ST. MARY'S UNIVERSITY

SCHOOL OF GRADUATE STUDIES

Role of Quality Improvement Techniques on leather product manufacturing productivity: case of Pittards Product Manufacturing

A THESIS TO BE SUBMITTED TO THE DEPARTMENT OF PROJECT MANAGEMENT AS A PARTIAL FULFILLEMENT OF THE REQUIREMENTNTS FOR THE AWARD OF MASTER OF ARTS (MA) DEGREE IN PROJECT MANAGEMENT

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Productivity of Leather Industries and the Role of Quality Improvement Techniques

A Case of Pittards product manufacturing

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Addis Ababa, Ethiopia

DECLARATION

I hereby declare that the work which is being presented in this thesis entitled "PRODUCTIVITY OF LEATHER INDUSTRIES AND THE ROLE OF QUALITY IMPROVEMENT TECHNIQUES IN PITTARDS PRODUCT MANUFACTURING" is original work of my own, had not been presented for a degree of masters in any other university, in any projects by any means, and all the resource materials used for this thesis had been accordingly acknowledged.

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Meron Tilahun Date

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

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Dr. Dereje Teklemariam (Advisor) Date

St. MARY'S UNIVERSITY SCHOOL OF GRADUATE

STUDIES -MBA PROGRAM

Productivity of Leather Industries and the Role of Quality Improvement Techniques in Pittards Product Manufacturing

A Case of Selected Leather Factory

BY

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ACRONYMS/ABBREVIATIONS

CSA- Central Statistical Agency

IDS- intrusion detection system

GTP- Growth and Transformation Plan

LIDI-leather industry development institute

ILRI- International Livestock Research Institute

RHS-raw hid and skin

PPM-Pittards product manufacturing

USA- United States of America

UK-United Kingdome

PDCA-Plan do check act cycle

ISO- International Organization for Standardization

TQM-Total quality management

MIE- Mauritius Institute of Education

GDP- Gross domestic product

USD- United States dollar

ERCA- Ethiopian Revenues and Customs Authority

LMB- Laboratory of Molecular Biology

HR-Human resource

UNIDO- United Nations Industrial Development Organization

KPI -Key Performance Indicator

OEE -Overall Equipment Effectiveness

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ABSTRACT

This thesis assessed role of quality improvement techniques in the productivity of Pittards Product Manufacturing. Quality improvement is a systematic, formal approach to the analysis of practice performance and efforts to improve performance. Leveraging the right one can lead to improved productivity, reduced errors, and greater profitability overall. Ethiopia is one of the largest country in the world for its livestock resources and indeed but it is underperformed due to different reasons. This leads the country to lose of comparative advantages in the global export competition and experience reduced export performance. Leather industries apply different techniques to improvement quality. While study had asses the role of quality improvement practices helps to improve Performance productivity. The descriptive research design was undertaken with the help of the structured questionnaire to conduct the research. The research had done based on the responses of employees from different section working in the selected case leather factory pittards product manufacturing. Data was collected from 109 respondents. The data found From 4 weekly production report we measured Overall Equipment Effectiveness of production of the company was on average 56.2.OEE bench mark show that the company was underperformed and need to improved manufacturing performance through straight forward measure. From the data this research found that the company faced quality related problems due to quality row material availability and lack of skilled manpower mainly. finally, the research recommended that Ethiopian leather industry development institute should implement a certain quality standards for leather product manufacturing companies and train farmers to practice modern husbandry system requires skilled labor, selected breeds, modern breeding techniques, and provision of sufficient health service and feed so as to improve current animal husbandry, slaughtering and preservation practices, which reduce the quality and value of raw hides and skins to improve the competitiveness of the sector.

Keywords: *Quality improvement, Ethiopian leather industry, Ethiopian leather industry development institute*

CHAPTER ONE

INTRODUCTION

This chapter presents an introduction to the study in which various sections have been produced. The sections include introduction background information to the study area, Organizational Profile and Statement of the problem. Other sections include significance of the, study scope of the study, limitation of the study, organization of the research report.

1.1 Background of the Study

What is quality?

Here are many definitions of quality. Some are more related to objective facts while others to more subjective feelings, but they are interdependent. If you look in a dictionary, you will find several definitions. In addition, every quality expert defines it in different way depending on their environment and criteria. Quality could be defined as a basic tool for a natural property of any good or service that allows it to be compared with any other good or service of its kind. The word quality has many meanings, but basically, it refers to the set of inherent properties of an object that allows satisfying stated or implied needs. Furthermore, the quality of a good or service is the perception that a customer has about it. It is a consumer's mind-set who accepts a specific good or service and acknowledges its ability to meet his or her needs.

What is productivity?

Productivity is the measure of the combined efficiency or integrated efficiency of employees, machines and other devices and equipment's, nature of raw material inputs, performance of the management, and efficiency of the whole production system. Productivity can be computed and expressed as the ratio of average acceptable output per period by the total costs incurred through various resources (Labor, Input material, consumables, power utilized, capital, energy, material, personnel) consumed in that period. It is nothing but a measure of efficiency of the integrated

system consisting of resources like Money, Men, Materials, Machines (4 Ms of an industry) and time as Dr. Meghan and Dr. Ruchika (2018) explain.

The global competition has forced business companies to examine their operation for the purpose of making improvement to their practices. This improvement involves better continuous improvement and result in higher level of quality. Minimizing defect is very important for ensuring the quality of products According to Mondal, Hasan, & Islam (2017). Uddin and Rahman (2014) explain how manufacturing a quality product is mandatory to sustain in this global competitive market. Ethiopian leather industry is an ancient industry with more than 90 years of involvement in processing leather and producing leather products. Misikir (2004) explain in the middle of the 1920s foreigners started modern tanning in Ethiopia called "Addis Ababa Tannery".it is the first tannery established in the country. Currently, there are 34 tanners in the country.

Ethiopia is one of the largest country in the world for its livestock resources and indeed the largest in Africa, with 59.5 million cattle, 30.7 million sheep and 30.2 million goats (CSA, 2016/17). In addition to this being a reliable and renewable source of raw material for the tanning industry and the leather goods sub-sector, it is also a source of meat, milk, fiber, fuel and fertilizer for the local consumption by the people. The country has built a reputation for producing world-quality hides and skins.

Ethiopia has prioritized the leather and leather products sector (IDS, 2003, GTP-I & II) and has designed and implemented sectorial policies, roadmaps and plans and created specialized institutions such as the leather industry development institute (LIDI) that support sustainable development of the leather industry. Because, Leather and leather products export plays an important role in Ethiopia's economy, influencing the level of economic growth, employment and balance of trade. Given the central role of leather and leather products exports in the economy, Despite the potential that exists in the livestock . The leather and sector is sub-sector is not satisfactory and characterized by low performance. Lisanework (2018) has explained that misunderstand the cause of the sector underperformed leads the country to lose of comparative advantages in the global export competition and experience reduced export performance. Therefore exploring the main cause of underperformance and product quality

improvement techniques trends in the world market, regarding leather and leather products industries export performance of the country is an important.

As most existing studies indicate that the main reasons for under performance of Ethiopian leather industry include low technology utilization, and low quality and unreliable supply of raw hid and skin (Dinh et al., 2012; Oqubay, 2015); supply of raw hid and skin (both quality & quantity), market, skilled labor and financial constraints (USAID, 2013); low quality of raw hid and skin (MoA and ILRI, 2013). What has emerged from our review of the existing studies and our discussion with various stakeholders is the importance of the quality of RHS. Two papers that have tried to address the issue of quality of RHS are Hailemariam (2005) and MoA and ILRI2 (013).

Discussing quality problems, it is critical to see the full picture. We argue that quality leakages occur along the value chain that are animal husbandry, processing and marketing of RHS, tanning and leather goods processing subsector. Each of these sub-sectors contains many actors and stakeholders that affect the quantity and quality of supply of RHS and leather products directly or indirectly. If organizations or sector to achieve continuous quality improvement it needs to use appropriate selection of quality improvement techniques. Most performance measurement and improvement methods used so far are not well designed to learning and rarely consider the personal ambition of employees, which results in insufficient improvement in the organizations' performance. Thus, the aim of this study is to examine the role of quality improvement techniques, causes of quality related problems in leather manufacturing industry, evaluate the current performance of the Pittards product manufacturing (PPM) and eventually forward a better firm level total performance improvement technique that enable the industry more productive and finally become main source for the economic development of the country.

1.1.2 Organizational Profile

Pittards product manufacturing is UK based Leather industry and it was established by Charles Pittards in Yeovil, Somerset, in 1826 as a leather dressing business supplying the many glove makers in the local area. In Ethiopia the company has operated its tannery in Edjersa since 2005 and processes both hides and skins in the manufacture of leather for gloves (including premium sports gloves), footwear and footwear linings here. The majority is shipped overseas to the manufacturing facilities of worldwide brands, making it the leading leather exporter in Ethiopia – but is also an important local supplier. Pittards product manufacturing (PPM) has been recognized for its integrity for the second year running, receiving an award together with certification for loyalty, accuracy, best practice and transparency in its business on 17th September 2020. The main reason that motivated this research is observing customer, production team complaints and loses of loyal customers of company.

