impeding product quality improvement in Ethiopian medium and large scale manufacturing industries and it was divided in two parts: i) questionnaire on basic quality awareness and developments and ii) on factors impeding product quality improvement. Moreover, the study was supported with interviewing and direct observation. Questions were designed to assess basic quality awareness and developments in a firm and were validated by quality experts both from industry and universities. Each questionnaire was filled by quality department head or individuals working on quality related activities of each firm.

Out of 45 officially mailed questionnaires, 35 valid questionnaires were collected from manufacturing industries engaged in the production of food and beverage, textile, leather & footwear, metal, non-metallic mineral products and chemicals. A cover letter was included in the mailing, explaining the purpose of the study along with the questionnaire. Moreover, a visit by the researcher or his research assistants were followed the mailing to provide further clarification, if the need arises, and collect the questionnaire.

Two industrial groups, metal and textile, leather & footwear cover 63% of the study. Categorization of manufactured products into the major industrial groups was adopted from Ethiopian central statistical authority (ECSA). Table I shows number of responses according to industrial groups.

Table I Industrial group of respondents

Industrial Group	Response
Food and Beverage	6
Textiles, Leather & Footwear	10
Metal	12
Non-Metallic Mineral Products	3
Chemicals	3
Others	1
Total	35

The sample firms consisted of 15 medium and 20 large scale manufacturing industries are collected mainly from industries around Mekelle and its environs, Kombolcha, Addis Ababa and its vicinity and Nazareth. Mails were also sent to

Bahir Dar and Dire Dawa, but there was no replay. Table II depicts number of responses according to size of firms.

Table II size of companies surveyed

Industrial Group	Response	Medium	Large
Food and Beverage	6	4	2
Textile, Leather & Footwear	10	2	8
Metal	12	8	4
Non-Metallic Mineral Products	3	0	3
Chemicals	3	1	2
Others	1	0	1
<b>Total</b>	<b>35</b>	<b>15</b>	<b>20</b>

Moreover, the research was designed to cover both public and private companies which consists 18 public, 16 private and one joint venture manufacturing industries, among which, three were found ISO 9000 certified. 24 of the surveyed companies are engaged manufacturing for domestic market while 11 manufacture for both domestic as well as export market.

This research is confined to medium and large scale manufacturing industries. Service industries of all size and small and micro scale manufacturing industries were not included in this research. Well, there is no standard definition of classifying industrial size even at national level let alone world wide. However, we have tried to look into related works both at national and international level before fixing the range for this research. Establishments which engaged ten persons and above and use power-driven machinery are considered large and medium scale by the Ethiopian central statistical authority (ECSA), on the other hand (Zealelem & Getachew, 2002) classified SMEs based on the number of employees (small firms have 50 or less while medium size firms have between 50 and 150) in their TQM implementation studies. According to recommendations 2003/361/EC (EU, 2003), SMEs are defined as enterprises employing fewer than 250 people, with an annual turnover under €50 million or assets of less than €43million. This shows how the definition varies from country to country. The definition in this research is based on the number of employees (Medium firms have between 50 and 300 while large firms are with more than 300 employees).

## 5. Basic quality awareness and developments

The first part of the questionnaire consists of ten yes/no questions followed by a question on how company leaders think quality to their company. Table III shows list of questions in brief and their corresponding replays.

Analysis of negatively responded companies for the basic quality elements using Pareto diagram is given in figure 3. It is easy to observe that across all industries, there is a sever problem in relation to introducing incentive programs related to quality improvement, Employment of PDSA cycle, absence of information about quality of competitors and absence of long as well as short term quality policy as displayed in figure 3. What is encouraging is that, there is a strong awareness as well as interest about quality at management level such as top leaders and quality department heads. Moreover, companies claim to practice a quality-first credo, no matter how attractive the price and delivery terms are.

Table III list of questions

Basic quality elements	Number of companies	
	Yes	No
Q1. Having long and short term quality policy	20	15
Q2. Had quality related training	35	0
Q3. Prioritize quality during decision making	30	5
Q4. Having information about quality of competitors	15	20
Q5. Working in collaboration with their suppliers	24	11
Q6. Using modern measurement instruments	20	15
Q7. With corporate plan to involve employees for quality improvement	24	11
Q8. Having incentive program for efforts towards quality improvement	9	26
Q9. Encourage the establishment of national quality award	31	4
Q10. Employing PDSA cycle	13	22

