St. MARY'S UNIVERSITY

SCHOOL OF GRADUATE STUDIES

DETERMINANTS OF CHEMICAL MANUFACTURING INDUSTRY GROWTH IN ETHIOPIA

By

Shumete Alem

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Shumete Alem

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APPROVED BY BOARD OF EXAMINERS

As members of board of examining of the final MSc thesis open defense, we certify that we have read and evaluated the thesis prepared by Shumete Alem under the title "DETERMINANTS OF CHEMICAL MANUFACTURING INDUSTRY GROWTH IN ETHIOPIA" we recommend that the thesis be accepted as fulfilling the thesis requirement for the Degree of Master of Science in Development Economics

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DEDICATION

It is the grace, mercy, charity, forgiveness, help and kindness of the almighty God that made me still alive, achieve this success and strength and to go through all the difficult time.

I dedicate this thesis to my Father, Ato Alem Wonde who had strong belief in education and gave me a courage till his last breath, May God be with you and Rest in Peace.

Declaration

I, the undersigned, declare that this study entitled "Determinants of Chemical Manufacturing Industry Growth in Ethiopia" is my own work. I have undertaken the research work independently with the guidance and support of Wondimagegne Chekol (PhD). This study has not been submitted for any degree or diploma program in this or any other institutions and that all sources of materials used for the thesis have been duly acknowledged.

_____	_____
Name	Signature and Date

ENDORSEMENT

This thesis has been submitted to Saint Mary's University, School of Graduate Studies for examination with my approval as a university advisor.

_____ _____

Advisor Signature and Date

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List of Acronyms

CGE	Computable General Equilibrium
CMI	Chemical Manufacturing Industry
CSA	Ethiopian Central Statistics Authority
EIC	Ethiopian Investment Commission
ERCA	Ethiopian Revenue and Custom Authority
ETB	Ethiopian birr (Local currency)
FDRE	Federal Democratic Republic of Ethiopia
GTP	Growth and Transformation Plan
GVP	Gross Value of Production
HIV	Human Immune Virus
ICCA	International Council of Chemical Association
ISICAEA	International Standard Industrial Classification of All Economic Activities
MI	Manufacturing Industry
MoFEC	Ministry of Finance and Economic Co-Operation
OECD	Organization for Economic Co-Operation and Development
R and D	Research and Development
ROI	Return on Investment
SIM	Simulation
TFP	Total Factor Productivity
UNCTAD	United Nations Conference on Trade and Development
UNEP	United Nations Environmental Program
WEC	World Energy Council

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ABSTRACT

This research aims to investigate the growth of chemical manufacturing industries by looking its contribution to the manufacturing sector and to the economy and the factors that affect the performance of CMIs. Its contribution studied based on nearly 20 years of time series data based on major macro economic variables such as gross value of production (GVP), employment, government tax revenue and investment. The factors affecting the performance of chemical manufacturing industries studied based on selecting sample factories comprised paint, soap and detergent, plastic candle and pesticide factories. To achieve the objectives of this study, both primary and secondary data employed. Secondary data collected from different governmental institutions concerning gross value of production (GVP), employment, government revenue through tax and investment and primary data likert scale questionnaires were analyzed using statistical analysis such as descriptive and inferential analyses. The information obtained through questionnaire from a sample of 64 operators and managers, and face-to-face interviews were conducted with 16 managers of CMIs. The respondent operators were selected using stratified sampling technique. Besides, the interview questions were analyzed using descriptive narrations. The empirical study identified eight major challenges which seem to affect performance of CMIs: inadequate finance, lack of working places, marketing problems, inadequate infrastructures, poor management practices, and technological, tools and machineries and politico-legal problems including bureaucratic bottlenecks system. The findings further indicate that, there exists significant relationship between independent variables and dependent variable. Moreover, the selected independent variables significantly explain the variations in the dependent variable at 1% level of significance. Based on findings, financial factor is found to be the major problem faced so that government should provide with foreign currency, affordable alternative sources of finance for CMIs. This can be done by promoting export oriented sector and utilizing each hard currency in a proper way.

Key words: chemical manufacturing industries, performance, factors, growth.

CHAPTER ONE

1. INTRODUCTION

1.1. Background of the Study

Chemicals industry is very diverse, comprising basic or commodity chemicals; specialty chemicals derived from basic chemicals like adhesives and sealants, catalysts, coatings, electronic chemicals, plastic additives...etc. products derived from life sciences such as pharmaceuticals, pesticides and products of modern biotechnology and consumer care products like soap, detergents, bleaches, hair and skin care products, fragrances (OECD, 2001).

Chemicals used to make virtually every man-made product and play an important role in the everyday life of people around the world. Such products provide protection for crops and increase yields, prevent and cure disease, provide insulation to reduce energy use and provide countless other benefits that make life better for people (OECD, 2001). There is hardly any industry where chemicals are not used and there is no single economic sector where chemicals do not play an important role. Most of the output from chemical companies is used by other chemical companies or other industries such as metal, glass, electronics, and chemicals produced by the chemicals industry are present in countless products used by consumers such as automobiles, toys, paper, and clothing (UNEP, 2012).

Industries which produce and use chemicals have a significant impact on employment, trade and economic growth of a country. In response to the growing demand for chemical-based products and processes, the international chemical industry has grown dramatically since the 1970s. Global chemical output produced and shipped increased from US$171 billion in 1970 to $4.12 trillion by 2010. (UNEP, 2012).

There are certain evidences shows that the contribution of chemical industry to the global economy is increasing. For instance, some chemical companies are ranked amongst the largest industrial companies in the world the top ten chemical companies had revenues in the range of US$10-30 billion. These firms employ over 100,000 workers and they have multiple manufacturing sites located throughout the world. The chemicals industry is also a major employer, with over 10 million people employed worldwide (Fortune, 2000:7). The global chemicals industry is an important part of the world economy with an estimated US$1.5

trillion in sales in 1998. It means more than twice the size of the world market for telecommunications equipment and services and it accounts for 7% of global income and 9% of international trade (WEC, 1995).

In Ethiopia, recent years chemical manufacturing industry became one of the strategic sector in growth and transformation plan (GTP). The government invested 21.7 billion ETB to establish Chemical Industry Corporation by which intended to oversee chemical industrial development to produce products from the rubber tree as well as fertilizers, cements and a range of chemical products for the domestic market and for export, it is also responsible for conducting designs and feasibility studies to set up new factories or to expand those that already exist. The reasons behind government give more emphasis to chemical industry is firstly, the private sector is unable or unwilling to invest in the manufacturing of chemical because it is capital intensive. Secondly the government involvement concerns the role that chemicals play in the economy. Due to a major input supplier for other industries sectors, the success of industries like textile and leather depend on the availability of reasonably priced chemicals. (Walta, 2013)

There is a prospect of growth of chemical industry by prioritizing and encouraging in investing production of major chemicals that are considered as the main input to textile and leather manufacturing industries. They are Formic Acid, Hydrochloric Acid, Nitric acid, Potassium chloride, Potassium Nitrate, Magnesium chloride, Polyethylene, Calcium Carbide, Polyethylene Terephatalate, Poly Vinyl Chloride, Talc, Titanium Dioxide respectively. These chemicals are used in key economic activities such as a preservative and antibacterial agent in livestock feed, making of fertilizers, and in many manufacturing areas they are used as an input to provide medicine, scientific applications, food processing, production process of paper, plastic, pharmaceuticals, cosmetics, paint, rubber and ceramics, an artificial flavorings and perfumes, purification and extraction of gold, raw material for textile industry (FDRE embassy, India: 2015).

1.2. Statement of the Problem

In most developing countries, the contribution of manufacturing industries to the economy is small. In particular the contribution of chemical manufacturing industries has insignificant role to economic growth. For example in Ethiopia the contribution of chemical manufacturing industries to the manufacturing sector and to the economy as a whole is insignificant and there is huge gap between demand for and supply of chemical and chemical product which leads to depend on imported inputs from abroad. Even though the raw material to provide them is available in unlimited quantities throughout different regions of the country, Ethiopia imports those chemicals from abroad with large quantity. [FDRE embassy, India: 2015]

In view of the above gap, the central question of this study are: how much is the contribution of Chemical Manufacturing Industries (CMIs) to the sector and to the economy, and what are the major factors that mostly affect the performance of CMIs.

According to Admasu [2012] there are number of factors that affect the growth of Micro and Small manufacturing sector which works for medium and large chemical manufacturing industries too such as politico legal factors, working place factors, technological factors, infrastructural, marketing, financial and management.

The study conducted by Ethiopian CSA [2009] discloses that, the contribution of medium and large scale manufacturing industries is small due to tools and machineries problems, financial problem, lack of qualified employees, marketing problems, lack of working premises, raw materials.

Up to my knowledge there is no researches conducted on the economic contribution of chemical manufacturing industries. This research is intended to fill the gap.

1.3 Objectives of the Study

1.3.1 General Objective

The main objective of the study is to examine the growth of Ethiopian chemical Manufacturing Industry in Ethiopia.

1.3.2 Specific Objectives

The specific objectives are:

- To carry out an assessment of the contribution of chemical manufacturing industry to the sector and to the economy as a whole;
- To identify the factors that affects the performance of chemical manufacturing industry.

1.4 Basic Research Questions

- How much is the contribution of chemical manufacturing industry to the sector and to the economy as a whole in terms of macroeconomic variables?
- What are the factors that affect the performance of chemical manufacturing industry?

1.5 Significance of the Study

This paper could be used as a policy suggestion for the concerned policy makers to examine the impact of chemical manufacturing industries on economic growth.

It could also be used as reference material for those who engage to further study on chemical industries in the country. The researcher believe this study will indispensable for academic purpose and to show the contribution of chemical industry to each sector of the economy and magnify role to the economic growth of the country.

1.6 Limitation and Scope of the Study

1.6.1 Limitation of the Study

Like all research, this study had limitations. The sources of difficulties encountered in this study were described as follows: most of the companies selected in the sample were not willing to cooperate due to suspicion that disclosing information may lead to negative effect on their business and dalliance in filling the questionnaire distributed. To persuade the

objective of the study and urgency takes longer period. It is very important to note that this limitation did not have any significant interference with the outcome of the study.

1.6.2 Scope of the Study

Although, there are different issues that can be researched in relation to CMIs, this study is delimited to first, the contribution of chemical manufacturing industries in terms of Gross Value of Product (GVP), employment, government revenue through tax and investment. Second, factors such as politico-legal, working place, technological, infrastructural, marketing, financial, management and tools and machineries affecting the performance of CMIs. Besides, the scope of this study was spread across large and medium scale manufacture of chemicals and chemical products [ISICAEA, 2012] which includes manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics and synthetic rubber in primary forms and manufacture of other chemical products which includes manufacture of paints, varnishes and similar coating, printing ink and mastics, manufacture of soap and detergents, cleaning and polishing preparation, perfumes and toilet preparation, manufacture of other chemical product not elsewhere classified, manufacture of manmade fibers.

1.7 Organization of the Thesis

The rest of the paper is organized as follows: chapter two presents the theoretical and empirical related literature to the study, while chapter three provides research methodology. Chapter four outlines data presentation, analysis and interpretation and chapter five concludes and suggests some recommendations.

CHAPTER TWO

2. LITERATURE REVIEW

2.1 Introduction

Generally this study was focused on chemical manufacturing industries and attempt to draw the analytical framework for industrialization in Ethiopia, specifically some theories and concepts related to the sector going to be described briefly as theoretical review, economic condition of Ethiopia today on one hand, the significant of chemical industrialization for manufacturing sector and for the economy as a whole than what could be observed from the experience of developed countries through empirical investigation on the other hand.

2.2 Theoretical Literature

2.2.1 The Importance of Chemical Industrialization

Around the world, the chemical industry is enabling the solutions that we need to meet global challenges by providing more reliable and cleaner sources of energy, improvements in the development and delivery of life-saving medicines, safer and more efficient transportation options, and access to cleaner and safer drinking water effective, non-polluting sanitation systems, sustainable agricultural methods that enable more abundant, nutritious food, new construction materials that provide energy-efficient, low-cost alternatives for housing and infrastructure and enhancements and innovation in global manufacturing processes.(ICCA: 2012)

2.2.1.1 Role for Sustainable Development

Sustainability of development related to environmental issue, chemical industries has already made innumerable contributions to identifying climate related problems through environmental analysis of ozone depletion and greenhouse gas emission; understanding their underlying causes and contributing solutions through studies of the roles of gases like carbon dioxide and methane. Much more will be required of chemical industries in the future, including better, cheaper and more robust field methods for environmental monitoring, impact assessment and developing new processes for energy generation, industrial production, and materials recycling, and so on. (Matlin, et al.2011).