1.2 Statement of the Problem

Survival of any company is strictly on its competitiveness in the market and the competition may be in a national or international level. As technology grows fast, management system becomes more computerized to increase efficiency, effectiveness and productivity in every dimension. According to Garry (1985), quality road to productivity is the shortest and most effective route to higher productivity.

Ethiopia leather is one of the leading industries playing a significant role in the generation of foreign currency, which ultimately the country utilizes, for developing all the other sector of its economy. From Ethiopian manufactured export 67% is from leather industry. Reports have indicated that the country was able to generate above US$60 million in a year from its leather industry the hides and skins are partially processed for export, or are tanned and finished goods industries as Deborah, Margaret and Xiaoyang (2018) research explained. This sectors is produce a range of products from semi processed leather in various forms finished consumer goods of leather garments, stitched upholstery, shoe uppers, handbags, industrial gloves, school bags and finished leather for different countries in Europe, USA, Canada, Japan, the Far East and the Middle East countries.

However, UNIDO report from the year 2008-2018 for the last 10 years indications that the quality of raw material has deteriorated with an increasing number of reject grades. Some of the defects in the tannery are unable to meet set standards for thickness, color, tear strength, tensile strength and the existence of other natural defects etc. These defective products are either downgraded or returned for retreatment, the returned items for rework are treated with chemicals and other quality improvement techniques. Leather products are downgraded or improper development as a result of various factors, including poor livestock management, poor quality raw material supply, low off-take and recovery rates, lack of skills, technology, intermediate inputs and processing equipment, Stiff competition among the existing tanners, low utilization of industry capacity, lack of or poor policies implementation for the specific development of the sector and Poor linkages among different organizations involved with hides and skins. Due to these problems the leather industry is unable to produce high quality products (skins & hides) which the export market demands.

Of all the specified constraints hindering development of the leather sector, the low quality of basic raw materials is the pressing issue in need of an immediate solution. Quality of these raw materials has implications on production costs and sales prices, which determine producer competitiveness in the world market. Poor quality materials are expensive to process and result in a high percentage of low grade products including rejects. This can lead to serious losses in earnings.

Quality related problems were apparent in all the sectors. There were many research conducted to alleviate the problems. Some of these are on: healthcare (Ermiyas, 2009), education (Jelalo, 2009), construction industry (Samson, 2008), manufacturing industry (Haben, 2008) and public service (Mihret, 2008). In their researches studied so far are either at organizational or sector level. More- over, most of the research was conducted on the consecutive results and effects of quality related problems. So far there is no effort to investigate role of quality improvement techniques used by leather product manufacturing productivity. So, the study aims to critically examine the main causes of quality related problems, role of quality improvement techniques and suggest solution to increase the productivity of Ethiopian leather industry.

1.3 Research Objective

1.3.1 General objective

General objective of this research is Investigation of Productivity of Leather Industries and the Role of Quality Improvement Techniques**.**

1.3.2 Specific Objectives

Specifically the study tries to address the following key research objectives:

- To describe productivity level of pittards product manufacturing.
- To explore respondents perceived reason for the main causes of quality related problems in pittards product manufacturing.
- To assess the main quality improvement techniques applied in Pittards product manufacturing
- To examine the role of quality improvement techniques in productivity of pittards product manufacturing.

1.4 Research Questions

The study is going to be guided by the following research questions:

- What is productivity level of pittards product manufacturing?
- What are the main quality related problems in Pittards product manufacturing?
- What are effective quality improvement techniques in pittards?
- What are the roles of quality improvement techniques in the productivity of the company?
- Who are responsible organizations to improve quality in Pittards product manufacturing?
- What are the possible solutions to solve quality related problems and increase productivity in Pittards product manufacturing?

1.5 Significance of the Study

The purpose of this study is to examine the role of quality improvement techniques in the productivity of Ethiopian leather in the case of pittards product manufacturing. It examines productivity level of pittards, the main causes for quality related problem in pittards. Also, identifies quality improvement techniques that the industry applies. The study further, recommend solution to reduce problems related to quality in the industry.

The leather industry is one of the many economic sectors, which should be given attention for the development of our country Ethiopia. It is leading industries playing a significant role in the generation of foreign currency, creating Job opportunity which ultimately the country utilizes, for developing all the other sector of its economy.

An organizations success is determined by the skill and motivation of employees. Recently, the global environment is changing faster; competition between organizations is increasing especially for manufacturing industry. With the increasing competitive, business survival pressure and the dynamic, changing customer-oriented environment, quality of products has been recognized as one of the important issues and generated a substantial amount of interest among managers and researchers. Quality management has been regarded as one of effective ways for industries to improve their competitive advantage .It calls for remedial action to be taken to solve the problem.

The study would enable the government and policy makers to formulate appropriate quality standards to overcome the problem. It helps the government to redesign the policies to fit the current environment, in relation to the quality related problems in leather sector. Government, Police administrators and Leather Industry Development Institute (LIDI) or actors will utilize the information gathered through this study in reducing the quality related problems and retention of Ethiopian leather. On the other hand, the findings of this research will help the firm understudy to better diagnose the impact of quality practice on productivity and profitability. It leads to development of strategies to reduce the leather sector quality problems (defects). Finally, this study will serve as the ground for those who want to conduct further studies in the related area. As such, it is expected to benefit both researchers and practitioners.

1.6 Scope of the Study.

This study delimited to the assessment role of quality improvement techniques with industry productivity. The target population was taken from pittards product manufacturing four factories. According to company profile pittards Leather Industry has four sub-factories. These are working Glove factory, fashion Glove factory, shoe factory and goods and garment factories which are found around saris kadisco. Due to this factories, the data collection for the research was delimited all factory. Since the main focus of the research was role of quality improvement techniques with industry operational performance of leather industry, it is assumed that quality improvement techniques mainly understood and practiced by quality and production supervisors and team leaders of the factory. The research has taken the total respondents from the target population of the study, and about 25% from factory one (shoe factory), 25% from factory two (working Glove factory) , 25% from factory three (fashion Glove), and 25% from factory four (garment and goods factory). The target respondents comprise production and some senior quality professional staffs of the factory who are working on a permanent basis. It was also decided for the simplicity and reliability of data that was collected.

The result of this study was mainly based on the opinion and ideas of the respondents who were selected judgmental randomly. Though, the causes of quality related problems in the company ‟ operational performance is contesting issues which deserve time series data collection, the data collection for this study delimited to the opinion of respondents which is collected once. The study had delimited to experimental method by using Stratified sampling.

1.7 Limitation of the Study

The study do not covered all possible determinants and there are many other lather manufacturing factories such as institutional quality, non-tariff barriers etc. These factors might have an impact on Ethiopia’s leather and leather exports. However, this study not covered all factors and under this research, impacts of those factors were assumed to be minor or insignificant. Actually, this is an inevitable issue for all researches. In addition, the paper does not deal with the export performance of leather and leather products at firm level. COVID 19 pandemic, time, financial limitation is the other limitation of the research.

1.8 Organization of the Research Report

The paper will be composed of four chapters. With this background, the report presents analysis and interpretation of the data gathered in the third chapter. Finally, the report concludes with the summary and conclusion of the study and recommendations that are made.

CHAPTER-TWO

LITERATURE REVIEW

2.1 Conceptual Framework

From the foregoing discussion, the conceptual framework that is developed to study productivity of leather industry in Ethiopia depend on the role of quality improvement techniques, which creates the values, goals, and systems needed to meet customers'" expectations and improve the operational performance of the industry and the skill and motivation of its members as by almost any other factors.

2.1.1Critical Success Factors for quality assurance

Quality Assurance is a metric with nearly as many variations as there are companies in the world. Every company has an idea of what they want quality to look like, and each creates a system they believe will bring them to that standard of quality. It's easy when setting up a QA system to make it too complicated. Everyone involved has something they think is critical to the contact. When all those things end up in one form, they create a jumble of expectations that frustrate agents and supervisors alike.

- There are 3 Key Factors for Successful Quality Assurance

1) Simplicity is Paramount

The first key with Quality Assurance is simplicity. How do you want your customers to feel about dealing with you? Listen to some calls or read some emails and chats that you believe embody the customer experience you want. Boil each one down to its essence. What do they have in common? How did it happen? That's what you want to replicate. Your QA plan should measure each contact against these. Where did they match up? What are the gaps? What actionable steps can be taken to make each contact more like these?

2) Feedback is Actionable

The second key is feedback. How your supervisors and QA staff handle the feedback from the monitoring makes all the difference in how it's received and put into practice. You've created a

simple form that agents and supervisors understand. It shows the gaps between the current contact and the ideal contact. It's actionable. Feedback has to make the desired action clear. A "drive-by" where the form is dropped on the agent's desk while they're involved with another customer is not feedback. It's the supervisor just checking a box, and it's not moving your company and its quality in the right direction.

3) Monitored and Recorded Contacts for Coaching

Contacts can be monitored live or recorded. Either way, being able to share the recording during the coaching can be useful. I once had an agent swear his call was not as bad as the resulting QA score reflected. I told him to bring the recording in and play it for me. We listened together for less than 30 seconds before he shamefacedly said, "Never mind, I see it now." We then had a good conversation about opportunities for improvement.

What to Measure?