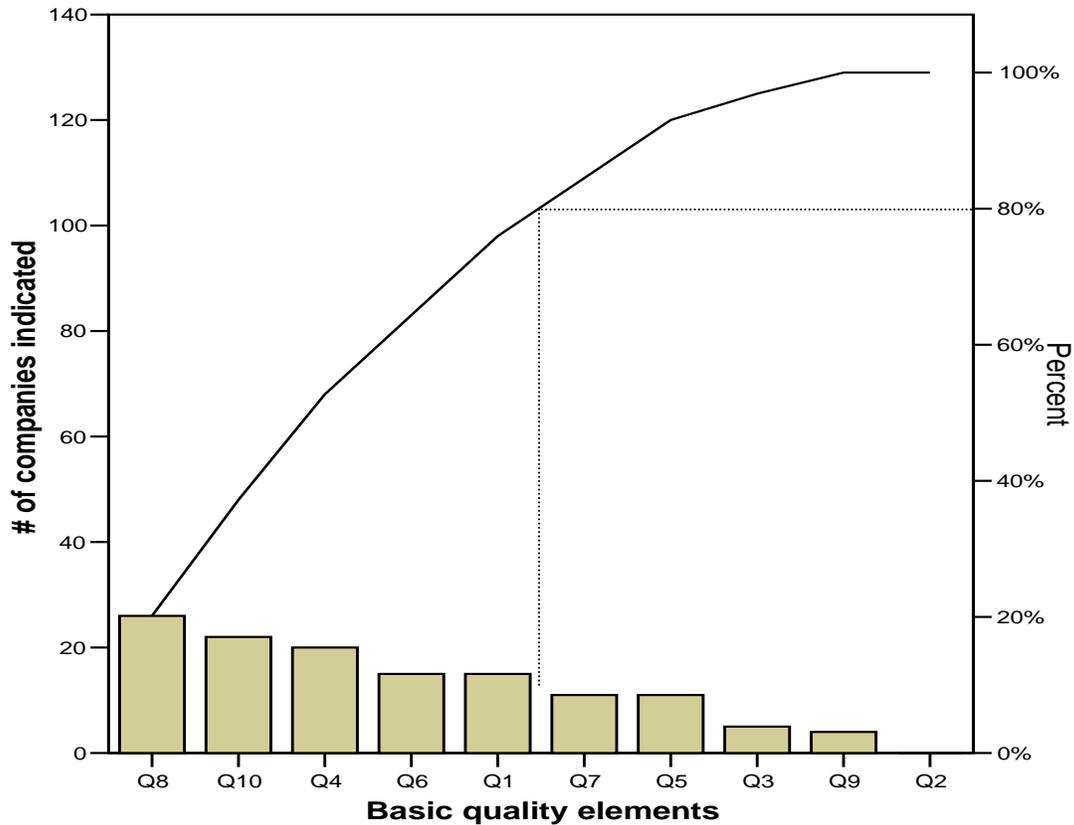


Figure 3 Pareto-analysis of basic quality elements

The trend in figure 4 shows, there is no much difference in the status of basic quality elements due to size of companies. However large scale companies are better in having long and short term quality policy while medium scale industries showed better collaboration with their suppliers. Moreover, both categories showed poor performance in both employing PDSA cycle and in having incentive programs to efforts leading towards quality improvement. What is more interesting is both categories unanimous support for the establishment of national quality award, which clearly show companies strong interest to strengthen the existing quality effort.

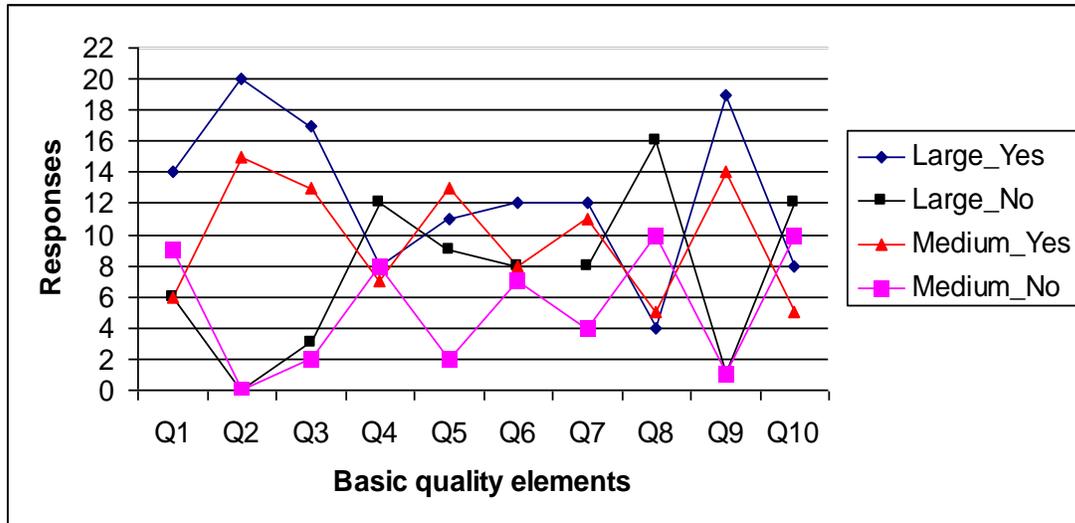


Figure 4 responses according to company size

An effort to look into basic quality elements according to company ownership uncovers that, the existing status is more or less similar in both cases as shown in figure 5. However, private companies are found to prioritized quality during decision making.