The global chemical industry could play a role in the development, production and delivery of products and technologies that ensure sustainable development goals helping to built a green economy that accommodates all three dimensions of sustainable development i.e. social equity, economic growth and environmental protection. For example the major contributions of chemical industry in six core areas enhancing sustainability, ensuring product safety and stewardship, minimizing adverse impacts of chemicals, enabling energy efficiency and renewable energy, driving innovation and technological advances and economic development**.** (ICCA: 2012)

The focus of sustainable development concerns in areas such as water, energy, nutrition, human habitation and the quality of the environment mean that chemistry has many central roles to play in monitoring the environment, in understanding, preventing and mitigating adverse chemical/biological impacts of human activities, and in devising new, cleaner and more environmentally sustainable process. In broader term chemistry and chemical industrialization has contributed enormously both to improvements in human wellbeing including enhancements of health and quality of life and to wealth creation for individuals and nations. Within the domain of Science and technology, research and development in chemical industries has emerged as a key discipline able to contribute to development of a nation. For instance the value added by these industries has contributed to the rapid growth in world GDP, especially in the industrially advanced countries during the second half of the 20th century. Knowledge intensive and technology intensive industries are estimated to have accounted for 30% of global economic output or US$15.7 trillion in 2007. Advances in science and technology in chemical industry enabled countries in Europe and North America to industrialize rapidly in the 19th and 20th centuries. For example, industrialization in Belgium drew on the process for manufacture of soda, which helped to establish Belgium as one of the world's leading countries in the chemical industry sector. (Matlin, et. al, 2011).

Chemical and chemical industries have also direct impact on achieving Millennium Development Goals (MDG's) and Sustainable Development Goals (SDG's). To illustrate the idea MDG's focused on reducing poverty and hunger, achieving universal primary education, promoting gender equality and empowering women, reducing maternal and under five child mortality, combating HIV/AIDS, malaria and other diseases, ensuring environmental

sustainability and developing a global partnership for development by ensuring food security through better applications of existing technologies and development of innovative new ones, creating opportunity to science and technology education for girls, innovating, drugs, vaccines and delivery systems, accessing chemically treated safe drinking water and basic sanitation.

2.2.1.2 Role for Agricultural productivity

Growth of chemicals industry could have positive spinoffs for the development of agriculture. The use of agricultural chemicals, including fertilizers, herbicides, fungicides and insecticides can help improve yields; it may also be beneficially used in livestock production as vaccines and in animal feed. Chemical industries has many roles to play in meeting challenges food shortage in sub Sahara Africa, adverse the effect of soil and water pollution, creation of better methods of plant crop protection to helping develop new, more productive and more robust varieties of seed. (Matlin, et. al, 2011).

In Africa increasing agricultural production is widely acknowledged as a priority area and essential in addressing food security problems, human vulnerability to environmental change, low productivity is a factor of the ecological reality and low investment in agriculture. Productivity is further threatened by human-induced changes and natural processes. Even though chemical use in the African agricultural sector is likely to increase as a result of the growing commercialization, per capita use of fertilizers is relatively low in small farmers.

2.2.1.3 Role for Medical Science

Chemical industries have been playing a significant role in the eradication of deadly diseases by developing life-saving pharmaceuticals and chemical pesticides. High incidence of some diseases is not just a challenge in relation to mortality levels, but also threatens economic prospects. For example malaria is still a primary killer in Africa. (Lead M. et al., 2010) Chemical industry can make a major contribution not only to the development of new drugs, diagnostics and medical devices appropriate to these changing populations but also to the creation of new materials that enhance their quality of life.

2.2.1.4 Role for creating employment Opportunity

Growth in the industrial sector creates new opportunities for employment and can also help diversify the economy. This is especially important given the high level of urbanization, and growing levels of unemployment and poverty in many cities.

The chemicals industry and its products have many potential benefits particularly related to improving and sustaining human capital through new opportunities for employment, improved health and nutrition. For example the chemical industry in the United States remains a cornerstone of manufacturing and is connected to numerous jobs throughout the U.S. approximately 4.2 million jobs in the economy are directly or indirectly linked to the productive activities of the chemical industry. This accounts for approximately 22% of the nation's manufacturing and industrial workers and chemical manufacturing sector of the U.S. economy has maintained a positive foreign trade balance for the past several decades. (Heintz,et al.,2011).

In the case of UK's economy chemical industry has a wider impact than simply the activity and jobs in those companies directly part of the industry. Companies in the industry are source goods and services from other companies, thereby generating activity in the rest of the UK economy. These industries themselves will in turn source goods and services from suppliers and so on. This multiplier effect is known as the 'indirect effect' of the chemicals industry. In addition, economic activity is supported by the spending of people who work in the upstream chemicals industry and its supply chain: this is termed the 'induced effect'. These multiplier impacts depend on the extent of domestic linkages between industries. The indirect multiplier for the upstream chemicals sector in the UK is estimated to be 1.71. This means that for every £1 million of value added output generated by the upstream chemicals industry, another £0.71 million of value added output is generated indirectly in its supply chain. Chemicals industry contributed a combined total of £258 billion in value-added, equivalent to 21% of its GDP, and supported over 6 million jobs in 2007, The UK's chemicals industry is a major source of its exports, accounting for 15% of the exported goods. (UK Report, 2010)

2.3 Green Revolution and Chemical Industries

The term “Green Revolution” refers to rapid increases in wheat and rice yields in developing countries such as India, Pakistan, Bangladesh, Indonesia and China who severely affected by food shortage brought about by improved varieties combined with the expanded use of fertilizers and other chemical inputs. It has facilitated institutional and social changes in rural areas and provided opportunities for self-sustaining economic growth and reduced poverty. (Hazell, Peter B R: 1985)

The term “green revolution” describes a series of research, development, and technology transfer initiatives involving the development of high yielding varieties of cereal grains, expansion of irrigation infrastructure, and distribution of hybridized seeds, synthetic fertilizers and pesticides to farmers. (Parai, BJ: 1996)

Behind these massive technological transformations there were Monsanto, Novartis, AgrEvo, DuPont, and other chemical companies who are reinventing themselves as biotechnology companies that would have the world's anti-hunger energies aimed down the path of more agrochemicals and genetically modified crops.

Chemical manufacturing industries played significant role providing with necessary input for agriculture sector like chemical fertilizer, pesticide and herbicide for the farmers, and use of chemical fertilizers and pesticides increased by five folds. Soon after productivity increased in agriculture sector of those countries for example In Indonesia, rice yield in 1960 was 1.3 tons per hectare to 4.3 tons per hectare in 1994, In India, production more than doubled between 1960 and 1993. During this period, total annual grain production raised from 77 Mt to 201.5 Mt then the agriculture sector transformed from subsistence to commercial level.

In return, the transformation took place in agriculture sector required massive output from chemical industries which resulted in growth of chemical manufacturing industries both quality and quantity. The linkage between agriculture and chemical industries create an opportunity to stimulate other sectors of the economy. This could bring structural change in those countries and they became industrialized countries, the owner of modern chemical technology including nuclear energy, and large exporter of agricultural and chemical product.

Therefore, the event of "green revolution" shows how economic sectors are linked one another on one hand, and could bring structural change in the economy on the other.

Building strong balanced linkage between the sectors requires establishment of import-substituting industrial sectors, which could bring more foreign exchange and expand industries. Otherwise reliance on import of agricultural input will create shortage of foreign exchange and makes difficult to escape from vicious circle, this is what happened in India with the first decade of green revolution. (Ohno, 1999)

The primary reason linkage among manufacturing industries and also to other sectors is because of export-oriented industrialization is more difficult and entrepreneurs should at first depend on the domestic market which is more familiar to them before going to exploit export market. The existence of the domestic market for their products is essential when promoting industrialization. (Fujita, Koichi)

2.4 Future Prospect Areas of Chemical Industries

According to the report of UK report in 2010, the Fundamental area of focus in chemical industry is to search for the solutions to some of the most important technological and societal challenges facing the wider world include:

Climate change - developing sustainable alternatives to fossil fuels and lowering carbon emissions by increasing energy efficiency in areas ranging from domestic electronic products to nuclear power stations;

Energy – chemistry research leads to improvements in the generation, transmission and use of energy in all forms. Airbus' next-generation A350 XWB aircraft will have significantly improved fuel economy in part because they will be over 50% (by weight) built from lightweight composite materials derived from chemistry research;

Security – chemistry research has resulted in faster, smaller and more sensitive devices able to detect microscopic levels of explosives;

Food Supply – Azoxystrobin, an extremely successful agricultural fungicide developed by UK-based chemists between 1981-96, has increased yields of more than 120 types of crop in over 100 countries; and,

Health – Amlodipine, one of many blockbuster drugs underpinned by UK chemistry patents, has reduced the number of days a patient visits hospital, cutting costs to both patient and the health service.

2.5 Empirical Literature

Several researchers have conducted empirical studies on the manufacturing industries in general and chemical industries in particular and its effect on economic growth. These studies have applied different methodologies to capture the effect of a wide range of industrial policies and strategies and have arrived at different conclusions.

Finger, Stephen R. [2008], made an empirical analysis of R&D competition in the chemicals industry in US using dynamic oligopoly model to calculate welfare effects. Tax credit used to measure the effect of R&D on growth of chemical industry and found that increased expenditures and innovations from large firms are largely offset by smaller firms whose marginal benefit from innovating is decreased by the actions of their rivals. The effectiveness of the tax credit is reduced by the decreased in R&D by smaller firms suggests that alternative policies may be more efficient in meeting the government's goals. The median firm is able to generate approximately $158,000 in profits from an additional unit of knowledge. When conducting the optimal level of research, this implies the firm generates $115,500 in the product market for each additional million dollars in R&D. Given that knowledge depreciates at 15% and firms discount profits at 5%, a marginal dollar of research is expected to contribute $0.67 directly in discounted profits. It also increases the research efficiency of the firm in the future periods, allowing firms to fully recover research costs. In comparison, a marginal dollar of research generates $1.21 and $0.34 for the 25th percentile and 75th percentile firms, respectively. This is another key motivation of using a dynamic structural model to analyze competition in the industry. It would be difficult to construct a static model to rationalize why firms of different sizes have varying marginal returns. The heterogeneous dynamic returns to innovation, mainly through differences in absorptive capacity, explain this result.

Bethelhem [2012] analyzed the effect of improved productivity of the manufacturing industry on the Ethiopian economy using dynamic Computable General Equilibrium (CGE) model. The empirical results she obtained, the manufacturing sector is in its infant stage, contributing a small amount to GDP and employment though the number of firms has shown an increasing trend since 2002. Total Factor productivity (TFP) measures the growth of manufacturing industry. Three policy simulations (SIM1, SIM2 and SIM3) used to measure the impact of policy shocks regarding the manufacturing industry and comparing with base simulation. for instance in textile industry real GDP grew by 12.04%, 11.56% and 11.05% which are 1.37, 0.89, and 0.38 percentage points higher than the base in SIM1, SIM2, and SIM3, respectively. Absorption increased from 9.98% to 10.58% due to a 90% increase in total factor productivity of the textile and clothing sector in SIM1. This is due to the strong increase in investment and private consumption which were 0.62 percentage points higher compared to the respective value in base simulation.

Urgaia [2007] analyzed the contribution of Ethiopia's manufacturing industries to GDP using Johansen co integration analysis of time series model. The study established that Ethiopia's manufacturing sector contribution to GDP is about 6% which is approximately 1/11th and 1/6th of that of the agricultural sector and service sector respectively with negligible overall annual growth rate of about 0.24%. This calls for immediate restructuring to improve the sector's contribution to the overall economy. According to Urgaia, the manufacturing sector is labour intensive and is negatively influenced by total factors of production. The study further established that the obsolete use of technology could be one reason for the sector's stagnant growth.