In most cases we design and measure the quality against a predefined set of standards. In this way we can make sure agents are following the right processes and procedures. We can make sure all the rules were followed and the customers were given the correct information (or if there is an issue, what training and coaching is required). But this approach ignores the customer point of view. Were they satisfied with the outcome of the contact? Was the experience effortless for them? Customers may not be familiar with the internal requirements of a contact, but they are the ultimate judges when it comes to rating their experience with the quality of the contact. Your QA program must consider the customer's point of view.

• Today's best practice QA programs consist of two parts:

a) Compliance –an internal measurement against requirements; and

b) Customer Feedback – an external measurement based on customer experience with the agent and ultimately with the center.

2.1.2 Challenges of Implementing Quality System

There are challenges in implementing and designing quality management system in organizations;-

Too much theory

Organizations that are striving for perfection often go overboard. In an attempt to implement the "perfect" Quality Management System, they often focus more on theory than on putting theory into practice.

Lesson 1: The perfect QMS doesn't exist, but every QMS can and should be improved over time. When designing a QMS, make sure it is practical for the company. The theory is useless when you don't put it into practice. Focus on the theory, but focus even more on the implementation of that theory and the added value for your organization.

2. Too much documentation

Many organizations create way too many documents; sometimes even to such an extent that the documentation starts hindering the functioning of the Quality Management System. In such cases, employees can get lost in the documentation and they may lose interest in the QMS. As a result, the QMS will not yield the expected results.

Lesson 2: The objective of a QMS is not to create paperwork, but to formalize the right information (to be more efficient) at the right time. Make sure that your documentation supports the communication of information, proof of compliance (evidence of results achieved) and knowledge sharing and that it never hinders your daily operations.

1. Too many details

Organizations often want their documentation to include as many details as possible. Evidently, this takes time and resources and will result in a more difficult application of the documentation.

Lesson 3: Make sure that your documentation is compliant with all the laws and regulations and that it supports (and doesn't hinder) the different activities of your company. Some documents may require a high level of detail, others don't. It is up to you to choose the appropriate level of detail for your situation. Think lean: include all and only the most important information at the right time.

2. **Too much rigidity**

If your Quality Management System is too rigid and inflexible it will be difficult to improve when necessary. As a result, it may not guarantee the best results for the future.

Lesson 4: Customer requirements and organizations are constantly evolving. Therefore, Quality Management Systems must evolve as well. They must be improved over time to remain consistent with the changing circumstances of your business. This will improve your performance and enable you to seize new opportunities.

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4. **Not enough implication and communication**

From time to time, a Quality Management System is only supported by the Quality Manager(s). In such cases, colleagues often think that the QMS 'belongs' to the people who created it and -as a consequence – they don't actively contribute to the quality system. Instead, they just 'follow' the QMS whenever necessary.

Lesson 5: Make sure your staff members clearly understand their role and responsibilities in the Quality Management System. Otherwise, they won't feel part of the system. You need the full support of your entire organization to get the desired results.

It takes great leadership and communication skills to get the most from a QMS. If you inform your staff about successes and challenges it will serve as a motivation, and if you share lessons learned it will start discussions that will prevent you from making the same mistakes again.

6. Not enough motivation

When organizations implement a QMS because of external factors only (e.g. a client demands a certified QMS, competitors have an advantage because they are certified and you are not), it will be hard to get the best results from your QMS.

Lesson 6: Top management and staff should be fully on board and intrinsically motivated to get the best results from your QMS. Everyone must feel responsible for the overall quality of the product(s) or service(s) you offer and everyone should know his/her role in the QMS.

7. Not suitable enough

Sometimes a Quality Management System is 'delivered' as a 'ready to use' system. However, if a QMS is out of sync with the company's strategy and operations, it will be very difficult to get the results you want.

Lesson 7: Quality Management Systems such as ISO 9001 are based on the obligation of results but not on the obligation of how to reach them. It is up to the company to choose the way that suits them most, so set up your Quality Management System in a way that fully supports your staff, processes and business.

8. Not enough attention to customers

We often see that companies are focused on quality but not so much on customer satisfaction.

Lesson 8: Without your customers, there is no business. Never forget that Quality Management Systems such as ISO 9001 are based on customer satisfaction. The goal is to achieve and maintain customer confidence. Therefore, it is necessary to know your customers' requirements and expectations and to measure your customers' satisfaction continuously.

Productivity can be defined as a measure of effectiveness of a production system. Producing right type of products of right quality (as per the design requirements) is what is expected from the term productivity. Productivity is a product of rate of production and the quality of outputs and therefore it is rather outcome-oriented than output-oriented (Sreekumar, Meghna, Ruchika, 2018. In the studies that have investigated the relation of productivity to various dependent variables. The quality management practices identified in measurement studies by Abdurrahman Alsughayir, (2013:3, 7). Pignanelli, A. and Csillag, J. M (2012:7) in review states that most of the studies that consider productivity and profitability as a dependent variable in the evaluation of quality management practice impact on operational performance, presented in the Literature Review.

Based on the above literature review the conceptual framework of this study was developed. (See Fig 2.1 The model demonstrates the relationship between low quality product and industry operational performance and productivity through exploring the combined direct effects of 9 identified quality related problems on two main business dependent variables operational performance i.e., industry productivity and profitability. By following the literature, this study focuses on the 9 quality related problems: Equipment and Machines, Skilled manpower, Input Raw material, Customer focus, Training and education, Strategic quality planning, Benchmarking, Product design, work environment, HR related problems , and also two operational performance dimensions i.e. industry productivity and profitability.

1. **Equipment and Machines** the number of machine tools, their capacity and accessories required, replacement policy of the organization and maintain productivity and profitability schedules etc.
2. **Skilled manpower** selection of right man for a specific job applying well known saying division of labor. Training i.e. consideration of training requirements whether to be imparted training in the plant itself or to be sent for training outside the unit to other plants within the country or abroad or training institutes.
3. **Input Raw material** input raw materials meets appropriate quality, requirement planning, Substitute of materials being used the output requirements and cost of input raw material important factors that affect the overall productivity. Availability of right

material in manufacturing industries definitely affects the productivity. Similarly material of inferior quality like high hardness had also affected the productivity of workers.

4. **Customer focus** Organizations must be knowledgeable in customer requirements and responsive to customer demands, and measure customer satisfaction through quality implementation (Zakuan et al., 2010, Talib et la 2010). According to the review results from Hackman and Wageman (1995), obtaining information about customer is one of the most widely used Quality implementation practices to improve quality performance of the organization.
5. **Training and education** Training and education spread the knowledge of continuous improvement and innovation in service process to attain full benefits and business excellence. Talib and Rahman (2010) reported the critical role of training and education in maintaining high quality level within the service industry.
6. **Benchmarking** Bench marking is the process of comparing performance information, within the organization as well as outside the organization benchmarking for improving the performance of the organization and to achieve competitive advantage. It helps in continuous service improvements and establishment of customer satisfaction.
7. **Product Design** Product design examines an organization's quality and service delivery performance in terms of timeliness, errors and costs of quality, responsiveness, and customer satisfaction. These indicators are used for measuring the product and service design quality (Faisal Talib et la 2010).
8. **Working Environment** Working environment has a direct impact on employee productivity and morale in any organization Better temperature conditions, improved air circulation and quality, providing enough lighting, reduced noise level, availability of drinking water, etc. create a better harmonious working environment. This will motivate the employees to work harder and more effectively which can lead to improved quality and productivity of the organization. It is an accepted fact that if the workers are kept happy and healthy, they will perform better.
9. **HR related matters** HR related issues which were disturbing the minds of the workers. Delay in payment of regular wages and other financial benefits, promotion related issues, other personal oriented issues were there. that also have effect on production capacity of workers.