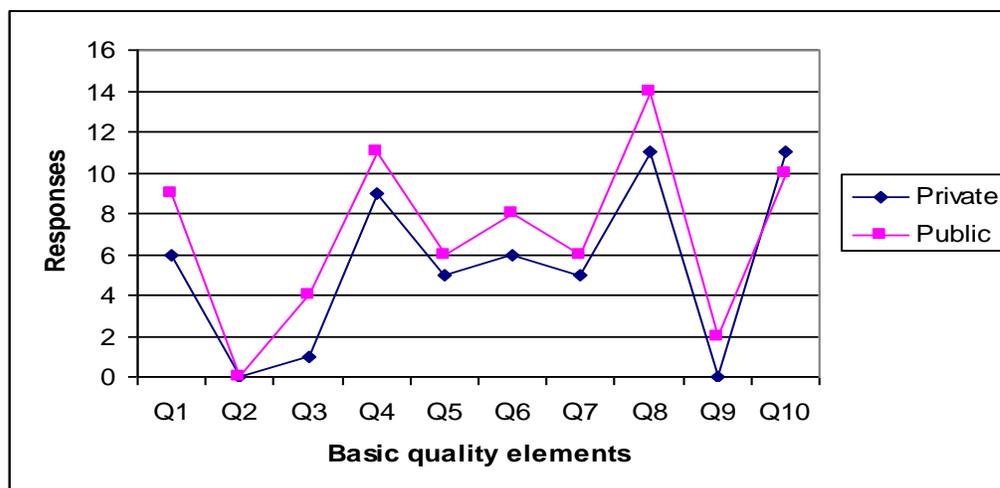


Figure 5 responses according to company ownership

In addition to the basic quality elements, it was important to assess managers and quality department heads perception of quality to their company. 77% of the respondents believe quality is a must to their respective companies, while 23% believe quality is a necessary. No one considered quality as added cost as reflected by many companies (Kifayah and Zuraidah, 2002).

Among the firms who consider quality a necessary, half of them are exporting their products; moreover, they claim their products quality is good compare to competitor's products, which contradicts with the basic principles of quality. It would be interesting to study the factors that gave such firms the competitive advantage.

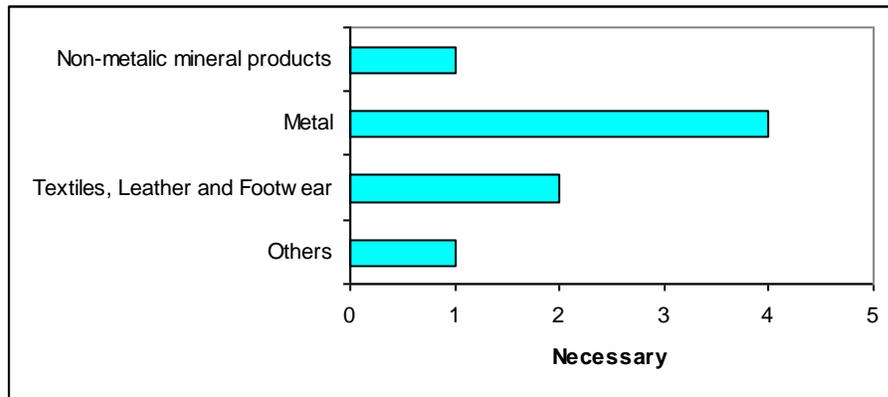


Figure 6 shows distribution of respondents who consider quality a necessary according to industrial group.

50% of the companies which considers quality as necessary belong to metal industry. Indeed, this was highly visible during the direct observation and interviewing of the companies. Figure 7 shows poorly organized shop floor in one manufacturing industry.



Figure 7 a typical shop floor of one metal industry.

## **6. Factors impeding product quality improvement**

Companies were asked to list out three most serious obstacles to their quality competitiveness, then, company statements were translated into technical terms. This research uncovers nine factors which are currently affecting the product quality of Ethiopian Medium and large scale manufacturing industries. These are old and/or outdated machines, poor quality of raw material, unskilled manpower, lack of quality awareness by employees, lack and/or inefficient measuring and testing equipment, lack of commitment by top management, lack of employee motivation, lack of standards and lack of effort for improvement.