2.6 The Conceptual Framework

Conceptual framework means that concepts that relate to one another were used to explain the research problem. Since CMIs performance is influenced by both internal and contextual factors, it is necessary to understand what influences CMIs to reach peak performance. The contextual factors include politico-legal, working place, technological, infrastructural, marketing, financial, and tools and machineries factors. The influence of these factors to the firm performance is very important but it is noteworthy that the management has no (little) control over them (Wanjiku, 2009). Nevertheless, the factors must be closely monitored to

ensure that stringent measures are taken within the best time to either take advantage of the opportunities or combat the threats found in the external environment. The internal factors that influence the firm's performance can be classified as management, and tools and machineries factors. To align the conceptual framework with the research objectives, CMIs performance is the dependent variable whereas politico-legal, working place, technological, infrastructural, marketing, financial, management and tools and machineries factors are all independent variables. The relationship can be expressed and shown in figure 2.1

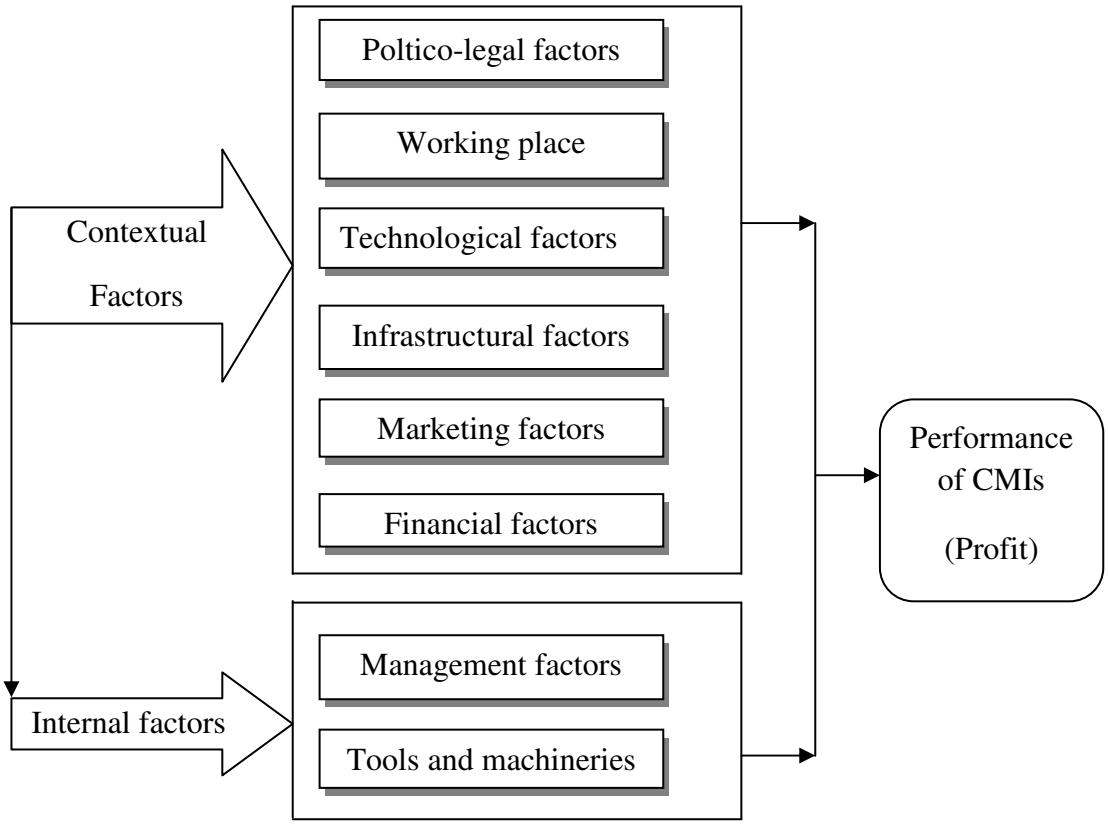

Figure 2.1 Conceptual frameworks

CHAPTER THREE

3. RESEARCH METHODOLOGY

3.1 Introduction

This section provides an overview of the study's research approach which lays within the mixed methods strategies. The chapter discusses procedures and activities undertaken, focusing on namely the research design, questionnaire design, data collection, sampling strategy, data processing and analysis and instrument development.

3.2 Procedures and Activities Undertaken

The assessment of the contribution and factors that affect the performance of chemical manufacturing industries involves several activities such as proposal development, literature review, research design, questionnaire design, and data collection, sampling procedures, visiting of relevant office/enterprises, selection of participants, test of validity and reliability of instruments, data collection and data analysis.

3. 2.1 Research design

Research design is the blueprint for fulfilling research objectives and answering research questions (John A.H. et al., 2007). In other words, it is a master plan specifying the methods and procedures for collecting and analyzing the needed information. It ensures that the study would be relevant to the problem and that it uses economical procedures. The same authors discusses three types of research design, namely exploratory (emphasizes discovery of ideas and insights), descriptive (concerned with determining the frequency and percent with which an event occurs or relationship between variables) and explanatory (concerned with determining the cause and effect relationships).

The types of research employed under this study were descriptive and explanatory research. The major purpose of descriptive research is to showing the impact of chemical manufacturing industries on economic growth (GDP) and different macroeconomic variables such as GVP (GDP) employment, import, government revenue and investment and also identifying the major factors affecting the performance of chemical manufacturing industries on selected sample.

This study employs descriptive critically assesses the contribution of chemical manufacturing industry to the sector and to the economy as a whole with different macro variables by utilizing time series data. The reason for preferring a time series secondary data in study is due to the availability of processed data.

This study also employs explanatory critically assesses the factors affecting the performance of chemical manufacturing industries in that the relationship between variables is correlated with an aim of estimating the integrated influence of the factors on performance. Moreover, the study utilized cross-sectional in the sense that primary data was collected at a single point in time.

The reason for preferring a cross-sectional primary data in study is due to the vast nature of the study and the limitation of time. And obtaining information from a cross-section of a population at a single point in time is a reasonable strategy for pursuing many descriptive researches (Janet M. Ruane, 2006). According to Mark et al. (2009) mixing qualitative and quantitative approaches gives the potential to cover each method's weaknesses with strengths from the other method.

Therefore, in this study a combination of qualitative and quantitative approaches of doing research was employed, which has been practiced, as recommended by Creswell (2009).

3.2.2 Questionnaire Design

The design of questionnaires takes into account the statistical requirements of data users. A list of variables laid down specifying the expected output of the survey. The questionnaire allows a maximum number of problems detected and could be eliminated by the selected testing methods as suggested by Brancato, G (2006).

The layout of the questionnaire was kept very simple and ordered to encourage meaningful participation by the respondents. The questions were kept as concise as possible with care taken to the actual wording and phrasing of the questions. The reason for the appearance and layout of the questionnaire are of great importance in any survey where the questionnaire is to be completed by the respondent (John A. et al., 2007). The literature in the study was used as a guideline for the development of the questions in the questionnaire. Besides, some questions in the questionnaire were adopted from other sources (Admasu, 2012) while others taken from

(CSA, 2009). The questions that were used in the questionnaire are multiple-choice questions and five-point likert scale type questions. The type of scales used to measure the items on the instrument is continuous scales (strongly agree to strongly disagree).

3.2.3 Data Collection

Sources of Data

The study employed both primary and secondary sources of data collection.

i. Primary Sources

In order to realize the objective, the study used well-designed questionnaire as best instrument. This was completed by 4 individual selected from each sample factory working as the 1 owner/manager, 1 head in operation department, 1 operator and 1 planning expert with the assumption of getting full-fledged and unbiased information about the factory. Besides, face-to-face interviews with the operators and the relevant owner managers who head the enterprises are conducted. The interview method of data collection is preferred due to its high response rate. That is it gives the two people concerned an opportunity to interact and get details on the questions and answers. Through interviews, clarification of issues is easily achievable leading to accuracy of data from the respondents.

ii. Secondary Sources

Secondary data obtained from Central Statistics Agency (CSA), Ethiopian Revenue and Custom Authority (ERCA), Ethiopian investment commission (EIC) and Ministry of Finance and Economic Cooperation (MoFEC) to analyze the contribution of chemical manufacturing industry to the sector and to the economy as a whole from 1995/96 to 2014/15.

Secondary data from files, office manuals, reports, pamphlets, circulars, and database, websites and policy papers were used to provide additional information where appropriate. Besides, variety of books, published and/or unpublished government documents, websites, reports and newsletters were reviewed to make the study fruitful.

3.2.4 Sampling Strategy and Procedures

Due to its diverse in nature of the product, sampling technique that would be relevant to study chemical manufacturing industry is stratified sampling. Most of them are working on soap and detergent, paint, candle plastic, pesticide and other chemicals found in Addis Abeba as a study area for this research. This is because first; the factories were selected based on their nearness and convenience to collect data in short time. Second, industries have largest concentration in the capital city in number compared to other regions of the country. This made the sector more and easily accessible for the data collection selected for this research.

3.2.5 Sampling Technique

Stratified random sampling was used to get information from diverse nature of chemical manufacturing industry. This technique is preferred because it is used to assist in minimizing bias when dealing with the population. With this technique, the sampling frame can be organized into relatively homogeneous groups (strata) before selecting elements for the sample. According to Janet (2006), this step increases the probability that the final sample will be representative in terms of the stratified groups. The strata are factories including: paint, soap and detergent, plastic candle and pesticide factories. According to Catherine D. (2009), the correct sample size in a study is dependent on the nature of the population and the purpose of the study. Although there are no general rules, the sample size usually depends on the population to be sampled. In this study to select sample size, a list of the population got from Central Statistical Agency (CSA) data collected in until May 2013. The total population of the study is 106 enterprises which include manufacture of paint, varnish and mastics (13), manufacture of soap and detergent cleaning & polishing perfumes & toilet preparation (70), manufacture of plastic product (19), and manufacture of basic chemicals, except fertilizers & nitrogen compounds and chemical product not elsewhere classified (4). The sample size selected here is considered as representative put on the above categories and also large enough to allow for precision, confidence and generalibility of the research findings. The following formula was used for the calculation of the sample size since it was relevant to studies where a probability sampling method was used (Watson, 2001).

$$n = \left(\frac{P\,[1-P]}{\frac{A^2}{Z^2} + \frac{P\,[1-P]}{N}} \right)_{R}$$

Where,

n = sample size required = 16

N = number of population = 106

P = estimated variance in the population = 50%

A = margin of error = 5%

Z = confidence level = 1.96 for 95% confidence

R = estimated response rate = 100%

Accordingly, 16 companies were selected from the total of 106 chemical manufacturing industries. To increase the precision 4 respondent were selected from each enterprise. Therefore, [(13/106) x 16] = 2 paint factory out of 13, [(70/106) x 16] =10 soap and detergent factories out of 70 and [(19/106) x 16] =3 plastic factories out of 19 were selected. The interviews were administered on the sample of 16 managers out of 64 respondents. This small number of interviewee was selected because of related responses from majority of respondents.

3.3 Variables and Measurements

The lack of universally accepted standard performance measures left the door open to business organizations to decide and choose its own performance measures that might not truly reflect their performance. Performance measures include but not limited to: market share, sales volume, company reputation, return-on-investment (ROI), profitability, and established corporate identity are appropriate for medium and large scale manufacturing industry.

In this study, change in profit is used as a dependent variable to measure the performance of chemical manufacturing industries. Here the change in profit ratio data is used as the measure of the dependent variable performance of the enterprises involved in the survey. This is mainly because of the following three reasons. First, as the literature and rationale of any

business enterprise clearly indicates, chemical manufacturing industries are more focuses on profitability than other modes of performance measures. Second, as recommended by Rami and Ahmed (2007:6) change in profit has been widely adopted by most researchers and practitioners in business performance models. The independent variables are politico-legal, working premises, technological, infrastructural, marketing, financial, management, and tools and machineries variables.

The variables are expected to have a cause-effect relationship the data on mentioned independent variables used to assess the factors that affect the performance of chemical Manufacturing industry. With these data, therefore, one can estimate the parameters that measure the growth of chemical manufacturing sector in Ethiopia

3.4 Data Processing and Analysis

3.4.1 Data Processing

The method of data processing in this study was classified into two part based on the source of data. First, primary data analyzed by using the computerized Econometric Statistical Package of Social Science (SPSS) and others written programs. In the data processing procedure editing, coding, classification and tabulation of the collected data were used. Data processing has two phases namely: data clean-up and data reduction. During data clean-up the collected raw data was edited to detect anomalies, errors and omissions in responses and checking that the questions are answered accurately and uniformly. The process of assigning numerical or other symbols came next which was used to reduce responses into a limited number of categories or classes. After this, the processes of classification or arranging large volume of raw data into classes or groups on the basis of common characteristics were applied. Data having the common characteristics was placed together and in this way the entered data were divided into a number of groups. Finally, tabulation were used to summarize the raw data and displayed in the form of tabulation for further analysis. Second, secondary data analyzed into tabulation and charts.

3.4.2 Data Analysis

This is the further transformation of the processed data to look for patterns and relationship between and/or among data groups by using inferential (statistical) analysis. The Statistical

Package for Social Science (SPSS) version 20 was used to analyze the data obtained from primary sources. Specifically, descriptive statistics (frequency and percentile) and inferential statistics (correlation) were taken from this tool.

3.4.2.1 Descriptive Analysis

Descriptive analysis was used to reduce the data in to a summary format by tabulation (the data arranged in a table format). Moreover, bar charts were used to describe the general contribution of sub-sector to the sector and to the economy as a whole. The reason for using descriptive statistics was to show its impact on the growth of manufacturing industries and on the whole economy through different macro economic variables such as GDP, employment, import, government revenue and investment.

3.4.2.2 Inferential Analysis

According to Sekaran (2000), inferential statistics allows to infer from the data through analysis the relationship between two or more variables and how several independent variables might explain the variance in a dependent variable. Pearson Product Moment Correlation Coefficient methods were used to study the factors that affect the performance of chemical manufacturing industries.