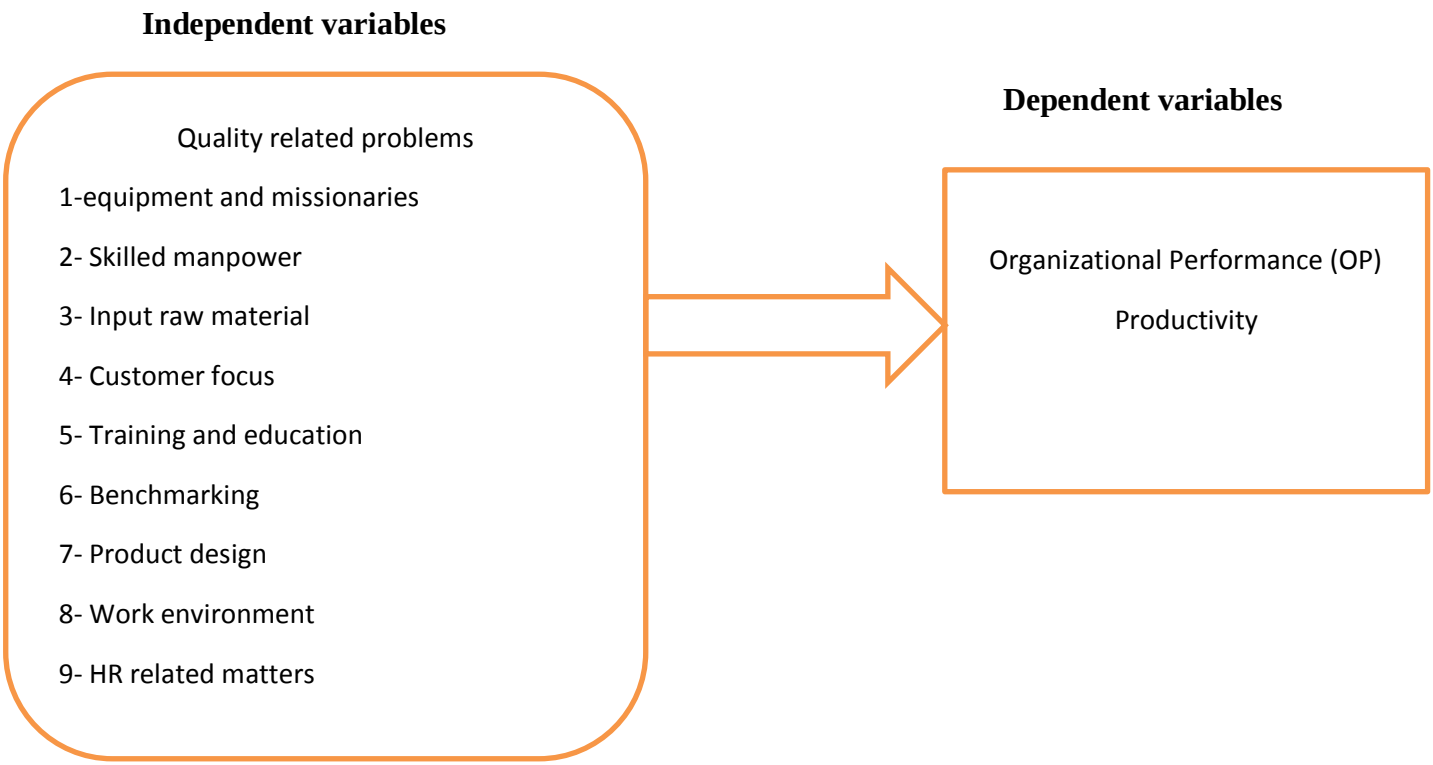

Figure2. 1 Adapted from Abegaz Tadesse (2015)

2.2 Theoretical Review

2.2.1The concept of quality

After reviewing the literature, the authors noted two strategies for defining quality. The first is to construct a broad definition that targets one central goal or outcome, such as fulfilling a stated mission or vision (Bogue, 1998; Harvey & Green, 1993). There are 13 broadly constructed definitions of quality in the literature reviewed. Some definitions are primarily standards-driven, focusing on meeting a pre-defined set of standards, specifications, and requirements, or focusing on exceeding the highest standards in pursuit of excellence and exclusivity (Cheng & Tam, 1997; Garvin, 1987; Green, 1994; Harvey & Green, 1993; Harvey & Knight, 1996; Martin & Stella, 2007; Peterson, 1999; Vlăsceanu et al., 2007). Other definitions are primarily stakeholder-driven, focusing on accountability to the public or providing a transformative learning experience to benefit students and employers (Bogue, 1998; Harvey, 2005; Haworth & Conrad, 1997; Quality Assurance Agency for Higher Education, 2012; Srikanthan & Dalrymple, 2002, 2004, 2007).

According to Garvin (1984) for competitive advantages product quality is an important issue. He comes up with five different definition approaches to define quality as transcendent approach, product-based approach, user -based approach, manufacturing-based approach and the value -based approach. In1984 he identified eight dimensions for product quality namely performance, features, reliability, conformance, durability, service ability, aesthetics and perceived quality. There is no clear definition what quality is and what managers can really do to achieve it while serving their customers. Philip Crosby (2016) is another person credited with starting the TQM movement. He made the point, much like Deming, that if you spend money on quality, it is money that is well spent. Crosby based on four absolutes of quality management and his own list of fourteen steps to quality improvement.

Joseph Juran (2017) is responsible for what has become known as the "Quality Trilogy." The quality trilogy is made up of quality planning, quality improvement, and quality control. If a quality improvement project is to be successful, then all quality improvement actions must be carefully planned out and controlled. Juran believed there were ten steps to quality improvement. These steps are;an awareness of the opportunities and needs for improvement must be created,

improvement goals must be determined, organization is required for reaching the goals Training needs to be provided, initialize projects, monitor progress, recognize performance, report on results, track achievement of improvements and repeat.

Shewhart (2019) defined quality through an account of production (later called value generation theory) and suggested the scientific model (later to be named as Plan-Do-Check-Act cycle, PDCA) as the epistemology for improving quality. Somewhat later, Deming recommended ideas falling into process ontology as applicable in the quality context. These prescriptions were not presented in terms of theory, epistemology or ontology but through examples. Perhaps partly for that reason, in subsequent developments these prescriptions were often forgotten or rejected. Especially, the ISO standard for quality management rediscovered the original PDCA epistemology only in 2015. Thus, the degeneration of the original theoretical and philosophical foundation seems to be one of the longstanding problems in the area of quality. On the other hand, it has turned out that the value generation theory of production is a partial theory. As the success of the lean movement indicates, production should also be seen through the flow theory. The achievement of quality can, for its part, also be explained through this flow theory of production. However, there has been very little theoretical work both regarding production and quality, and thus the integration of theories on production has not been achieved. Lacking theoretical evolution is another long-standing problem that arguably has hindered the progress of quality.

According to Juran & Godfrey (1999) Quality can positively affect an organization, firstly by improved financial outcomes, increasing profitability, and secondly by the quality cultural transformation, which drives to sustainability. (Juran & De Feo, 2010) Moreover, poor quality will result in unsatisfied customers and thus lead an organization in losing market or even close.

There are also theories reviews the bodies of knowledge that the researcher examined the impact of quality management on profitability and productivity. In response to increase global pressures – customers‟ demanding superior quality of products and services, the global marketplace has become very competitive, many organizations have adopted practices such as total quality management (TQM), and benchmarking.

Many scholars claim that managers can implement TQM in any organization in any sectors of the economy such as manufacturing, service, education, and government (Dean & Bowen, 1994), and that it generates improved products and services, more satisfied customers and employees, reduced costs, improved financial performance, enhanced competitive, and increased productivity (Zu, 2009; Kaynak, 2003; Deming, 1986). Increasingly, more importance is being given to "quality" in organizations. This is mainly because organizations are realizing that quality management strategies are the most important strategy tool in competitive advantage in the business operation. (Flynn, Schroeder, & Sakakibara, 1994). This emphasis can also be partly attributed to the new emerging values of Organizations that adopt a quality management strategy focus like kaizen in Ethiopia on achieving and sustaining a high quality outputs using management practices as the inputs and quality performance as the outputs.

2.2.2 Quality testing

Tests can indicate the various environmental conditions and constraints to which products are exposed when used by customers. According to practical handbook published at 1987 explain that manufacturing industries can also prevent recurrent quality problems through analysis of the feedback data from the field; they can identify the failure mechanism and establish corrective action for new designs, identify any malpractice or malfunction revealed and indicate the corrective action to be taken during the manufacturing process. Finally, results of accelerated durability testing predict the life of the product. Such tests are performed under stringent environmental conditions for components which are critical for safety and for customers' needs. Quality assurance procedures in the market must cover the pre-sale, on-sale and after-sale stages.

2.2.3 Quality Improvement Methods

Deming is philosophy worked as a consultant in Japan, helped the Japanese industry increase their quality and improve productivity, with his philosophy and methods for quality improvement and thus he made a huge contribution to the Japanese economy.(Deming, 1986) Quality improvement can be applied to all kinds and sizes of business, from industry and production of products or foods to services, even in a company department. (Deming, 1986) There are many examples of successful quality improvement practices in Deming's book "Out of Crisis". According to Deming, quality improvement transfer the

waste of human or machine work hours and operation time, in the creation of better products and services.

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According to Ibrahim and Saad (2018) research Productivity is considered one of the main indicators that measure the efficiency of an individual, institution, or the state in general. Industrial companies are within one of the most important sectors that contribute to the overall development of the country. Additionally, Libya is one of the oil-based countries, and industrial companies in Libya should be at a certain level of competition in order for them to enter the export market. Productivity is a key factor that is utilized by firms to remain competitive in the market. Firms have to closely monitor every aspect of productivity.in addition; they try to identify Factors Causing Low Productivity of Companies which is Lack of

the Good Management, Inappropriate Production Systems and Employees Technical Skills and Dissatisfaction.

2.3 Empirical literature review

Birhanu and danel (2014) conduct the study Quality management practice in Ethiopia has explains most of the stakeholders that quality related problems are the stumbling block for the majority of the industries.

According to Sisay (2019) conducted an exploratory study on TQM practices in the manufacturing industry. He explain manufacturing industry of Ethiopia is characterized by a low level of development, with a share to GDP stagnated. In addition Apart from dozens of issues, quality-related problems have been identified as the stumbling block for the development of MIE (Addis, et al., 2017), and sometimes the challenge is referred as "low-quality trap" (Altenburg, 2010, p. 9). It is also justified that quality will remain as the future challenges of competitiveness for organizations in Ethiopia Beshah and Kitaw (2014). Despite this, significant efforts have not been made by academicians/industrialists to introduce appropriate management philosophies in the MIE, even basic quality tools and techniques (Kahsay et al., 2007).

According to Demeke (2019) productivity defined by researchers as follow Eat well and Newman (1991) defined productivity as a ratio of some measure of output to some index of input use, As stated by Kulkarni et al. 2014, productivity is the ratio of output and the input. I.e. Productivity = Output/ Input (Verma et al. 2015).