### **6.1 Old and/or obsolete machines**

Many companies surveyed firmly believe that major barrier for their product quality competitiveness is the frequent failure and process incapability of their production machines. This is understandable considering the year of establishment of plants. This complaint was mainly limited to the establishments of 1980s and before since most companies never had major replacement program till date. Obviously, recent generation machineries are more efficient and sophisticated. Even though, it is difficult to find the exact correlation, age structure of companies has an influence on quality competitiveness of the firms. Service life of machines varies from country to country, especially on the age of information technology. However, based on general experience, depreciation of plants, particularly in developing countries, lasts for about 10 to 15 years, even though hard wares may not remain efficient enough throughout the whole period (EEA, 2004:192). In this research, firms were asked about the year of establishment, 74.3% of the companies found to be established before ten years (table IV) present results of the survey.

The same problem can not be ruled out for the establishments of 1990s and after, as in some cases the firms installed secondhand machines intentionally or cheated by suppliers. In some cases, it is common to see old machines painted to look a new one. It is also common to see some companies uses machines which are outdated compared with the current level of technology used by their competitors. Advanced technologies and methodologies have helped to improve the quality of goods and services (Wadsworth *et al.*, 2002). Some machines are still manual while supposed to be semi-automatic or fully automated. Moreover, their productivity was reduced due to lack of proper maintenance techniques.

Table IV age distribution of companies

Age structure	No. of companies
< 5	3
6 - 10	6
11-15	4
16 - 20	2
21 - 30	8
> 30	12
Total	35

## **6.2 Poor quality of raw material**

Poor quality of raw material was found another major hindrance for many companies both who use local raw material as well as imported one. Although, the complaints of those companies who use raw materials from the local market are understandable, it is very difficult to justify the problems related with imported raw materials. This is an alarm for Ethiopian companies to work in cooperation with domestic suppliers, to enhance their supplier's capacity or invest on the area to maintain the quality of raw materials. As to the imported raw material, the problem is much more complex and needs company's commitment to investigate their system.

## **6. 3 Lack of trained manpower**

It goes to the overall composition of both the line and functional staffs of the companies. Although, no research was conducted to assess the gap between company's requirement and the present staffing, it is easy to understand from our direct observation that companies should do a lot in this aspect. There was a time that we found only one engineer in one metal industry. The problem is not only on quantity, but also on the quality of the professionals, particularly, in those public industries. New western management techniques of lay off and early retirement incentives may give a new imputes to this serious problem. There is a strong correlation between product quality and skill of manpower in the company.

## **6. 4 Lack of quality awareness by employees**

Although, the awareness by top management is getting momentum, there is a lack of awareness by the main actors such as operators and supervisors at shop floor, this, added with lack of trained manpower will remain as a major hindrance in an effort to promote quality in the present situation of Ethiopian industries. Deming noted that everyone in the organization, from top to bottom, from office to technical services, from headquarters to local sites, must be involved. He further suggested that people are the source of ideas and innovation; therefore,

their expertise, experience, knowledge and sense of duty have to be harnessed to the benefit of the organizations (Deming, 1986:15). Thus, employees are expected to have the right knowledge about factors that affect their product quality and what have to be done to achieve a better quality product.

### **6.5 Lack and/or inefficient measuring and testing equipments**

If we can't measure correctly, it is not possible to know our system efficiency and the quality of our products as the saying goes if you can't measure it, you can't improve it. In the absence of proper measuring and testing instruments, it is impossible to measure deviations of form and dimensions. For that matter, any type of deviation from the requirement be it in weight, composition or dyeing, so this is a crucial component in which industries has to pay due attention to maintain their product quality. This factor was found to relate with the year of establishment of industries. Those industries established during 1980s and before were found to complain more on this factor. Some companies even don't have measuring and testing equipments and are forced to request other companies for such important task.

### **6.6 Lack of commitment by top management**

Although, there is no exaggerated problem on quality awareness by top management as most of the respondents claimed to have quality training. There seems to be a lack of commitment to work towards quality improvement. It is not common to share their knowledge and skills to the employees either in the form of seminars, short term training or through practicing the principles of quality. One problem for the lack of commitment can be attributed to lack of in-depth knowledge on the subject. Moreover, the top management thinks that quality is the responsibility of the quality department and tries to disassociate themselves from activities related to quality promotion and improvement. They fail to introduce new tools, techniques and initiatives to achieve continuous improvement of product quality. Success stories as well as different literatures showed that there is less possibility of success to achieve quality without full commitment of the top management. Zhang (2000) conducted structured interviews of managers at 10 manufacturing companies in the Netherlands. He found that top management commitment had the greatest effect on product quality. There are complaints in relation to team leadership but, mainly limited to the new establishments of private industries, in which some of the managers are even living geographically far from the industries. They are virtual managers,

rarely visit the factories. They are handpicked managers and spend most of their time in public relation activities, spend little time with their subordinates, that too mostly through phone calls. In the situation of Ethiopian industry, where there is no short and long term planning and proper working procedures, such factors will have tremendous effect on the quality of products in particular and competitiveness of the company in general.