3.4.2.2.1 The Pearson Product Moment Correlation Coefficient

According to Phyllis and his associates (2007), inferences have a very important in management research. This is so because conclusions are normally established on the bases of results. Such generalizations were therefore, be made for the population from the samples. They speculate that the Pearson Product Moment Correlation Coefficient is a widely used statistical method for obtaining an index of the relationships between two variables when the relationships between the variables is linear and when the two variables correlation are continuous. To ascertain whether a statistically significant relationship exists between politico-legal, working premises, technology, infrastructure, marketing, finance, management and tools and machineries factors with firm's performance, the Product Moment Correlation Coefficient was used. According to Duncan C. and Dennis H. (2004), correlation coefficient can range from -1 to +1. The value of -1 represents a perfect negative correlation while a

value of +1 represents a perfect positive correlation. A value of 0 correlations represents no relationship. The results of correlation coefficient may be interpreted as follows.

Correlation coefficient Interpretation

(-1.00 to -0.8]	Strong	Negative
(-0.8 to -0.6]	Substantial	
(-0.6 to -0.4]	Medium	
(-0.4 to -0.2]	Low	
(-0.2 to 0.2)	Very Low	
[0.2 to 0.4)	Low	Positive
[0.4 to 0.6)	Medium	
[0.6 to 0.8)	Substantial	
[0.8 to 1.00)	Strong	

In this study Pearson's Product Moment Correlation Coefficient was used to determine the following relationships.

- The relationship between politico-legal factors and performance of CMIs;
- The relationship between working premises factors and performance of CMIs;
- The relationship between technology factors and performance of CMIs;
- The relationship between infrastructural factors and performance of CMIs;
- The relationship between marketing factors and performance of CMIs;
- The relationship between financial factors and performance of CMIs;
- The relationship between management factors and performance of CMIs;
- The relationship between tools and machineries factors and performance of CMIs;

3.5 Instrument Development

Basically, the instruments were developed based on the objectives of the study and research questions. The principles of questionnaires such as, use simple and clear languages, statements should not be too long and use of appropriate punctuations is also considered when

develop the instrument. In addition, interviews can be taken as an instrument to strength the investigation.

3.5.1 Design of the Instruments

The instruments were designed in such ways that can strength the viability of the study. The questionnaires were designed both in English and Amharic languages. The purpose of translate from English to Amharic language is to utilize those who cannot clearly understand English language so that respond easily. The interview questions were designed in English language only, because the discussion was in Amharic while making interviews with operators.

3.5.2 Instrument Validity

Validity is the degree to which a test measures what it purports to measure (Creswell, 2009). Validity defined as the accuracy and meaningfulness of the inferences which are based on the research results. It is the degree to which results obtained from the analysis of the data actually represents the phenomena under study. He contends that the validity of the questionnaire data depends on a crucial way the ability and willingness of the respondents to provide the information requested.

A questionnaire was tested on potential respondents to make the data collecting instruments objective, relevant, suitable to the problem and reliable John Adams et al. (2007). Issues raised by respondents were corrected and questionnaires were refined. Besides, proper detection by an advisor was also taken to ensure validity of the instruments. Finally, the improved version of the questionnaires were printed, duplicated and dispatched. The instruments selected can help to show factors that affect performance of CMIs. It can clearly address how these factors affect the performance of CMIs. The relevant data was collected on the factors of the CMIs that can better indicate the relationship between factors and the performance of CMIs. Interviews can also validate the measurement. Moreover, to have valid conclusion, inferential statistical model was used to test the relationship between the variables.

3.5.3 Instrument Reliability

The reliability of instruments measures the consistency of instruments. Creswell (2009) considers the reliability of the instruments as the degree of consistency that the instruments or procedure demonstrates. The reliability of a standardized test is usually expressed as a correlation coefficient, which measures the strength of association between variables. Such coefficients vary between -1.00 and +1.00 with the former shows that there is a perfect negative reliability and the latter shows that there is perfect positive reliability.

CHAPTER FOUR

4. RESULT AND DISCUSSION

4.1 INTRODUCTION

To facilitate ease in conducting the empirical analysis, the results of descriptive analyses are presented first both primary and secondary data, followed by the inferential analysis. The purpose of this study is to critically assess the contribution of CMIs to the MI and to the economy as a whole and the factors affecting the performance of CMIs. Primary data were collected from operators and owner managers of CMIs.

Secondary data collected from four government institution started from 1995 to 2014. Out of which years, data of gross value of production have got from1998 to 2014, employment from 1995 to 2013, government revenue through tax from 2002 to 2014 and investment inflow from 1995 to 2014 data were completed and retrieved successfully, representing 86.25% response rate. This represents a response rate of 85%, 95%, 65% and 100% for gross value of production, employment, government revenue through tax and investment inflow respectively.

Regarding to primary data Sixty four questionnaires were distributed across various sectors working on manufacturing chemical and chemical product. All questionnaires were completed and retrieved successfully, representing 100% response rate. Out of the 64 questionnaires administered 8, 40, 12 and 4 were distributed to and retrieved from Paint, Soap and detergent, plastic and other chemical factories respectively. This represents a response rate of 100% for all sectors.

Generally, this section is organized in the following manner: First, contribution of CMIs to the MI and to the economy as whole presented and analyzed. Second the general information about CMIs were presented and analyzed followed by analysis of primary data collected through questionnaires and interviews. Moreover, the results of Pearson's Product Moment Correlation Coefficient and regressions were analyzed.

4.2 Contribution of Chemical Manufacturing Industry

4.2.1 Contribution in terms of increasing gross value of production

According to Viet (2009) production approach of gross domestic product (GDP) is the economy in producing an output of 100 generates newly additional value of 30, which is called value added. This value added (which in this simple form is equal to GDP) is obtained by deducting from the value of output the cost of goods and services used in the process of production.

Table 4.1 Gross value of production growth in Ethiopia

year	Economy	Manufacturing sector		Chemical manufacturing sub- sector		
	GDP in "million" (Br)	Gross value of production in "million" (Br)	Contribution to the economy (%)	Gross value of production in "million" (Br)	Contribution to the sector (%)	Contribution to the economy (%)
1998	175,359.29	2,089.04	1.19	74.39	3.56	0.04
1999	198,827.14	2,279.34	1.15	117.86	5.17	0.06
2000	215,332.64	2,326.55	1.08	109.98	4.73	0.05
2001	218,870.31	2,332.20	1.07	118.24	5.07	0.05
2002	213,870.31	2,365.89	1.11	139.66	5.90	0.07
2003	242,897.56	2,548.49	1.05	189.75	7.45	0.08
2004	271,605.24	2,844.48	1.05	162.18	5.70	0.06
2005	301,032.67	3,232.75	1.07	178.23	5.51	0.06
2006	335,519.02	3,539.29	1.05	239.52	6.77	0.07
2007	371,716.67	3,984.37	1.07	354.93	8.91	0.10
2008	404,436.98	4,394.26	1.09	691.65	15.74	0.17
2009	456,196.02	4,895.21	1.07	920.56	18.81	0.20
2010	515,078.54	12,323.85	2.39	1,323.92	10.74	0.26
2011	559,621.57	17,161.01	3.07	1,224.03	7.13	0.22
2012	618,842.23	23,032.41	3.72	2,197.06	9.54	0.36
2013	682,454.18	32,093.31	4.70	1,661.09	5.18	0.24
2014	748,021.09	36,324.00	4.86	1,997.46	5.50	0.27

Source: Ministry of Finance and Economic Cooperation (MoFEC: 2016)

Table 4.1 shows the data about Gross value of production from 1998-2014. The trend of growth in terms of chemical manufacturing sub sector, manufacturing sector and total GDP used in each year. It is clear that manufacturing sector generally, chemical manufacturing sub sector specifically contribute insignificant.

The fourteen years data shows Gross value of production increases, on average, the rate of total GDP, gross value added in manufacturing sector and chemical manufacturing sub-sector was 10.7 percent, 22.96 percent and 26.92 percent respectively. The rate of growth of value added of CMI is higher than both manufacturing sector and total GDP; it signifies the contribution is increasing over time.

GDP was highest in 1999 and lowest in 2002, which is 13.38 percent and -2.28 percent respectively. The peak time in 1999 was the combined result of the reforms and favorable weather followed by sharp decline in 2002 was Growth performance has nonetheless been fragile and uneven; on a-year-to year basis, growth was heavily dependent both on the vagaries of nature and on external shocks, including the war with Eritrea (Alemayehu: 2004).Chemical manufacturing sub-sector rate of growth was highest Chemical manufacturing industry had the highest rate of growth in 2008 and the lowest in 2013; it was 94.87 percent and -24.39 percent respectively.

From the total GDP the contribution of CMI is ranged from 1.9 billion in 2014 to 74.39 billion ETB in 1998. On average, the contribution of chemical manufacturing sub-sector increasing.

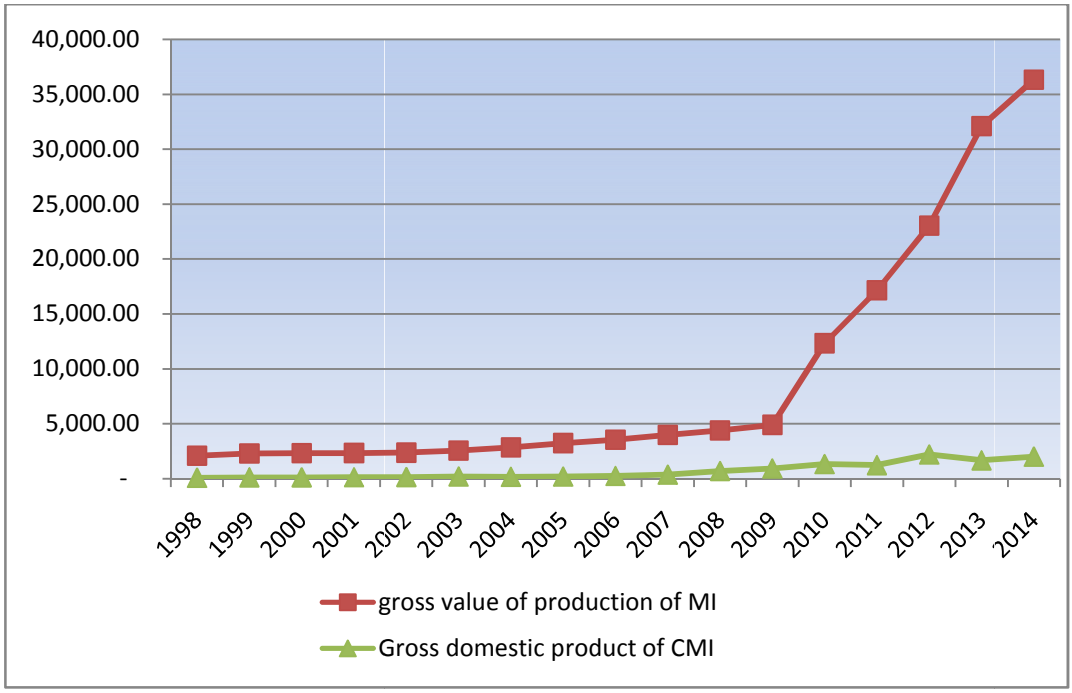

Figure 4.1 Gross value of production growth in "million birr"

Source: Ministry of Finance and Economic Cooperation (MoFEC: 2016)

Figure 4.1 shows the trend of GDP and the contribution of manufacturing sector and chemical manufacturing sub sector from 1995 to 2014. It can clearly be seen that GDP moves ups wards and the contribution of manufacturing sector generally and chemical manufacturing subsector specifically null. It signifies the dominance of other sectors like agriculture and service other than manufacturing sector.