According to Mishra (2013), productivity improvement focuses on: Doing the ―right things to produce and distribute by continuously reviewing and identifying changing customer and societal needs. Doing ―things right to produce and distribute by constantly improving production and distribution processes to produce and deliver the goods and services in the most efficient way, Lim and Hoffmann (1997) found that improved layout of the workplace increased productivity of the workers, through more economical use of hand movements by conducting an experiment on hacksaws assembly.

Yibralem (1999) explain that Low quality supply is the main factor for low quality leather, low selling price, and higher cost of production, higher rejection rate, and unsellable products and finally result for loss of economic growth in the country.

2.3.1 Quality for Productivity

few researches have been conducted to study the possible relationship between quality and productivity. Most of the researches mainly focused on creating mediator-based analytical relationship. The mediators used until recently include: profitability (Everett et al., 1981); profit (Sumanth and Arora, 1992); unit profit (Lee et al., 2007); efficiency and utilization and maintenance (Khan and Darrab, 2010). researches which tried to show and correlate quality and productivity came up around the end of the 1990s. Mohanty (1998), tried to see some peculiarity between the two concepts in terms of some variables. He showed that the two ideologies perfectly correspond in terms of culture and responsibility; he however observed slight distinction among them when he viewed in terms of definitions, organizational objectives, and decisions. Whereas definition for quality was customer- driven, definition for productivity was organization-driven; whereas quality's organizational objective was minimizing waste, productivity's organizational objective was maximizing resource utilization. Moreover, Vaziri- (1987), depicted the traditional and emerging ideological views of these two concepts; the **emerging view** primarily targets on delighting customers whereas the **traditional view** mostly emphasized on end result, which was profit. However, they had little deviation when evaluated in terms of their driving forces and measurement approaches; the driving force for quality was inspection and for productivity it was increasing efficiency. Quality was a concern to meet customer specifications and productivity was used as an approach towards achieving the targets set by organizations – labor

Garry (1985), noted that the "quality road to productivity is the shortest and most effective route to higher productivity". Pantera (1985), also affirmed as "quality, not quantity is key to productivity "Other Productivity. Similar studies also vowed that quality incorporates productivity since only through quality improvement can productivity be enhanced and the route to increased productivity is by increasing quality (Hart and Hart, 1989; Sumanth and Arora, 1992;). Butts (1984), also described poor quality as "a vampire-like creature which

takes bite after bite out of productivity". Overall, quality and productivity came closer in most of the criteria used to express their relation.

On the contrary, Gitlow (1990), believed that emphasizing only on productivity will sacrifice quality and may even lower output. Hsu and Spohrer (2009), indicated that quality is a measure of value from the customer perspective, and productivity is a measure of value from the provider perspective. There are also other researches which showed possible negative relationships that might exist between the two concepts (Sumanth and Arora, 1992).

Up till now, their relationship remains controversial. Lee et al. (2007), identified five sets of researches that attempted to relate quality and productivity: mutually conflicting; synonymous; hard to relate them due to the existence of a large variety of definitions; the relationship exists and should be positive; and productivity can be enhanced through the improvement of quality. Then, what are the sources of such confusions in understanding the linkage between the two concepts, both in academics and practice. Even if based on logical reasoning, most researchers believed as the two concepts have positive relationship (Mohanty and Yadav, 1994). Thus, improving quality and boosting productivity are in conflict only when productivity is narrowly defined and viewed exclusively from the producers standpoint (Parasuraman, 2002, Parasuraman, 2010; Armando, 2011).

After companies determine customer needs, they must concentrate on meeting those needs by yielding high quality products at an efficient rate. Companies can improve quality and productivity by securing the commitments of all three levels of management and employees as follows: top-level management to Implement sound management practices, middle management to plan and coordinate quality and productivity efforts and low-level management to work with employees to improve productivity through acceptance of change, commitment to quality, and continually improving all facets of their work.

Productivity is the relationship between a given amount of output and the amount of input needed to produce it. Profitability results when money is left over from sales after costs are paid. The expenditures made to ensure that the product or service meets quality specifications affect the final or overall cost of the products and/or services involved. Efficiency of costs will be an

important consideration in all stages of the market system from manufacturing to consumption. Quality affects productivity. Both affect profitability. The drive for any one of the three must not interfere with the drive for the others. Efforts at improvement need to be coordinated and integrated. The real cost of quality is the cost of avoiding nonconformance and failure. Another cost is the cost of not having quality—of losing customers and wasting resources.

As long as companies continually interact with their customers and various partners, and develop learning relationships between all levels of management and employees, the levels of productivity and quality should remain high.

2.3.2 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.

The better an organization's quality is, the more competitive the organization is (Goestch & Davis, 2016). Everything will function better as long as the organization stays competitive. Only organizations that produce quality products can compete, and stay, in the market. An organization that offers a quality product and employs quality leadership will always be able to stand out among competitors. In order to remain competitive, organizations must ensure to reduce the costs associated with poor quality. Goetsch and Davis (2016) list excessive overtime, pricing and billing errors, development cost of the failed product, handling complaints, planning delays, and lack of follow-up as some of the costs that must be reduced.

2.3.3 Customer satisfaction

Customers today have different needs and increasingly demand for higher quality of products and services. However, in majority of case customer priorities often differ significantly from what organizations think they are (Quinn & Humble, 1993). While the needs of customers has been recognized as being of crucial importance but that understanding has not yet been fully

translated into action in terms of accessing the necessary information. In general definition "quality" is "satisfying customer's requirements" (Ghobadian, Speller, & Jones, 1994). What quality means for the customer today no longer constitutes a competitive weapon but the basic core offering expected by customers Drucker (2005) suggests that the sole purpose of any organization is to create value for its customers. To enjoy superior performance, we need to serve the customer in distinctive ways to attract, Customer satisfaction goes beyond service experience that a customer went through. It incorporates value judgment and comparison to initial expectation of what the service quality should be; oftentimes based it is an overall comparison between the value that customers perceive and the price that they pays (Rust & Zahorik, 1993). By focusing on customer value organizations think outwards, toward external customers and about ways in which customers can achieve greater responsiveness to their needs (Wooduff, 1997). Fulfillment of customer needs through delivering customer value, in turn increases customer loyalty (Gronholdt, Martensen, & Kristensen, 2000).

2.3.4 Productivity Concepts

Productivity is the ratio between output and input. It is quantitative relationship between what we produce and what we have spent to produce. According to Bernolak (1997) productivity means ―how much and how good we produce from the resources used,‖ whereas The European Association of National Productivity Centers (EANPC, 2005) defines productivity as ―how efficiently and effectively products and services are being produced.‖ Efficiency in this context can be seen as ―doing things right‖ or utilizing resources to accomplish desired results (Grünberg, 2004). Productivity statistics also assume that if more input were available, output would increase at the same rate. This may not be true, as there may be limits to output other than those on which the productivity calculations are based. Furthermore, productivity emphasizes output produced, not output sold. If products produced are not sold, inventories pile up and increases in output can actually accelerate a company's decline.

Effectiveness, on the other hand, is often described as ―doing the right thing‖; it refers to the extent to which customer requirements are met (Neely et al., 1995). Thus, effectiveness highlights the importance of reaching a desired objective, whereas efficiency focuses on the process or means involved. Definitions of productivity seem to be dependent on the reviewer's point of view and the context in which it is used. Studies on technology, engineering and

economics, three broad industry categories, all examine productivity from slightly different viewpoints (Ghoabadian and Husband, 1990). Productivity = total output/total input which is identical to total results achieved/total resources consumed or effectiveness/efficiency. In effect, productivity becomes the attainment of the highest level of performance with the lowest possible expenditure of resources. It represents the ratio of the quality and quantity of products to the resources utilized.

Profitability is defined as output volume times output unit price, over input volume times input unit costs (Bernolak, 1997), or profitability = productivity + price recovery (Miller, 1984). Van Loggerenberg and Cucchiaro (1981) explain how changes in profitability are caused by changes in productivity, price recovery, or in both of these factors. A significant point to consider is that the profitability of a company can change for reasons that have nothing to do with productivity (Bernolak, 1997). A company can increase its profits and at the same time decrease its productivity because of market mechanism (Grunberg, 2004).

2.3.5 Ethiopian leather industry

Leather industry is one of the prioritized industries for the diversification of export and foreign exchange earnings (Ministry of Finance and Economic Development, 2010 and National Planning Commission 2016). While Europe had been the main destination until 2011, the United States, China, neighboring Kenya and Canada came to be the main importers of Ethiopian footwear in 2016, according to data from ERCA.

During the last two years of the second Growth and Transformation Plan (GTP II), the low performance of leather and leather products export compared to the plan continued. In 2015/16 the plan was 206.6 million dollar while the actual export was 115.3 million. In 2016/17 the plan was 272.7 million USD with the performance of 114 million USD. In the remaining three years an ambitious plan of reaching 368.1 million USD, 505.0 million USD and 706.5 million USD envisaged in 2017/18, 2018/19 and 2019/20 respectively (Ministry of Trade, 2017).