### **6.7 Lack of employee motivation**

Though, it is not a significant inhibitor, some companies indicated that lack of employee's motivation is contributing to hindrances of firm's product quality improvement. This can be a result of lack of job satisfaction or low earnings from the company. Our interview with some employees revealed that their lack of motivation is directly correlated with lack of job satisfaction. This problem was severe among the public than private industries.

### **6.8 Lack of standards**

In the absence of standard working procedures as well as standards for some products, it is obvious that firms will face difficulty in evaluating their product quality as well as efforts towards system or product quality improvement. This problem was also reflected in the lack of PDSA implementation by industries across the country.

### **6.9 Lack of effort for improvement**

This is a shared problem among the Ethiopian industries; an industry that was producing a nail fifty years ago produces the same nail with no improvement in size, material or production system which proves the lack of strong research and development department. In general, Ethiopian industries lack dynamism and found to be static.

The findings of our research are to a large extent similar with that of (Kifayah and Zuraidah, 2002; Tamimi and Sebastianelli, 1998; Sebastianelli and Tamimi, 2003; Salaheldin, 2003; Masters, 1996; Adebajo and Kehoe, 1998; Salegna and Fazel, 2000) which implies most existing barriers to product quality improvement are similar, but great care should be taken in interpretation. Of course, the methodology followed to identify the factors were not the same while the objective is more or less the same.

Kifayah and Zuraidah (2002) uncovered 11 factors that contribute in diluting or dampening the efforts towards TQM implementation in an organization. Those are: Human resource issues, management, machines and equipment, attitude towards quality, culture, interdepartmental relations, materials, quality related information, method and training and finance.

Salaheldin (2003) indicated that, insufficient infrastructure, lack of training, workers' reluctance to get involved in decision making and inadequate knowledge base are regarded as resisting forces that inhibit the introduction of TQM strategy.

Tamimi and Sebastianelli (1998), in their study, identified 25 potential barriers to TQM initiatives in an organization. The barriers are ordered from highest to lowest. Failure to link management's compensation to achieve quality goals was found the number one barrier. Ranking near to the top, they identified a series of statements related to lack of employee training that includes:

- In group discussion and communication techniques
- Quality improvement skills
- Problem identification and problem solving techniques.

Quality improvement skills include the basic tools of quality and process improvement, such as quality control charts, cause and effect diagrams and flowcharting. Problem identification and problem solving techniques are broader in scope: for instance training employees in the four sages of the plan-do-study-act cycle to provide them with a structured approach for identifying and solving quality problems.

Using data from a national sample of quality control and quality managers Sebastianelli and Tamimi (2003) found out, five underlying obstacles associated with ineffective change management are identified: Inadequate human resources development and management, lack of planning for quality, lack of leadership for quality, inadequate resources for TQM and lack of customer focus.

In addition, Masters (1996) found the following contributing factors leading to ineffective TQM implementation: Lack of management commitment, weak comprehension of quality management, inability to change organizational

cultures, lack of accuracy in quality planning, absence of continuous training and education and insufficient resources.

Likewise, Adebajo and Kehoe (1998), who studied TQM implementation in UK manufacturing organization, identified quality problems as listed below:

- Upper management does not insist on systematic measuring of customer satisfaction level and training programs.
- Lack of training programs to enhance workers' skills and involvement in quality improvement activities.
- Organizations do not place enough importance on cases of goods returned nor relate such cases to customers.
- Many organizations don't involve suppliers when making improvements to products and in general suppliers have difficulties in meeting the organizations' requirements.
- Insufficient teamwork facilitators and team building techniques such as Belbin are not employed.
- Worker evaluation lacks a systematic approach and hence salary adjustments are not commensurate with job functions. Appreciation for contribution by workers is not apparent.

Salegna and Fazel (2000) surveyed the obstacles faced by TQM and non-TQM organizations. The results showed three major obstacles facing TQM organizations. These are insufficient time, poor communication and lack of real employee empowerment. For non-TQM organizations, the obstacles include lack of motivation, insufficient time and lack of strategic planning for change.