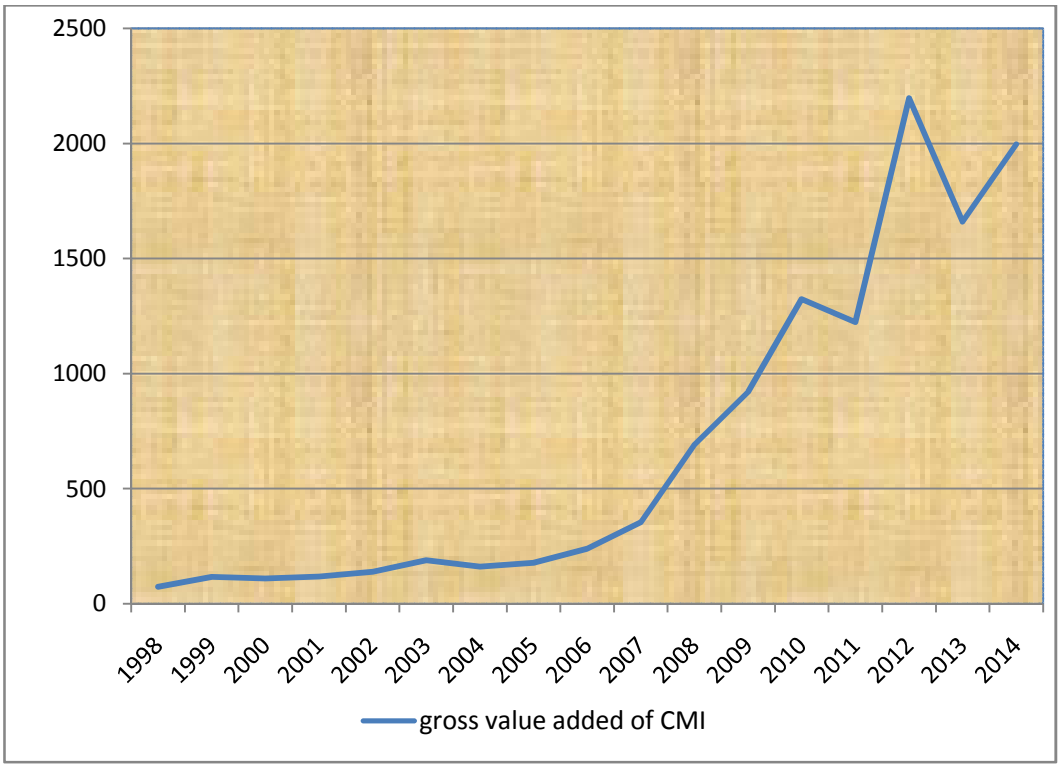

Figure 4.2 Gross value of production of CMIs

Source: Ministry of Finance and Economic Cooperation (MoFEC: 2016)

Figure 4.2 shows the trend of contribution of CMI in Gross value of production. It is clearly seen that the sector is growing with the expansion of manufacturing industry in Ethiopia, the demand of chemical used as an input increasing, and the consumer care product like soap and detergent, hair skin product increase as the result of increase in population and household income.

4.2.2 Contribution in terms of creating new employment opportunity

According to ILO (1998) employment defined as persons who during a specified brief period such as one week or one day performed some work for wage or salary or for profit or family gain or for any specific reason in cash or in kind.

Table 4.2 Rate of employment growth in Ethiopia

year	Economy	Manufacturing sector		Chemical manufacturing sub- sector		
	Total employment	Employment in manufacturing sector	Contribution to the economy (%)	Employment in chemical manufacturing sub- sector	Contribution to the sector (%)	Contribution to the economy (%)
1995	9,808,882	91,199	0.93	5,071	5.56	0.05
1996	10,325,139	93,166	0.90	6,135	6.59	0.06
1997	10,868,567	94,023	0.87	7,247	7.71	0.07
1998	11,440,597	94,412	0.83	7,014	7.43	0.06
1999	12,042,734	95,708	0.79	7,457	7.79	0.06
2000	12,676,562	94,310	0.74	7,485	7.94	0.06
2001	13,343,749	98,986	0.74	9,410	9.51	0.07
2002	14,046,052	102,347	0.73	9,531	9.31	0.07
2003	14,785,318	106,151	0.72	9,487	8.94	0.06
2004	16,428,131	110,160	0.67	11,656	10.58	0.07
2005	18,253,479	119,397	0.65	12,590	10.54	0.07
2006	20,281,643	125,649	0.62	14,684	11.69	0.07
2007	22,535,159	133,673	0.59	16,529	12.37	0.07
2008	25,039,066	149,672	0.60	20,055	13.40	0.08
2009	27,821,185	186,799	0.67	25,084	13.43	0.09
2010	30,912,427	175,641	0.57	20,775	11.83	0.07
2011	34,347,141	200,014	0.58	23,817	11.91	0.07
2012	38,163,491	313,958	0.82	99,793	31.79	0.26
2013	42,403,879	304,764	0.72	33,355	10.94	0.08

Source: Central Statistical Agency (CSA: 2016)

Table 4.2 indicates that the employment growth from 1995-2013. It shows trend of employment growth at chemical manufacturing sub sector level, manufacturing sector level and aggregate level in each year. It is clear that manufacturing sector generally, chemical manufacturing sub sector specifically have small contribution.

The time series data shows rate of employment growing, on average, the growth rate of employment in aggregate sectors, manufacturing sector and chemical manufacturing sub-sector 8.51 percent, 7.66 percent and 23.64 percent respectively. The rate of growth of

employment of chemical manufacturing sub-sector is higher than both manufacturing sector and total GDP; it signifies the contribution is increasing over time.

The rate total employment growth reached its peak in 2004 the lowest in 1996, which is 11.11 percent and which is 5.26 percent respectively. Chemical manufacturing industry highest rate of employment growth in 2012 and the lowest in 2010; it was 319 percent and -17.18 percent respectively. On average, in terms of employment chemical manufacturing sub-sector contribute 11.01 percent and 0.08 percent to manufacturing sector and to the economy respectively.

Table 4.2 indicate in 2013, from the total of 42.4 million employment, manufacturing sector contribute 0.3 million which is 0.72 percent and the contribution of chemical manufacturing industry was much smaller, 0.03 million which brought in 0.08 percent of overall employment.

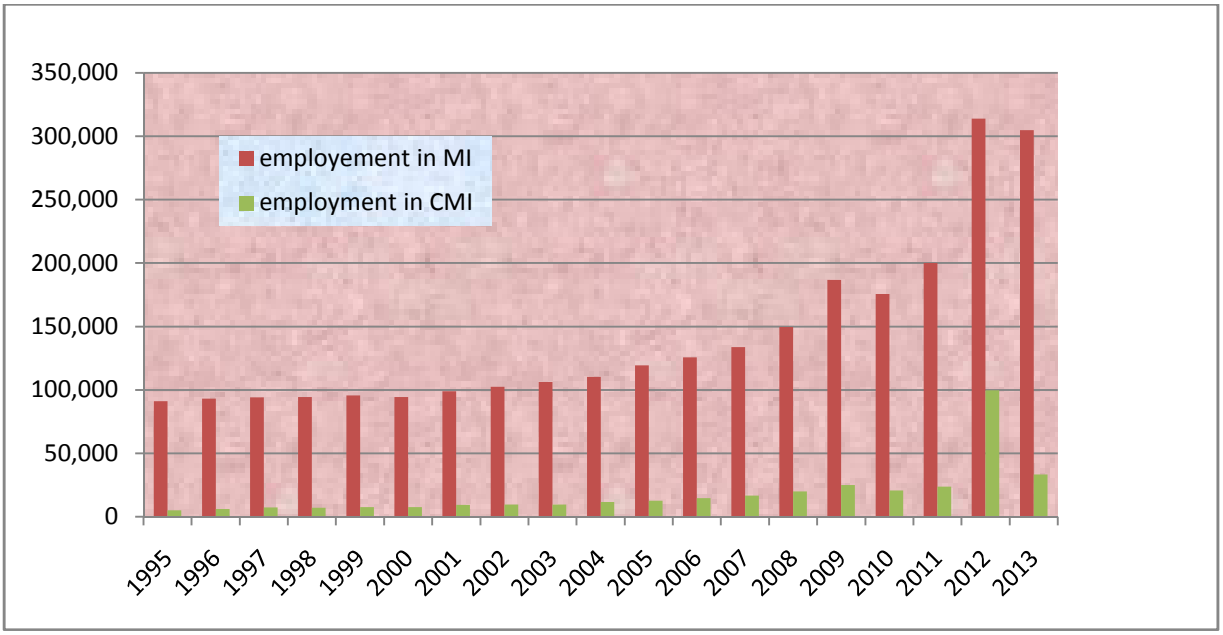

Figure 4.3 Contribution of CMI in terms of employment

Source: Central Statistical Agency (CSA: 2016)

Figure 4.3 shows the growth of the rate of employment at aggregate level, manufacturing sector level and chemical manufacturing sub sector level for the years from 1995 to 2013. It

can be seen that employment rate growing rapidly. However the contribution of manufacturing sector generally and chemical manufacturing subsector is insignificant.

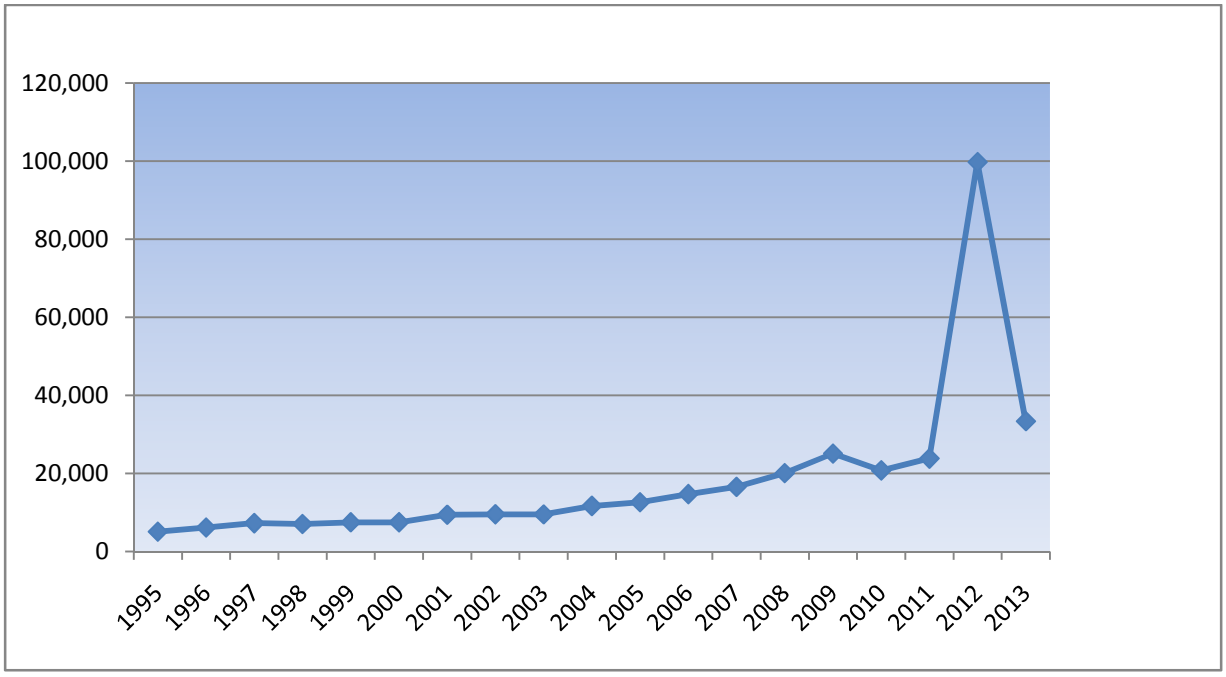

Figure 4.4 Trend of CMI employment

Source: Central Statistical Agency (CSA: 2016)

Figure 4.4 shows the trend of contribution of CMI in providing new employment opportunity and creating jobs. It is clearly seen that the rate of absorbing employment increasing over time. It is growing with the expansion of manufacturing industry in Ethiopia.

Employment in CMIs reaches its peak by 2012 and sharp decline 2013 this due to expansion and increase newly established of firms and also temporary employed workers (CSA:2016)

4.2.3 Contribution in Terms of Increasing Government Tax Revenue

According to IMF [2011] Tax revenue refers to compulsory transfers to the central government for public purposes. Certain compulsory transfers such as fines, penalties, and most social security contributions are excluded.

Table 4.3 Growth of Tax Revenue in Ethiopia in "000"

year	Economy	Manufacturing sector		Chemical manufacturing sub- sector		
	Total Revenue from tax	Total tax from manufacturing sector	Contribution to the economy (%)	Total tax from chemical manufacturing sub-sector	Contribution To the sector (%)	Contribution to the economy (%)
2002	3,781.87	1,002.13	26.50	29.10	2.90	0.77
2003	1,606,389.17	723,575.83	45.04	18,329.89	2.53	1.14
2004	1,842,852.51	743,917.89	40.37	23,718.78	3.19	1.29
2005	3,721,900.20	1,094,684.26	29.41	47,801.91	4.37	1.28
2006	6,137,699.79	1,654,240.23	26.95	61,644.96	3.73	1.00
2007	10,078,077.97	2,631,286.69	26.11	93,201.29	3.54	0.92
2008	14,239,861.00	3,335,098.66	23.42	118,430.22	3.55	0.83
2009	17,786,668.00	4,440,544.35	24.97	160,096.76	3.61	0.90
2010	24,759,567.67	5,810,976.29	23.47	187,656.58	3.23	0.76
2011	33,629,956.16	7,629,853.88	22.69	239,641.03	3.14	0.71
2012	47,023,749.31	9,822,882.10	20.89	318,108.40	3.24	0.68
2013	57,372,983.90	12,006,991.90	20.93	318,395.45	2.65	0.55
2014	67,929,767.58	14,849,794.19	21.86	345,983.98	2.33	0.51

Source: Ethiopian Revenue and Custom Authority (ERCA: 2016)

Table 4.3 shows the data about tax revenue from 2002-2014. It presents the path of growth in chemical manufacturing sub sector, manufacturing sector and total tax revenue in each year. It is clear that manufacturing sector generally, chemical manufacturing sub sector specifically contribute insignificant amount.