Despite some limited encouraging results, the leather and leather products industry faces enormous challenges that require grand strategic initiative to address the constraints. The problem of the leather and leather products sector among others includes shortage and low quality of raw materials, high cost and inefficient logistics, transportation and custom services,

lack of information, power and water utilities, marketing orientation, lack of skilled human resource (both technical and managerial), low level of technology use and financial constraints which limits the competiveness of the sector (LIDI, 2015).

Berihu and Mulu (2018) conduct study In Ethiopia Starting from the days of the imperial regime, various policies and strategies have been developed to boost the performance of the manufacturing sector in general and that of the leather and leather products industry in particular. As part of this policy, the Livestock and Meat Board (LMB) were formed in 1964 using Proclamation No. 212/64. The proclamation targeted improving leather quality through modern preservation process and a trading system that applies price discrimination on basis of quality of raw materials (Mahmud, 2000). The board was also involved in setting up market centers in different provinces and appraising and monitoring the erection of slaughterhouses. In 1972, the LMB initiated and implemented the Second Livestock Development Project (Girma, 2002).

Leather Processing and Product Research and Innovation Center from Ethiopian textile and fashion technology examine that most Ethiopian Leather processes and product industries and SME's are facing a serious problem related to shortage of finished leather, lack of quality raw material, design weaknesses, manufacturing related problems, lack of Effluent treatment, lack of good management etc. (LIDI 2017, UNIDO 2012).

Tomas and Robel (2018) conducted the study on Performance Measurement and Improvement Method for Leather Footwear Industries reveal that the overall performance of the sector is unsatisfactory due to various internal and external factors which include: poor performance measurement practice, limitation with inputs, poor production planning and control practices, high manufacturing cost.

CHAPTER THREE

3. RESEARCH METHODOLOGY

3.1 Research Design

The research design used in this study is descriptive. The study aimed at assessing the role of Quality improvement techniques on the productivity of Pittards product manufacturing. the reason to use this research design that is used to show the effect of the independent variables on the dependent variables is usually observed and recorded over some time, to aid researchers in drawing a reasonable conclusion regarding the relationship between these variable types.

3.2 The Study Approach

A descriptive type of study was adopted in this study preferably because it makes enough provision for protection against bias while maximizing reliability with due concern for economic completion of the study. The study relied on individuals' self-reports on their knowledge, opinions and attitudes. Kothari (1990) Descriptive research includes surveys and fact-finding enquiries of different kinds. The major purpose of descriptive research is description of the state of affairs as it exists at present. Given the purpose of the study, which aims at assessing the role of quality improvement techniques in the productivity of pittards product manufacturing, the study adopted both quantitative and qualitative approaches.

3.2.1 Primary data sources

The primary data was collected from, line Quality controller, Quality supervisors, Quality managers, production supervisors, production manages and sales and marketing officers using primary data questionnaire and observation to assess the role quality improvement techniques on the productivity of in pittards product manufacturing.

3.2.2 Secondary data sources

To strengthen the reliability of research data and supplement the information missing in the questioner survey, information will be collected from other related researches, Journals, the company procedure and policy and weekly production report of the company.

3.3 Study population

Population is a group of individuals who have one or more common characteristics that are of interest to the researcher (Best and Khan, 1998). The population for this study included workers under Pittards product manufacturing whose sum is 109.

3.4 The Sample Size

According to Babbie (1992), the sample is a segment of population in which the researcher is interested in gaining information and drawing conclusions. While selecting a sample size, researchers are advised to put into consideration three important aspects namely; the availability of population, methods of sampling to be used and the financial resources available for the facilitation of the specific study (Charles, 1995). The sample drawn consisted of respondents, of which were from production manages 4; quality manages 4, sales and marketing officers 9, line quality controller 125, production supervisor 4, quality supervisor 4 the total number of respondents to be 150.

This study will apply simplified formula provided by Yamane, (1967) to determine the required sample size at 95% confidence level, degree of variability = 0.5.

Where:

n = Desired sample size

N =Total population size

e = Accepted error limit (0.05) on the basis of 95 percent degrees of confidences put into decimal form

$$n = \frac{N}{1 + N(e)^2}$$

$$n = \frac{150}{1+150\ (0.05)\ (0.05)}$$

$$n = \frac{150}{1.375}$$

n = 109

Currently, Enterprise, Key Account Department has 6 different sections. To have fair distribution between the sections, purposive sampling method will be used. Population number for each section taken from the division's monthly report (July, 2017).

Table 3. 1 responndant from each section

Sections Name	No. of Population	Sample
Factory Production managers	4	4
Factory Quality managers	4	4
Sales and marketing officers	9	5
Line quality	125	30
Production supervisors	4	4
Quality supervisors	4	4
	150	109

3.5 Sampling Techniques

Sampling is the procedure of a proper subset of the elements from the population so that the subset can be used to make the interference to the population as a whole (Charles, 1995). Moreover, sampling enables generalization to be made on a large population (Babbie, 1992). The sampling techniques for this study were purposive sampling used in order to increase the number of representative sample the main concerned positions. It also improves the accuracy and representativeness of the results by reducing sampling bias. However, it requires knowledge of the appropriate characteristics of the sampling frame (the details of which are not always available), and it can be difficult to decide which characteristic(s) to stratify by.

3.6 Data Collection Methods

In the research questionnaires to quality related workers, and collected by factory supervisors and for primary data. Secondary data was collected through reviewing different books, past studies, company production report, journals and through the internet.

3.7 Validation of Instrument

The instruments in question form were given to five people and the supervisor before they were put in use and where there were corrections and amendment, all were accommodated before data collection process.

3.8 Data Analysis Method and Interpretation

The research was applied quantitative and quantitative techniques for data analysis. The qualitative technique employed the application of content analysis which was supplemented by descriptive analysis done by the MS Office Word software package ready for interpretation and quantitative techniques the data were presented in form of table Percentage, frequency clear understanding to everyone.

3.9 Key Performance Indicators

KPIs (Key Performance Indicator) are a selection of general performance indicators evaluating the success, performance of a solution or an activity. KPIs are always used to measure and evaluate the organization success or the output (product's success).

KPIs are calculable measurements that show the organization success factors, they will differ depending on the organizational structure, working environment and culture.

Key Performance Indicators usually are long-term considerations. The definition of what they are and how they are measured do not change often. The goals of specific key performance indicators can be changed when the organization goals, mission, and vision change or it will change when the organization accomplished the goals.

- Overall Equipment Effectiveness (OEE) is a main measurement method of efficacy in the manufacturing processes (the machine or equipment, manufacturing cell or assembly and operation or production line levels).

This is a measurement of the operational performance of the production lines maximizing equipment efficiency means making it work as well as it possibly can by eliminating all the losses that prevent this. According to Frost (2005), the OEE calculation based on three contributing factors, Availability, Performance, and Quality.

- **Availability** is the time that the equipment is actually operates without any break downs or interruptions, and it is expressed as a percentage of the time for which it; -

$$\text{Availability} = \frac{\text{loading time} - \text{Downtime}}{\text{Loading time}} \quad \ldots\ldots\ldots\ldots\ldots\ldots (1)$$

$$\text{Availability} = \frac{\text{Actual production time}}{\text{Planned production time}} \quad \ldots\ldots\ldots\ldots\ldots\ldots (2)$$

Downtime is a cumulative time that caused when an equipment or machinery is breakdown in a standstill situation due to human made and non-human made factors. (i.e., set up adjustment electric power shortage or interruption, motor failure; change over time, absent of operators and unplanned maintenance)

- **Performance** takes into account Speed Loss and indicates whether the equipment is actually operating as fast as the equipment capacity as initially designed, (i.e., at the standard speed or cycle time).

$$\text{Performance} = \frac{\text{Current run rate}}{\text{Ideal run rate}} \quad \ldots\ldots\ldots\ldots\ldots\ldots (3)$$

Usually, the performance rate measures the ratio of the actual operating speed of the equipment's that was used for the manufacturing (assembling) the output or product. (I.e. the maximum speed minus some speed losses that caused by different barriers like minor slowdowns and idling work force).

- **Quality** is the amount of acceptable product produced which are without any defectives or rework, as a percentage of the total amount of products actually processed (includes all defectives).

$$\text{Quality} = \frac{\text{Actual output}}{\text{Current run rate}} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (4)$$

The quality rate only takes into consideration the quality losses (number of items rejected due to quality defects) that happen close to the equipment, not the quality losses that appear downstream.

Different losses that are affecting the equipment efficiency can be calculated as described in the above and they can be multiplied together to give an overall equipment efficiency indication to show how the equipment is effectively utilized. The resulting percentage is called the OEE and is calculated as follows:

OEE= Performance X Quality X Availability

According Nakajima (Raouf, 1994) asserted that any business firms who have the result that is higher than OEE > 0.84 is consider as a world- class firms and Nakajima considers these figures as a good bench mark for typical manufacturing capabilities.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND INTERPRETATION

Presentation of findings is in line with the research questions that guided the study. Background information about characteristics of the respondents like education level, edge, and their work position.in addition from weekly production report we found the productivity level of the company and Respondents were further asked to rank the various statements concerning the quality of company using the Likert Scale comprising of five ranking which were “strongly agree”, “Agree”, “Neutral”, “Disagree”, “strongly disagree”.