The research was not only limited to identify the obstacles rather proceeded by further analysis to identify the most critical factors. We have applied Pareto-analysis to identify the most serious hindrances as all factors can not be solved overnight on the eve of high scarcity of resources. Figure 8 show that five factors are severely affecting the product quality of Ethiopian medium and large scale manufacturing industries. These are old and/or outdated machines, poor quality of raw material, unskilled manpower, lack and/or inefficient measuring and testing equipment and lack of commitment by top management. Old and/or outdated machines and poor quality of raw material was found to take lion's share of the factors affecting product quality across all industrial groups.

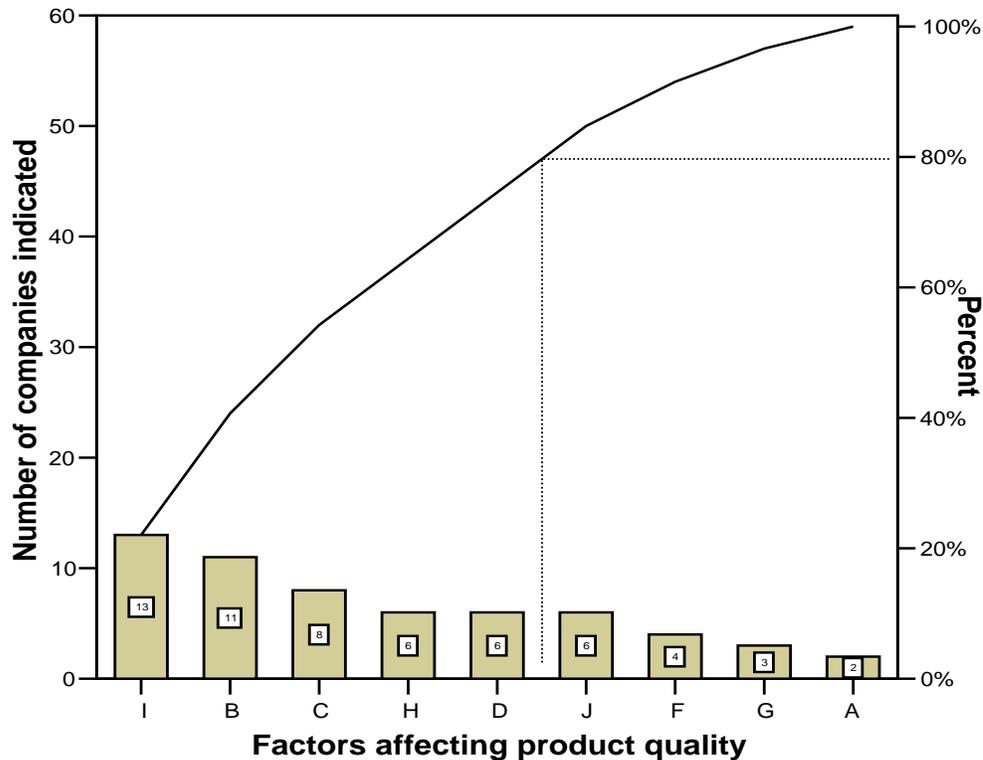


Figure 8 Pareto-diagram of factors affecting product quality across all industries

I- Old and/or obsolete machines

G- Lack of standards

B- Poor quality of raw material  
effort for improvement

C- Lack of trained manpower

A- No

J- Lack of quality awareness by employees

D- Lack and/or inefficient measuring and testing equipment

H- Lack of commitment by top management

F- Lack of employee motivation

An effort to find out the factors severely affecting product quality of public and private industry is displayed in figure 9 and 10. Quality related problems in public companies are resulted due to the presence of old and/or obsolete machines, while, poor quality of raw material is the main factor affecting product quality of private firms.