The data shows tax revenue increasing tremendously, on average, at the rate growth of tax from total economy, manufacturing sector and chemical manufacturing sub-sector is 42.48 percent, 32.44 percent and 32.70 percent respectively. The rate of growth of total tax revenue is higher than both manufacturing sector and CMI; it indicates the contribution is lags behind compare to other sectors of the economy.

Total tax revenue growth rate was highest in 2005 and lowest in 2004, which is 101.96 percent and 14.72 percent respectively. Chemical manufacturing sub sector scored highest rate of growth was in 2005 and lowest was in 2013.it was 101.54 percent and 0.09 percent respectively.

On average, the contribution of tax revenue from chemical manufacturing sub-sector to manufacturing sector and to the economy is 3.23 percent and 0.87 percent respectively.

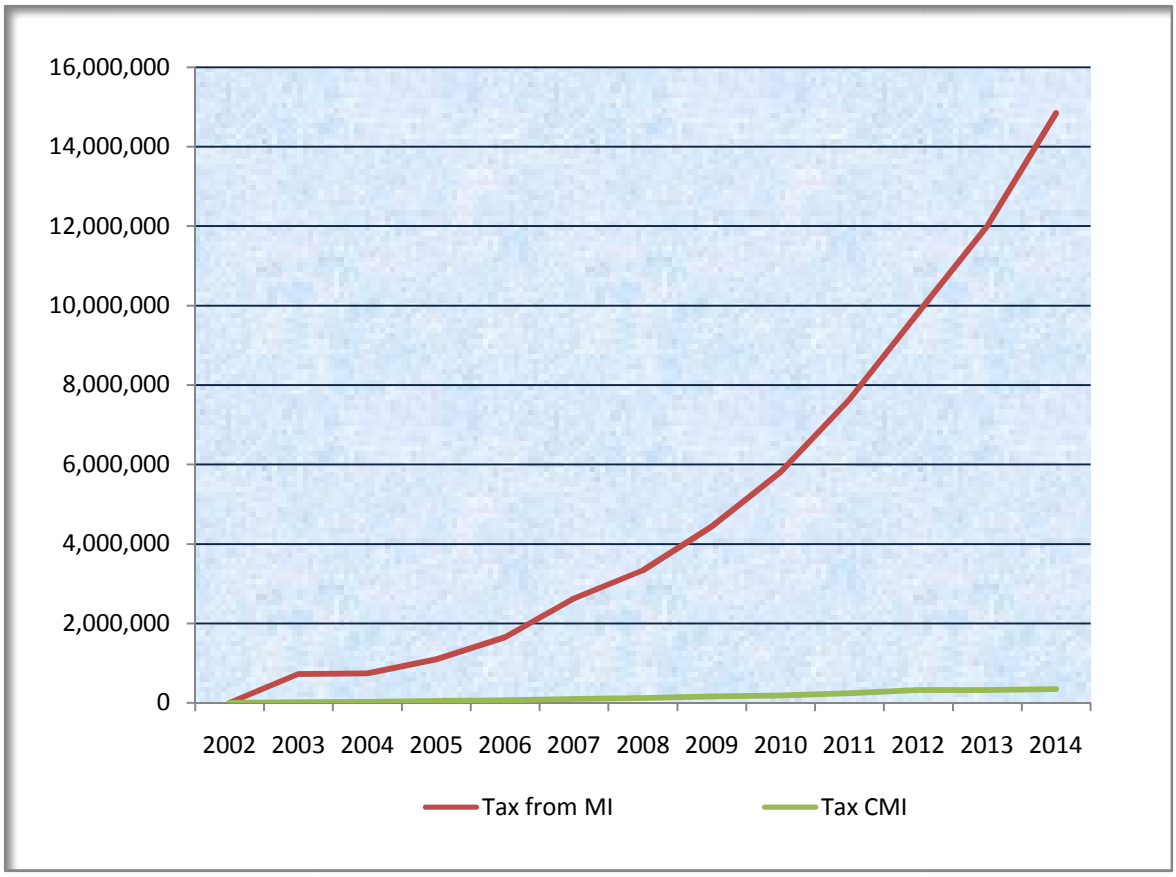

Figure 4.5 Trend of Tax revenue growth in "000 birr"

Source: Ethiopian Revenue and Custom Authority (ERCA: 2016)

Figure 4.5 shows the growth of tax revenue comparing the rate at total economy, manufacturing sector and chemical manufacturing sub-sector level from 2002 to 2014. It can clearly be seen that total tax revenue shows rapid increment. However the contribution of manufacturing sector generally and chemical manufacturing subsector specifically is insignificant.

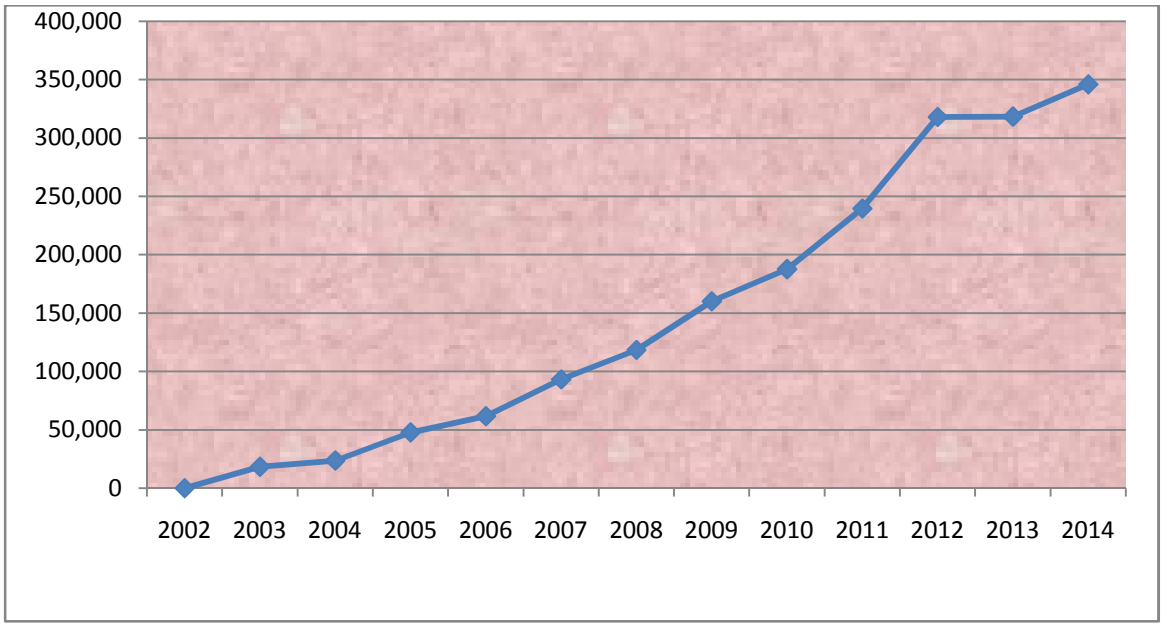

Figure 4.6 Trend of government tax revenue from CMI

Source: Ethiopian Revenue and Custom Authority (ERCA: 2016)

Figure 4.6 shows the trend of growth of tax revenue from chemical manufacturing sub-sector. It is clearly seen that, as one component of manufacturing sector, tax revenue increased with the expansion of manufacturing industry. Tax revenue increased with increase in gross value of production, employment and investment.

4.2.4 Contribution in terms of increasing investment flow

According to UNCTAD [2011] investment can be defined as business concessions conferred by law or under contract, including concessions to search for, cultivate, extract or exploit natural resources.

Table 4.4 Investment Flow Growth in Ethiopia in "million birr"

year	Economy	Manufacturing sector		Chemical manufacturing sub- sector		
	Total investment	Total investment manufacturing sector	Contribution to the economy (%)	Total investment chemical manufacturing sub-sector	Contribution To the sector (%)	Contribution to the economy (%)
1995	2,775.81	117.91	4.25	24.43	20.72	0.88
1996	3,169.50	1,307.82	41.26	185.69	14.20	5.86
1997	2,072.57	542.43	26.17	191.29	35.26	9.23
1998	4,601.36	713.32	15.50	46.13	6.47	1.00
1999	3,509.00	1,111.28	31.67	76.03	6.84	2.17
2000	2,039.71	1,108.82	54.36	131.35	11.85	6.44
2001	2,818.22	1,664.53	59.06	1,089.92	65.48	38.67
2002	2,246.00	744.18	33.13	126.07	16.94	5.61
2003	3,048.68	466.74	15.31	283.84	60.81	9.31
2004	5,716.70	1,372.90	24.02	728.43	53.06	12.74
2005	5,661.49	434.11	7.67	100.73	23.20	1.78
2006	13,198.60	1,179.34	8.94	453.46	38.45	3.44
2007	8,844.27	2,581.44	29.19	252.27	9.77	2.85
2008	8,459.13	2,012.26	23.79	745.08	37.03	8.81
2009	23,006.48	9,058.48	39.37	289.00	3.19	1.26
2010	10,013.82	4,114.74	41.09	829.40	20.16	8.28
2011	14,752.46	3,815.06	25.86	697.59	18.29	4.73
2012	17,725.61	7,519.02	42.42	219.29	2.92	1.24
2013	10,380.62	6,243.94	60.15	236.92	3.79	2.28
2014	12,472.42	6,884.36	55.20	919.53	13.36	7.37

Source: Ethiopian Investment Commission (EIC:2016)

Table 4.4 shows investment flow from 1995-2014. It describes pace of growth in chemical manufacturing sub sector, manufacturing sector and total tax revenue in each year. It is clear that manufacturing sector generally, chemical manufacturing sub sector specifically contribute insignificant amount.

The table shows investment capital increasing tremendously, on average, the growth rate of investment capital in aggregate sectors, manufacturing sector and chemical

manufacturing sub-sector is 22.82 percent, 93.06 percent and 126.34 percent respectively. The rate of growth of investment flow the chemical manufacturing sub-sector is higher than both manufacturing sector and aggregate sectors; it indicates the contribution is indispensable and future dominance in the economy.

Total investment flow growth rate was highest in 2009 and lowest in 2010, which is 171.97 percent and -56.47 percent respectively. Chemical manufacturing sub sector scored highest rate of growth was in 2001 and lowest was in 2002; it was 829.78 percent and -88.43 percent respectively. On average, the investment flow into chemical manufacturing sub-sector to manufacturing sector and to the economy contribute 23.09 percent and 6.7 percent respectively.

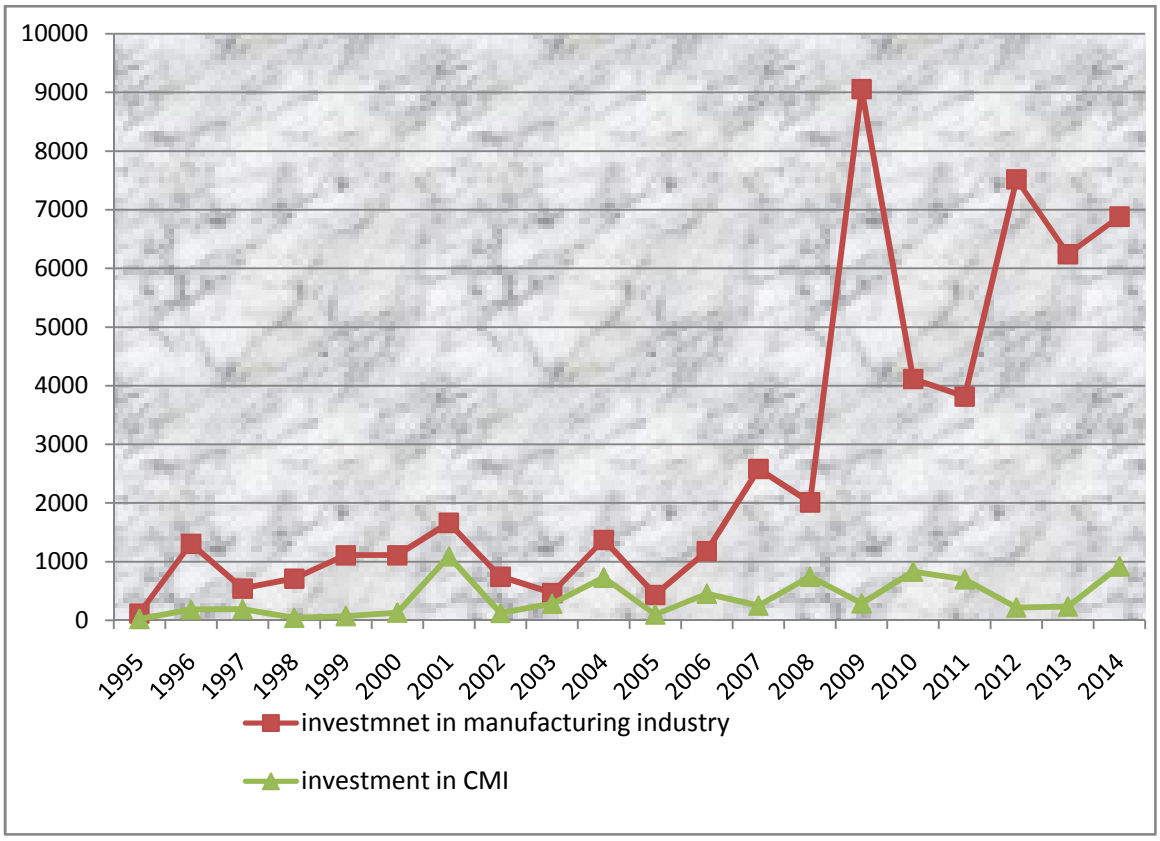

Figure 4.7 Trend of Investment growth in "million birr"

Source: Ethiopian Investment Commission (EIC:2016)

Figure 4.7 shows the growth of investment flow comparing the rate at total economy, manufacturing sector and chemical manufacturing sub-sector level from 1995 to 2014. It

can clearly be seen that total investment flow moves ups and down ward in line with manufacturing sector. It signifies the dominance of manufacturing sector in total investment flow. Whereas the contribution of chemical manufacturing sub-sector specifically is insignificant.