4.1 Respondents’ Demographic Characteristics

The purpose of the study was to examine the role of quality improvement techniques in pittards product manufacturing. The information generated to address the stated research objectives is solicited from respondents with diverse demographic characteristics. The first part of the questionnaire consists of the demographic information of the participants. This part of the questionnaire requested a limited amount of information related to personal and professional characteristics of respondents. Accordingly, the demographic variables about the respondents were summarized and described in tables. These variables include: age number of service years of the respondents in the factory, the highest educational level achieved, field of specialization, and current position of work in manufacturing.

Table 4.1 Respondents’ Demographic Characteristics (N=109)

Level of education	**Age**				**Total**	
	25-40		41-60			
	Number	Percent %	Number	Percent %	N	%
Training certificate	33	30.3	5	4.6	38	34.9
College Diploma	26	23.8	5	4.6	31	28.4

First Degree	16	14.7	7	6.4	23	21.1
Masters	5	4.6	8	7.3	13	11.9
PhD	1	0.9	3	2.8	4	3.7
Total	**81**	**74.3**	**28**	**25.7**	**109**	**100**

Position	**Number**	**Percent (%)**
Factory Quality managers	17	15.6
Factory Quality supervisor	10	9.2
Line quality controllers	33	30.2
Factory production managers	16	14.7
production supervisor's	16	14.7
sales and marketing officers	7	6.4
Customers	10	9.2
Total	**109**	**100**

The following survey data show the response of the respondents on the questions which asked them to state their ages, level of education and work position.

- Out of the 109 (100%) respondents 28 (25.7%) were between the age of 41 and 60 years while 81 (74.3%) were between the ages of 25 and 40 years of age.In case of educational level, 13 (11.9%) respondents had Master degree, 23 (21.1%) had first degree, 31 (28.4%) had Diplomas, 38 (34.9 %) had certificates. The statistical data shows most of pittards workers are young and low level of education.
- Pittards is structured basing on different positions in this research most of respondents are line quality controllers. Out of the 109 (100%) respondents 33 (30.2%) where line quality controllers, 16 (14.7%) where quality and production managers and production

supervisors, 10 (9.2%) where quality supervisors, and customers and the rest 7(6.4 %) of respondents where sales and marking officers.as shown in the table 4.1.

4.2 Productivity of pittards from factories weekly production report

As weekly production report of the factories show a machine was supposed to run for 48 hours per week, but suffered a breakdown and only ran 39,42,38,36 hours for four weeks the availability would be shown in the table 4.2 below. As the data showed Low asset availability can tell as that a machine is breaking down too often or for too long. This might mean the asset isn't getting the proper amount of preventive maintenance, or critical spare parts aren't available to quickly repair a problem.

Table 4.2 availability of production

Week	**Actual production time(hr.)**	**Planned production time(hr.)**	**Availability**	
			Number	Percent (%)
1	39	**48**	0.81	81
2	42	**48**	0.87	87
3	38	**48**	0.79	79
4	36	**48**	0.75	75

Next, measure the performance of an asset by dividing the actual system throughput by its maximum possible throughput.

Gloves production runs for week 48 hours with a maximum production rate of 3600 units per day (8 hours). The maximum throughput would be 19800 per week. But gloves are only produces 17500,17700,18000,17300 units in four weeks the performance score shown in the table 4.3 below. This show Low performance could point toward issues with a specific part or preventive maintenance tasks.

Table 4.3 production performance

Week	Current run rate (unit)	Ideal run rate (unit)	Performance	
			Number	Percent (%)
1	17500	**19800**	0.88	88
2	17700	**19800**	0.89	89
3	18000	**19800**	0.90	90
4	17300	**19800**	0.87	87

Finally, the quality of the gloves produced must be determined. Quality is calculated by dividing the number of usable units produced by the total units started.

Gloves produces different units in a 48 hour production time in four weeks, but3500, 3800, 4100, and 3200 of them have defects that make them unusable, then the number of usable units and quality score shown in the table 4.4 below. As the data shows poor quality score is often the result of process failures and a lack of standardization.

Table 4.4 quality of products

Week	Actual out put (unit)	Total Goods produced (unit)	Quality	
			Number	Percent (%)
1	14000	17500	0.8	80
2	13900	17700	0.78	78
3	13900	18000	0.77	77
4	14100	17300	0.81	81

The OEE formula is calculated by multiplying availability, performance and quality and is represented by a percentage. OEE score 57%, 60.3%, 54.7% and 52.8 for about four weeks as shown in the table 4.5 below.

Table 4.5 OEE Calculation

	Week 1	Week 2	Week 3	Week 4
Availability	**81%**	**87%**	**79%**	**75%**
Performance	**88%**	**89%**	**90%**	**87%**
Quality	**80%**	**78%**	**77%**	**81%**
OEE	**57%**	**60.3%**	**54.7%**	**52.8%**

The OEE result implies that production is fairly typical for discrete manufacturers, but indicates there is substantial room for improvement.

4.6 quality related problems of company findings

Causes Quality related problems	Strongly agree		Agree		Neutral		Disagree		Strongly disagree	
	N	%	N	%	N	%	N	%	N	%
Poor quality raw material	76	69.7	22	20.2	2	1.8	6	5.5	3	2.8
Discarding customer requirement	71	65.1	26	23.9	1	0.9	7	6.4	4	3.7
Lack of training	70	64.2	26	23.9	1	0.9	8	7.3	4	3.7
Equipment and machineries	74	67.9	24	22	1	0.9	7	6.4	3	2.8
Unskilled man power	73	66.9	26	23.9	1	0.9	5	4.6	4	3.7
Absence of benchmark	75	68.8	24	22	1	0.9	5	4.6	4	3.7
Poor design quality	63	57.8	29	26.6	2	1.8	8	7.4	7	6.4

Bad work environment	66	60.6	29	26.6	2	1.8	7	6.4	5	4.6
HR related problems	68	62.4	26	23.8	3	2.8	7	6.4	5	4.6
Total	109	100	109	100	109	100	109	100	109	100

- Based on research question findings show that absence of benchmarking, unskilled manpower, equipment and machineries and Poor quality of raw material are the main causes of quality related problem in pittards as shown in the table 4.6 above. results are:
  - ✓ The findings also show that 99 (90.8%) respondents agree that unskilled manpower is a reason for quality problem and 9 (8.3 %) disagreed.
  - ✓ Findings show that 99 (90.8%) respondents agree that absence of benchmarking is a cause for quality problem and 31 (24.8%) disagreed.
  - ✓ Findings show 98 (89.9%) respondents agreed and 9 (8.3%) did not agree with Poor quality of raw material is the main cause for quality problems that affect organizational performance and productivity.
  - ✓ Findings show 98 (89.9%) respondents agree with equipment and machineries are also causes for quality problem and (9.2%) disagreed.
  - ✓ Findings show 97 (89.0 %) respondents agreed with Discarding customer requirements is the also reason for quality problems and 11(10.1%) did not agree with the statement.
  - ✓ Findings show 96 (88.1%) respondents agree with lack of training is also reason for quality problems and 12 (11.0%) disagreed.
  - ✓ Findings show 95 (87.2%) respondents agree that bad work environment is a reason for quality related problem while 12 (11.0%) disagreed.
  - ✓ Findings show 94(86.2%) respondents agree that HR related problems are the reason for quality related problems while 12(11.0%) disagreed.
  - ✓ Findings show 92 (84.4%) respondents supported that poor design product is cause of quality related problem while 15 (13.8%) disagreed.

4.7 quality improvement techniques applied by the company

Respondents were asked to state effective quality improvement technique.43 (39.4%) respondents stated select Quality raw material Is effective technique to improve quality and productivity level of a company.22 (20.2%) respondents' stated benchmarking, 14 (12.8%) respondents stated chalking equipment and machineries before production,12(11%) respondents stated employment skilled man power, 7 (6.4%) respondent state Considering customer requirements, 4.36 (4%) respondents stated sole HR related problems, 3 (2.8%) respondent state giving training and creating comfortable work environment and the rest 1% of respondents designing quality product . The results are as shown in the table 4.7 below.

Table 4.7 Effective quality improving techniques (N=109)

Quality improvement techniques	Number	Percent
Using quality input raw material	43	39.4
Considering customer requirements	7	6.4
Giving training for employees	3	2.8
Chalk equipment and machineries before production	14	12.8
Employment skilled manpower	12	11
Bench marking	22	20.2
Design quality product	1	0.9
Creating comfortable work environment	3	2.8
Solving HR related problems	4	3.7
Total	**109**	**100**

4.8 Roles of quality improvement techniques

Quality improvement techniques which are a method of continuously examining the system and processes of the sector to supply customers with the desired products.in their research they

mention importance of quality improvement techniques some of them are build confident and consistent, increases efficiency, improve customer satisfaction, create businesses to integrate new customer, effectively and exploit business market, reduce level of risk and Inspire Brand Loyalty (Alem, et al., (2017).

Respondents were asked to select the main role of improving quality of products in pittards. Basing on the number of the respondents, the results were as follows; out of 109 respondents, 30(27.5%) respondents stated that It helps an organization achieve greater consistency in tasks and activities that are involved in the production of products and services, while 21(19.3%) respondents stated that It increases efficiency in processes, reduces wastage, and improves the use of time and other resources, 18(16.5%) respondents stated that It helps improve customer satisfaction, 16 (14.7 %) it create businesses to integrate new customer,12 (11%) It enables businesses to market their business effectively and exploit new markets, 8 (7.3%) Reduce Level of Risk and 4 (3.6%) Inspire Brand Loyalty as shown in the table 4.8 below.