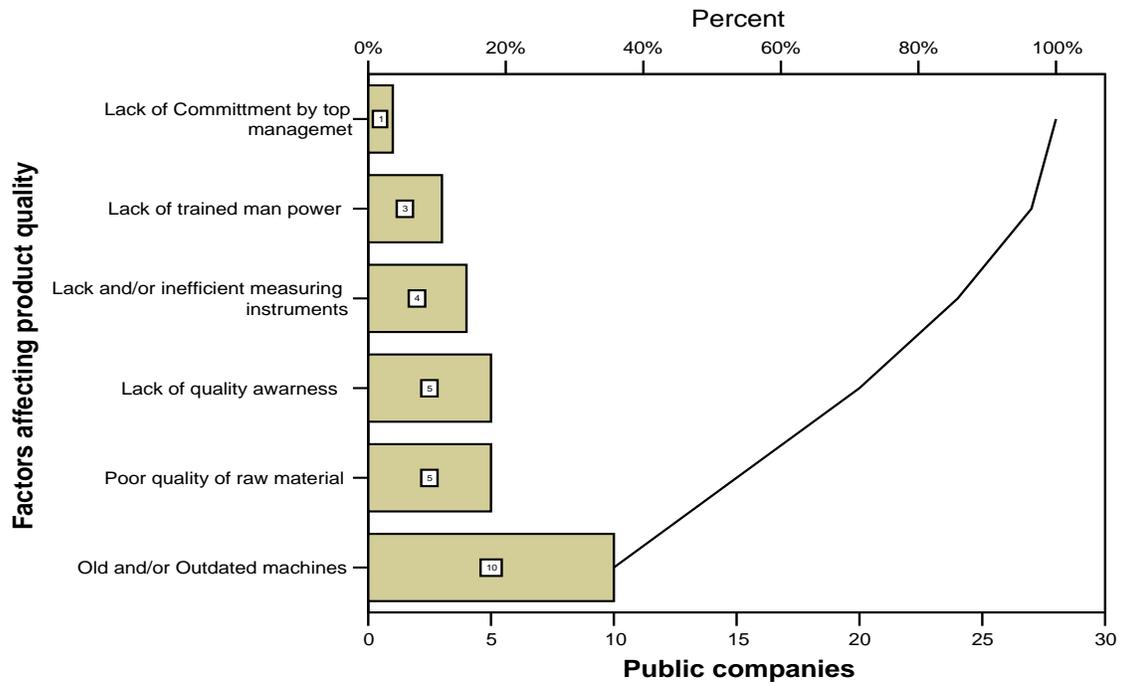


Figure 9 Pareto chart for public companies

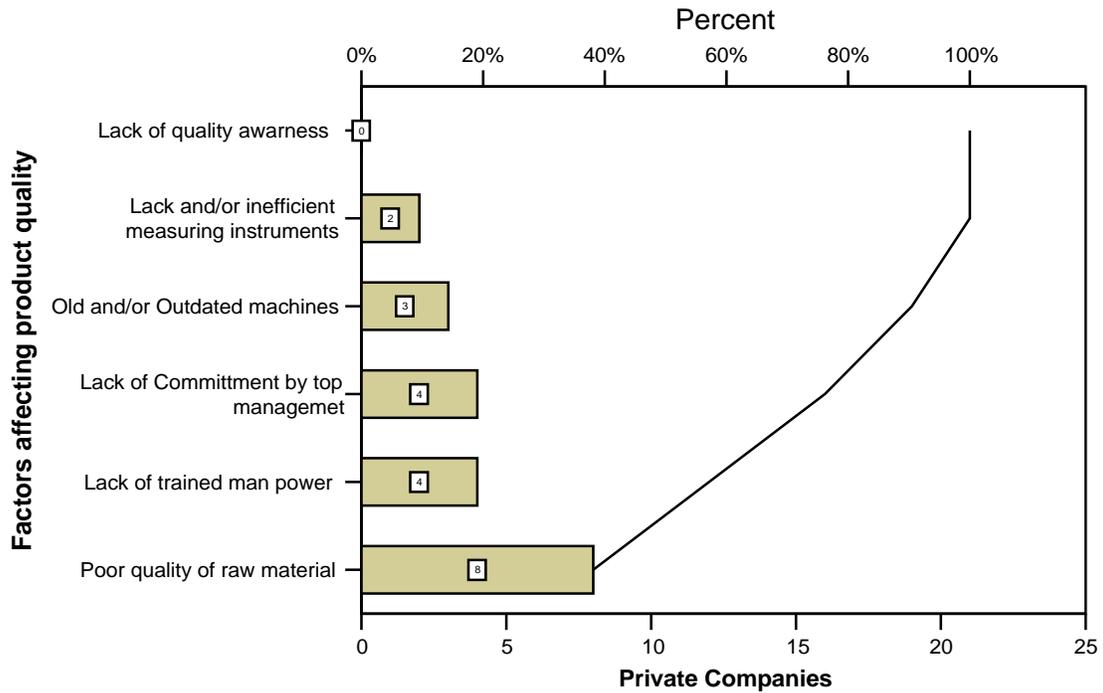


Figure 10 Pareto chart for private companies

Although, it is difficult to suggest solutions on how to deal with old and/or outdated machines as well as lack and/or inefficient measuring and testing equipments, as it entirely depends on the future plan of respective companies, it is time to alert the industries to give due attention to the uncovered factors in this research, so that, their product quality competitiveness can improve. At minimum, companies can put a short term plan like periodic maintenance and some spare parts replacements.