Even though there has been ups and downs in investment flow, on average investment flow has increase from time to time. Strong natural resource base, cheap labor, conducive tax environment, importing duty-free capital goods and construction materials, etc may be the reason for the increment of FDI from time to time (Belay: 2015).

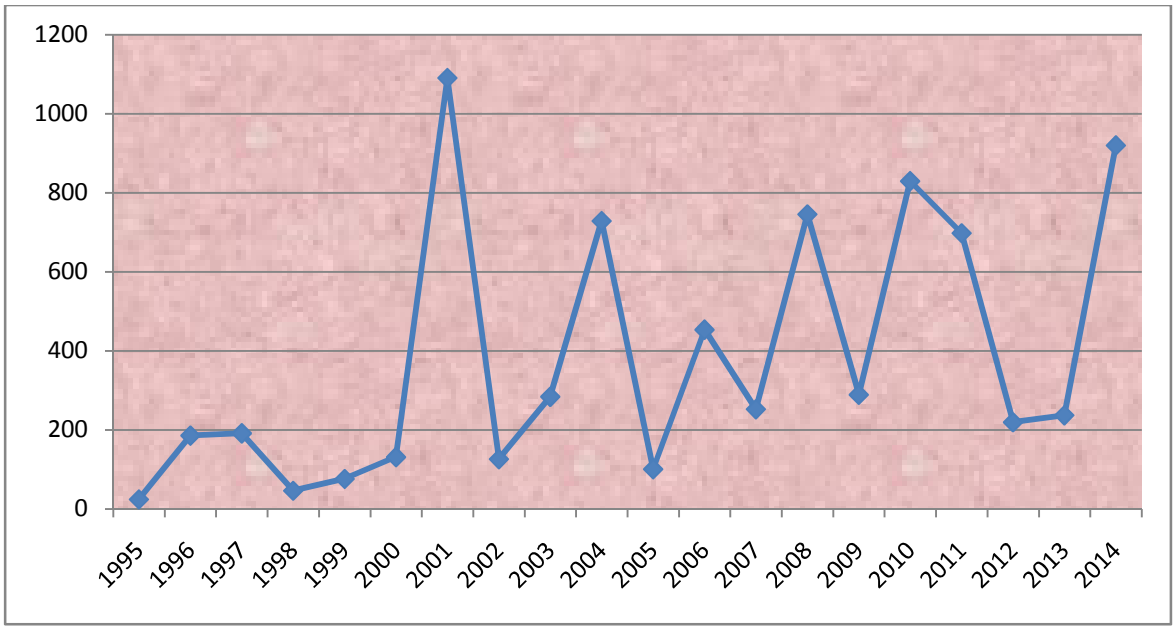

Figure 4.8 Trend of investment growth of CMI

Source: Ethiopian Investment Commission (EIC:2016)

Figure 4.8 shows the trend of investment flow to chemical manufacturing sub-sector. It is clearly seen that the rate of growth is full of ups and downs.

4.3 Factors Affecting the Performance of Chemical Manufacturing Industries

4.3.1 Category of Business Venture

As shown in figure 4.9 the sample firms were operating in three sectors of the economy. Most of them are engaged in soap and detergent (62.5%) followed by plastic (18.75%), paint (12.5%) and other chemical factories (6.25%). This division of CMIs by sector type was believed to be helpful to study each sector critical factors that affect the performance of CMIs. This is because firms in different sectors of the economy face different types of problems. That means the degree of those critical factors in soap and detergent may differ from the factors that are critical to plastic, paint and other chemical manufacturing sectors.

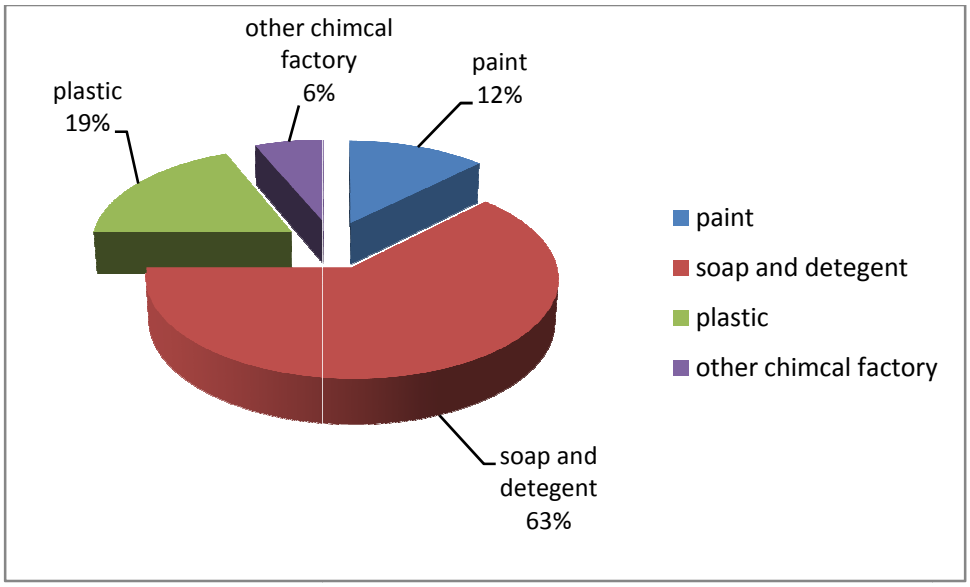

Figure 4.9 Sectors respondents engaged in

Source: Field survey, 2016

Respondents were asked different questions regarding the factors affecting the performance of CMIs in Ethiopia. Their responses are organized in the following manner.

4.3.2 Results of Descriptive Statistics

There are a number of `challenges that affect performance of CMIs associated with different factors. This part explains the descriptive statistics calculated on the basis of the factors that affect the performance of CMIs. The results for measures of central tendency and dispersion were obtained from the sample of respondents of CMIs are shown in the following tables.

Table 4.5 Politico-legal factors that affect the performance of CMIs in (%)

	Gov't rules and regulations	Env'tal rules and regulations	Unreasonable Tax levied	Beurocracy in license	Lack of gov't support	Political intervention	Lack of information on gov't regulation	Land lease policy
Strongly Disagree	4.7	4.7	7.8	1.6	7.8	60.9	6.3	21.9
Disagree	60.9	71.9	65.6	20.3	53.1	32.8	18.8	53.1
Undecided	10.9	10.9	9.4	12.5	18.8	3.1	17.2	7.8
Agree	23.4	10.9	14.1	54.7	15.6	1.6	53.1	12.5
Strongly Agree	0	1.6	3.1	10.9	4.7	1.6	4.7	4.7
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Field survey, 2016

As it is indicated in Table 4.5, percent for the all politico-legal factors were calculated including Government rules and regulations on chemicals, Environmental regulations on chemicals, unreasonable tax levied on their business, bureaucracy in products registration and licensing, lack of government support and incentive, political intervention, lack of accessible information on government regulation that are relevant to their business and land lease policy are affect the performance of their organization.

From the total 64 respondent 54.7 percent agreed bureaucracy in products registration and licensing and 53.1 percent agreed lack of accessible information on government regulation are affects their performance.

According to interviewees, there still exists an overly bureaucratic government system that often results in unnecessary delays in compliance and is excessively costly. This includes a complex system, lengthy procedures and rules. For example, registration of introducing new product, renewal of license for already online product and unavailability of organized laboratory in regulatory body. This cause to send the sample to European and Asian countries to make test of new product and till the product will not explore to market which limits their opportunities for growth.

Here, bureaucracy in products registration and licensing, and lack of accessible information on government regulation are identified as the major politico-legal factors that affect on the performance of CMIs.

Table 4.5.1 Aggregate of Politico-legal factors that affect the performance of CMIs

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	1	1.6	1.6	1.6
	Disagree	29	45.3	45.3	46.9
	Undecided	29	45.3	45.3	92.2
	Agree	5	7.8	7.8	100.0
	Total	64	100.0	100.0	

Source: Field survey, 2016

As it is indicated in Table 4.5.1, the aggregate of frequency and percent for the politico-legal factor is calculated. The table shows the out of 64 respondents 5, which is 7.8 percent; agree politico- legal factor is the factor that affects the performance of their organization.

Sum up, out of 64 respondents 58, which is 90.6 percent “undecided” and “disagree” politico-legal factors affect their performance. These shows compare to other factors politico-legal factors are not major factors but it affects performance of CMIs.

Table 4.6.Working place factors that affect the performance of CMIs in (%)

	Low wage and salary	Absence of own premises	Working place not convenient	High house rent
Strongly Disagree	1.6	3.1	9.4	14.1
Disagree	29.7	67.2	70.3	54.7
Undecided	4.7	14.1	7.8	1.6
Agree	53.1	14.1	9.4	10.9
Strongly Agree	10.9	1.6	3.1	18.8
Total	100.0	100.0	100.0	100.0

Source: Field survey, 2016

As it is indicated in Table 4.6, percent for the all working place factors were calculated including low wage and salary, absence of own premises, Current working place is not convenient, high rent of house affect the performance of their organization.

The percent in table 4.6 shows, out of 64 respondents 53.1 percent agreed and 10.9 percent strongly agreed low wage and salary affects the performance of their companies, followed by 29.7 percent respondents who argue the house rent is too high that affects the performance of their organization.

In an interview conducted in selected factories confirmed that, their factories are outside the capital city, Addis Abeba however, the liaison office is in rented house and high rental charges have impeded the performance of their businesses. Therefore, low wage and salary, and high house rent are identified as the major working place factors that affect on the performance of CMIs.

Table 4.6.1 Aggregate of Working place factors that affect the performance of CMIs

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	19	29.7	29.7	29.7
	Undecided	33	51.6	51.6	81.3
	Agree	10	15.6	15.6	96.9
	Strongly Agree	2	3.1	3.1	100.0
	Total	64	100.0	100.0	

Source: Field survey, 2016

The aggregate of frequency and percent in Table 4.6.1 shows, out of 64 respondents 10, which accounted for 15.6 percent, agreed and 2 respondents, which accounted for 3.1 percent strongly agreed working place is the factors that affect the performance of their companies.

Sum up, out of 64 respondents 52, which is 81.3 percent are "undecided" and "disagree" working place factors affect their performance. These shows compare to other factors politico-legal factors are not major factors but it affects performance of CMIs.

Table 4.7 Technological Factors that affect the Performance of CMIs in (%)

	Lack of skill	Lack of money	Inappropriate technology	Technology owners less to cooperate
Strongly disagree	6.3	3.1	4.7	3.1
Disagree	26.6	21.9	54.7	78.1
Undecided	1.6	6.3	4.7	6.3
Agree	59.4	54.7	29.7	6.3
Strongly Agree	6.3	14.1	6.3	6.3
Total	100.0	100.0	100.0	100.0

Source: Field survey, 2016

As it is indicated in Table 4.7, percent for the all working place factors were calculated including lack of skills to handle new technology, lack of money to acquire new technology, unable to select proper technology, technology owners less interested to cooperate and work together affect the performance of their organization.

As it can be seen in table 4.7, out of 64 respondents 59.4 percent are agreed lack of skills to handle new technology, 54.7 percent are agreed lack of money to acquire new technology and 29.7 percent are agreed unable to select proper technology are the factors that affect performance of their companies.