Table 4.8 Role quality improving techniques (N=109)

Role of Quality improvement techniques	Number	Percent
Build Confident and Consistent	30	27.5
increases efficiency	21	19.3
improve customer satisfaction	18	16.5
Create businesses to integrate new customer	16	14.7
Effectively and exploit business market	12	11
Reduce Level of Risk	8	7.3
Inspire Brand Loyalty	4	3.6
Total	**109**	**100**

CHAPTER FIVE

CONCLUSION AND RECOMMENDATION

5.1 CONCLUSION

This study was to assess the role of quality improvement techniques in pittards product manufacturing. The methodology used in data analysis was quantitative analysis. After analyzing the data, the following conclusion was drawn:-

Pittards Leather Company is under performed due to different quality related problems. The cause of quality related problems in pittards are raw material, unskilled man power, discarding customer requirement, equipment and missionaries, absence of bench mark, poor design product, bad work environment, HR related problems and lack of tanning. Based on the findings in the previous sections, input raw material and equipment and missionaries are the main causes of quality problems in leather industries need much improvement. The leather value chain consists of three broad sub-sectors: animal husbandry, processing and marketing of RHSs, and tannery and leather goods processing. Each of these sub-sectors involves many actors and stakeholders that affect the quantity and quality of supply of RHSs and leather products directly or indirectly. Maintenance department of these industries should be well equipped with resources to assure the cost effective availability of machines to increase productivity. On the productivity improvement; but it has received little notice in most of leather industries in Ethiopia.

Company used different technique to improve product quality and increase productivity. The techniques are using quality input raw material, Considering customer requirements, Giving training for employees, Chalk equipment and missionaries before production, Employment skilled manpower Bench marking , Design quality product, Creating comfortable work environment and also Solving HR related problems for employee. Employee satisfaction is supremely important in an organization because it is what productivity depends on.

As the research finding indicated the role of those techniques are helps an organization achieve greater consistency in tasks and activities that are involved in the production of products and services, increases efficiency in processes, reduces wastage, and improves the use of time and other resources, helps improve customer satisfaction, create businesses to integrate new customer

and enables businesses to market their business effectively and exploit new markets. Other importance of Improve quality processes are;-

- **Material efficiency**: Improved quality can mean fewer rejected parts along with cleaner production. This adds up to a much more efficient use of our material stock. The short-term benefits of fewer rejections are clear. Over time, incrementally making better use of material in production will also create a bottom line impact.
- **Machine lifecycles and durability**: Ensuring that your machinery is operating at optimal quality and efficiency can help lengthen the life of your investments. Small process irregularities can quickly become major problems, damaging product, equipment and, potentially, even personnel. Taking steps to proactively catch any equipment errors or inefficiencies early will not only improve the quality of your parts, but can potentially save you repair and downtime costs, as well.
- **Safety**: As mentioned above and worth repeating — improved quality can make a difference in the safety of our facility and products. A full review of our maintenance processes and employee protocols will improve our product quality just as it wills the safety of our workers, customers and end users.

It can be concluded that the overall identified QM practices improve operational performance in the industry. All aspects of quality improvement techniques should be effectively managed in the industry because each factor in QM practices has impact on the performance of the company and success of industry competitiveness, in addition leather industry development institute should implement a certain quality standard and control quality level of leather industries.

5.2 RECOMMENDATION

In developing such a framework on quality improving techniques, the researcher would like to forward the following suggestion to concerned body to discharge their responsibility in the development of leather industry operational performance and productivity**.**

- Traditional husbandry practice deteriorates the quality of RHSs produced by the farmers is the main cause of poor quality RHSs in leather manufacturing industries. Farmers should participate in relevant training programs and be provided with information leaflets on methods of increasing animal productivity. Veterinary and agriculture extension personnel should assist farmers in adopting modern livestock management techniques, including the use of manufactured animal feeds. Wherever possible, central slaughterhouses should be established. In the current Ethiopian context there will always be slaughter at homes, farms and in isolated villages. Training in proper flaying, curing and storage techniques and wide distribution of tools and literature in local languages are essential.
- Management must focus on the identified Quality related problems and Allocate sufficient resources to improve the quality and achieve higher levels of satisfaction in the industry which can provide an advantage over Daily, weekly, and monthly checklist should be available for every machine.
- Inspected by operators, mechanics and electricians. The frequency of inspection should consider the equipment history as well as factors like status of the equipment. Here all industries should have at least one planner, who can manage this task, to have effective preventive maintenance schedule other industries in retaining the competitive environment.
- The main aim of LLPTI Laboratory services, Providing Quality testing services to the leather & Leather products sector of Ethiopia is to advice technical issues pertaining to quality and standards problems related to their products and materials and to manage and upgrade the laboratory to instill quality systems, but leather industries are not use it, even though Ethiopia leather industry development institute should facilitate to measure quality standard for leather industries.

- Ethiopia leather industry development institute (LIDI) and ministry of farm needs to link to work together to improve quality and increase productivity in the leather sector.
- This research recommended manufacturing industries;-
    - To get skilled and qualified manpower for operating on the new proposed model the necessary training should be given. Otherwise the system could not bring meaningful significance for this factory.
    - To improve the management communication system between departments.
    - To give priority on reducing defect level, long transportation of raw material, lack of skill manpower, work in process and decreasing down time are potentials for quality improvement.
    - It is also recommended that the factory will be beneficiary if implement the newly developed model. Because these is an organized and sustainable quality improvement technique.
- Finally, further studies can be made on the Quality and productivity improvement in Ethiopian leather industries through capital resource other than maintenance and through human resource. Since leather industries are one of the potential economic sector, further studies on the mentioned areas helps to earn more for the country.

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Appendix III: Questionnaire

ST. MARY'S UNIVERSITY

SCHOOL OF GRADUATE STUDIES

Department of Project Management

Introduction

Thank you in advance for your voluntary participation in completion of this questionnaire. I am doing thesis on "ASSESSMENT ON PRODUCTIVITY IN ETHIOPIAN LEATHER SECTOR AND THE ROLE OF QUALITY IMPROVEMENT TECHNIQUES: THE CASE OF Pittads Ethiopian tannery".

The purpose of this questionnaire is to gather information about the main reason behind Ethiopian leather underperformance and what kinds of techniques are applied to improve quality in pittads product manufacturing. Your contribution and honest responses are very important in the study and will help gain better understanding the role of quality improvement techniques on the productivity and profitability of Pittads product manufacturing. Your response will only be used for research purpose.

Part I: Participant Information

1. Sex: Male ☐ Female ☐

2. Which of the following age categories describes you?

25-40 ☐ 41-60 ☐

3. Number of years you have worked for the factory:

0-4 ☐ 5-9 ☐ 10-19 ☐ 20-30 ☐ Above 30 years ☐

4 Educational Qualifications:

Technical school graduate Master Degree ☐ Master Degree ☐

College Diploma ☐ PhD ☐

BA/BSc Degree ☐

5. Your current position in the factory?

Quality supervisor ☐ production officer's ☐ customers ☐

Line quality ☐ production supervisor's ☐ sales and marketing manager ☐

Part II. Questions related to level of productivity

1. **Question for OEE indicator questions, please fill the blank space.**

OEE	Performance		Quality		Availability	
Week	Current run rate (unit)	Ideal run rate (unit)	Actual out put (unit)	Total Goods produced (unit)	Actual production time(hr.)	Planned production time(hr.)
1						
2						
3						
4						

2. What are the factors that influence the performance, quality, and availability of the plant?

Part III: Questions related to Quality improving techniques to wards operational performance

A. Causes of quality related problems in the company

S/N	Questions	Strongly Disagre	Disagre	Natural	Agree	Strongly Agree
1	Poor quality raw material is the main reason for quality problems that affect organizational performance and productivity.					
2	Disregard customer requirements is the main cause for quality problems that affect organizational performance and productivity.					
3	Lack of Training and education for employees is the main cause for quality problems that affect organizational performance and productivity.					
4	Equipment and machineries failure is the main cause for quality problems that affect organizational performance and productivity.					
5	Unskilled manpower can be the main cause for quality problems that affect organizational performance and productivity					
6	Absence Benchmarking for quality is the reason for quality related problem that affect organizational performance and productivity.					
7	Poorly designed product is the reason for quality related problem that affects organizational performance and productivity.					
8	Bad Work environment is the reason for quality related problem that affects organizational performance and productivity.					
9	HR related problems are the reason for quality related problem that affects organizational performance and productivity					
	Effective Quality improvement techniques					
10	Using quality input raw material					
11	Considering customer requirements Giving training for employees					

12	Chalk equipment and machineries before production					
13	Employment skilled manpower					
14	Bench marking					
15	Design quality product					
16	Creating comfortable work environment					
17	Solving HR related problems					
S/N	**Role of quality improvement techniques in the company**	**Strongly**	**Disagr**	**Natura**	**Agree**	**Strongly**
18	It helps an organization achieve greater consistency in tasks and activities that are involved in the production of products and services.					
19	It increases efficiency in processes, reduces wastage, and improves the use of time and other resources					
20	It helps improve customer satisfaction					
21	it create businesses to integrate new customer					
22	It enables businesses to sell their product effectively and exploit new markets					