Lack of trained manpower shouldn't have been a problem to industries these days had it not been for the stubbornness and simple bureaucratic systems. Managers should learn from their counterparts around the globe on how to break the old tradition of status quo. They should inject their companies with new and young graduates and bring change of industrial culture. Well, as to the quality awareness, it may take longer time unless companies, universities and concerned government institutions devise an aggressive strategy towards the creation of awareness not only among company employees, but also among educators and the society at large.

Quality of raw material depends on factors such as the processing methods, the source as well as the technology especially in the case of domestic raw materials. In this case companies have to look into a long term strategy to deal with this problem. For the imported raw materials, companies can apply cause and effect diagrams to find out the sources the problem. Figure 11 can give an insight on how companies have to handle the issue. This approach can be modified according to the specific situations of each company, but can serve as a general model to handle problems related to poor quality of raw material.

However, all raised obstacles can only be solved or alleviated for that matter, only if the top management is equipped with the necessary knowledge and skill and show their outmost determination to implement it into practice. So, top priority must be given to make sure that top management is capable enough to take responsibility and further strengthen their capacity through training.

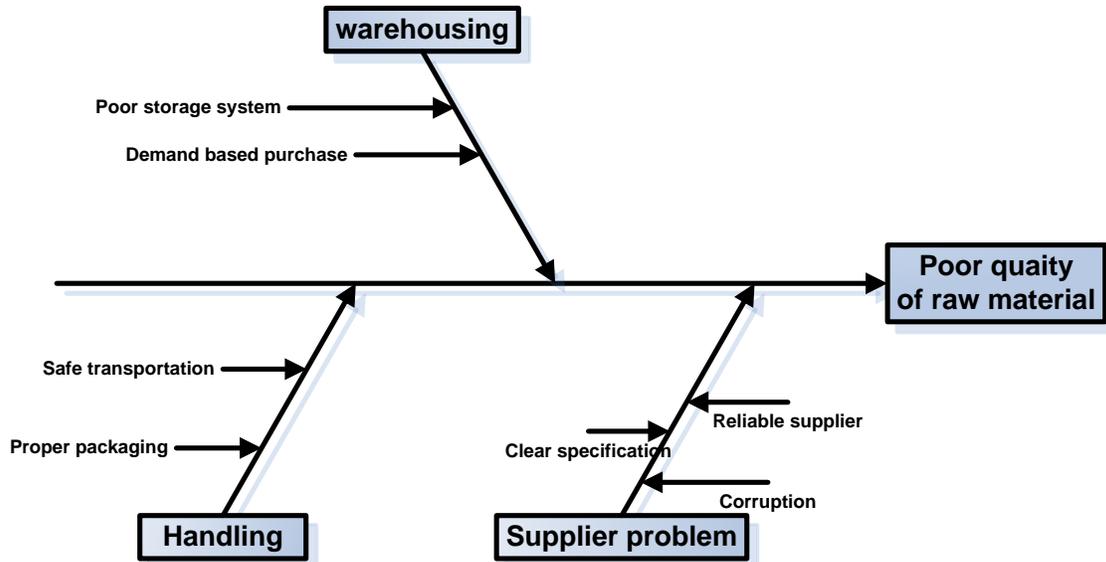


Figure11 cause and effect diagram for poor quality of raw material.

## 7. Conclusion

For all most two decades, quality has become a major issue both in industries and among different researchers. There is a consensus that the emergence of quality has revolutionized the entire system of industries of developed world, delivering quality is no more a choice, but a question of survival. Efforts has been going on to adopt quality tools, techniques and initiatives by industries of both developing and less developed countries, but the success is not easy particularly for industries of least developing countries which still lacks the basic infrastructure and human resources. This study, an investigation of quality awareness, developments and factors impeding product quality improvement in Ethiopian medium and large scale industries forwards the following concluding remarks:

In the current situation there is no significant difference in the level of quality awareness as well as initiatives to introduce basic quality elements among the private and public manufacturing industries.

The general terminologies on obstacles to improve product quality are to a great extent similar in many countries as we can see from the literature, but there is a failure to notice the differences in meaning. For instance, lack of commitment by top management in developing country may mean disassociating from quality

related activities while minor problem in communicating quality values in developed countries industry. So, care should be taken on the real implication of the barriers in each country.

An effort to improve market competitiveness through product quality improvement is not well conceived and is at its infancy stage. If the situation continues as it is, for sure, many Ethiopian industries will rapidly lose their share in the domestic market and will be soon forced to bankruptcy. There fore, there is an urgent need for a concerted effort at all levels, universities, industries and government institutions to work aggressively to promote awareness and design implementation strategies.

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