According to the interview with the operators, current production system becomes outdated but due to lack of money to acquire new technology unable to change the old one. Therefore, lack of skills to handle new technology, lack of money to acquire new technology and unable to select proper technology identified as the major technological factors that affect on the performance of CMIs.

Table 4.7.1 Aggregate of Technological Factors that affect the performance of CMIs

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	1	1.6	1.6	1.6
	Disagree	10	15.6	15.6	17.2
	Undecided	33	51.6	51.6	68.8
	Agree	19	29.7	29.7	98.4
	Strongly Agree	1	1.6	1.6	100.0
	Total	64	100.0	100.0	

Source: Field survey, 2016

The aggregate of frequency and percent in Table 4.7.1 shows, out of 64 respondents 20, which accounted for 31.3 percent, are agreed and strongly agreed technological factor is the one factor that affect the performance of their companies.

Sum up, out of 64 respondents 43, which is 67.2 percent are “undecided” and “disagree” technological factors affect their performance. These shows compare to other factors technological factor is one of the major factor that affects the performance of CMIs.

Table 4.8.Infrastructural factors that affect the performance of CMIs in (%)

	Power interruptions	Insufficient water	lack of business development	Lack of transport	Lack of expired product sewerage system
Strongly disagree	1.6	4.7	4.7	3.1	28.1
Disagree	0	10.9	35.9	17.2	54.7
Undecided	3.1	3.1	29.7	14.1	7.8
Agree	17.2	42.2	28.1	62.5	4.7
Strongly Agree	78.1	39.1	1.6	3.1	4.7
Total	100.0	100.0	100.0	100.0	100.0

Source: Field survey, 2016

The result presented in Table 4.8 shows percent for infrastructural factors including power interruptions, insufficient and interrupted water supply, lack of business development services, lack of sufficient and quick transportation service, lack of appropriate expired raw materials and product sewerage system are the factors that affect the performance of their companies.

Out of 64 respondents 78.1 percent strongly agree power interruptions, 62.5 percent lack of sufficient and quick transportation service and 42.2 percent insufficient and interrupted water supply are the factors affecting their company’s performance.

According to the interview with the operators, the demand for and the supply of electric power do not match which results repeated power interruption and makes some machines out of use. Insufficient and interrupted water supply and poor state of the road condition of locality has culminated in high transportation service costs to the CMIs is another challenge making the sector difficult for accessibility by the existing and potential customer.

Therefore, power interruptions, insufficient and interrupted water supply and lack of sufficient and quick transportation service identified as the major infrastructural factors that affect on the performance of CMIs.

Table 4.8.1 Aggregate of Infrastructural Factors that affect the performance of CMIs

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	3	4.7	4.7	4.7
	Undecided	29	45.3	45.3	50.0
	Agree	31	48.4	48.4	98.4
	Strongly Agree	1	1.6	1.6	100.0
	Total	64	100.0	100.0	

Source: Field survey, 2016

The result presented in Table 4.8.1 shows that the aggregate frequency and percent of infrastructural factors. Out of 64 respondents 31, which accounted for 48.4 percent, agreed infrastructural factors that affect the performance of their companies.

Sum up, out of 64 respondents 32, which is 50 percent are “undecided” and “disagree” technological factors affect their performance. These shows compare to other factors technological factor is one of the major factor that affects the performance of CMIs.

Table 4.9.Marketing factors that affect the performance of CMIs in (%)

	Low mkt demand	Lack of dd forecast	Lack of mkt info	competition	Inefficient export	Limited Raw material	Inadequate market	Unfair mkt environment	Search new mkt difficult	Inefficient Mkt research	Raw materials not local	Lack of promotion	Poor Customer handling
St.Disagree	14.1	9.4	9.4	4.7	1.6	4.7	3.1	6.3	4.7	7.8	7.8	6.3	14.1
Disagree	57.8	50.0	56.3	7.8	1.6	60.9	78.1	12.5	65.6	37.5	12.5	39.1	62.5
Undecided	4.7	6.3	4.7	3.1	7.8	3.1	4.7	10.9	6.3	9.4	3.1	17.2	4.7
Agree	23.4	32.8	28.1	62.5	21.9	17.2	10.9	54.7	21.9	39.1	53.1	35.9	15.6
St. Agree	0	1.6	1.6	21.9	67.2	14.1	3.1	15.6	1.6	6.3	23.4	1.6	3.1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Field survey, 2016

As shown in the Table 4.9, marketing factors which includes low market demand, lack of demand forecasting, lack of market information, competition with local and imported goods, inefficient in export marketing, limited raw materials suppliers, inadequate market for products, unfair market environment, searching new market is so difficult, inefficient in marketing research, raw materials are not locally available, lack of promotion to attract potential users, poor customer relationship and handling factors that affect the performance of CMIs engaged in all sectors.

Out of 64 respondents 67.2 percent strongly agree inefficient in export marketing, 62.5 percent agree competition with local and imported goods, 54.7 percent agree unfair market environment and 53.1 percent agree unavailability of raw materials locally are the factors that affect the performance of their companies.

In an interview conducted with an operator, it was confirmed that competition with imported goods and locally substandard product which is illegal are the major challenges for their business. Therefore, inefficient in export marketing, competition with local and imported goods, unfair market environment and unavailability of raw materials locally identified as the major marketing factors that affect on the performance of CMIs.

Table 4.9.1 Aggregate of Marketing factors that affect the performance of CMIs

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	7	10.9	10.9	10.9
	Undecided	46	71.9	71.9	82.8
	Agree	10	15.6	15.6	98.4
	Strongly Agree	1	1.6	1.6	100.0
	Total	64	100.0	100.0	

Source: Field survey, 2016

As shown in the Table 4.9.1, aggregate frequency and percent of marketing factors calculated. Out of 64 respondents 10, which accounted for 15.6 percent and 1 respondent, which accounted for 1.6 are “agree” and “strongly agree” marketing factors affect the performance of their organization.

Sum up, out of 64 respondents 53, which is 82.8 percent are “undecided” and “disagree” marketing factors affect their performance. These shows compare to other factors marketing factor is not a major factor that affects the performance of CMIs.

Table 4.10 Financial factors that affect the performance of CMIs in (%)

	Access to finance	Inadequate credit	Lack cash mgmt	Shortage of working capital	High collateral	High interest rate	Loan procedure too complicated
Strongly disagree	4.7	3.1	10.9	1.6	1.6	1.6	4.7
Disagree	6.3	40.6	48.4	4.7	7.8	4.7	6.3
Undecided	1.6	10.9	10.9	6.3	7.8	6.3	4.7
Agree	51.6	37.5	25.0	48.4	43.8	42.2	43.8
Strongly agree	35.9	7.8	4.7	39.1	39.1	45.3	40.6
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Field survey, 2016

As shown in the Table 4.10, marketing factors which includes access to finance & availability of foreign currency, inadequacy of credit institutions, lack of cash management skills, shortage of working capital, high collateral requirement from banks and other lending institutions, high interest rate charged by banks and other lending institutions, loan application procedures of banks and other lending institutions are too complicated are factors that affect the performance of CMIs engaged in all sectors.

The result presented in Table 4.10 shows out of 64 respondents 51.6 percent agree and 35.9 percent strongly agree access to finance and availability of foreign currency, 48.4 percent agree and 39.1 percent strongly agree shortage of working capital, 43.8 percent agree and 39.1 percent strongly agree high collateral requirement from banks and other lending institutions and 43.8 percent agree and 40.6 percent strongly agree complicated loan application procedures of banks and other lending institutions are major factors affect the performance of their organization.

Majority of interviewees widely outlined that, the above stated problems are the major problems that affect the operation, sometimes the factories are closed for six month without production due to unavailability of foreign currency and shortage in working

capital. According to them, because of high collateral and interest rate they are discouraged to take the loan.

Therefore, access to finance and availability of foreign currency, shortage of working capital, high collateral requirement from banks, high interest rate charged by banks and other lending institutions and complicated loan application procedures of banks and other lending institutions are identified as the major financial factors that affect on the performance of CMIs.

Table 4.10.1 Aggregate of Financial factors that affect the performance of CMIs

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	1	1.6	1.6	1.6
	Undecided	7	10.9	10.9	12.5
	Agree	20	31.3	31.3	43.8
	Strongly Agree	36	56.3	56.3	100.0
	Total	64	100.0	100.0	

Source: Field survey, 2016

The result presented in Table 4.10.1 shows aggregate frequency and percent of financial factors calculated. Out of 64 respondents 20, which accounted for 31.3 percent agree and 36, which accounted for 56.3 percent strongly agreed financial factor is the factors that affect the performance of their companies.

Sum up, out of 64 respondents 8, which is 12.5 percent are “undecided” and “disagree” financial factors affect their performance. These shows compare to other factors financial factor is number one factor that affects the performance of CMIs.

Table 4.11 Management factors that affect the performance of CMIs in (%)

	Poor mgmt skill	Lack of division responsibility	Poor communication	Poor selection of associates	Lack of trained employee	Lack low cost training	Lack of strategic planning
St. Disagree	4.7	10.9	7.8	7.8	6.3	1.6	12.5
Disagree	67.2	50.0	62.5	70.3	29.7	18.8	45.3
Undecided	1.6	15.6	6.3	14.1	1.6	4.7	6.3
Agree	26.6	21.9	23.4	7.8	51.6	62.5	32.8
Strongly Agree	0	1.6	0	0	10.9	12.5	3.1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Field survey, 2016

As shown in Table 4.11, management factors which includes poor management skills, lack of clear division of duties and responsibility among employees, poor organization and ineffective communication, poor selection of associates in business, lack of well trained and experienced employees, lack of low cost and accessible training facilities, lack of strategic business planning are the factors that affect the performance of their companies.

The result presented in the table shows out of 64 respondents 51.6 percent agree and 10.9 percent strongly agree lack of well trained and experienced employees, and 62.5 percent agree and 12.5 percent strongly agree lack of low cost and accessible training facilities are management factors affect the performance of their organization.

Therefore, lack of well trained and experienced employees and lack of low cost and accessible training facilities are identified as the major financial factors that affect on the performance of CMIs.

Table 4.11.1 Aggregate of management factors that affect the performance of CMIs

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	3	4.7	4.7	4.7
	Disagree	18	28.1	28.1	32.8
	Undecided	32	50.0	50.0	82.8
	Agree	11	17.2	17.2	100.0
	Total	64	100.0	100.0	

Source: Field survey, 2016

The result presented in Table 4.11.1 shows aggregate frequency and percent of management factors calculated. Out of 64 respondents 11, which accounted for 17.2 percent agree financial factor is the factors that affect the performance of their companies.

Sum up, out of 64 respondents 50, which is 78.1 percent are “undecided” and “disagree” management factors affect their performance. These shows compare to other factors management factor is not major factor that affects the performance of CMIs.

Table 4.12 Tools and machineries factors that affect the performance of CMIs in (%)

	Long lived machines	Unavailable spare part	Repeated machines breakage	High cost of machineries	Lack of appropriate machineries	Lower productive of machines
Strongly disagree	6.3	1.6	0	0	3.1	0
Disagree	26.6	14.1	31.3	7.8	45.3	42.2
Undecided	1.6	4.7	4.7	6.3	1.6	14.1
Agree	53.1	48.4	53.1	60.9	45.3	29.7
Strongly Agree	12.5	31.3	10.9	25.0	4.7	14.1
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: Field survey, 2016

The result presented in Table 4.12 shows tools and machineries factors which include long-lived machines, unavailable spare parts, repeated machines breakage, high cost of machinery and equipment, lack of appropriate machinery and equipment, lower productive capacity of machines are the factors that affect the performance of their companies.

The result presented in Table 4.12 shows out of 64 respondents 53.1 percent agree and 12.5 percent strongly agree long-lived machines, 48.4 percent agree and 31.3 percent strongly agree unavailable spare parts, 53.1 percent agree and 10.9 percent strongly agree repeated machines breakage and 60.9 percent agree and 25.0 percent strongly agree high cost of machinery and equipment are factors affect the performance of their organization.

Therefore, long-lived machines, unavailable spare parts, repeated machines breakage and lack of low cost and high cost of machinery and equipment are identified as the major tools and machineries factors that affect on the performance of CMIs.

Table 4.12.1 Aggregate of Tools and machineries factors that affect the performance of CMIs

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	6	9.4	9.4	9.4
	Undecided	26	40.6	40.6	50.0
	Agree	21	32.8	32.8	82.8
	Strongly Agree	11	17.2	17.2	100.0
	Total	64	100.0	100.0	

Source: Field survey, 2016

The result presented in Table 4.12.1 shows aggregate frequency and percent of tools and machineries factors calculated. Out of 64, respondents 32, which accounted for 50 percent, agree and strongly agree tools and machineries factors affect the performance of their organization respectively.

Sum up, out of 64 respondents 32, which is 50 percent are “undecided” and “disagree” tools and machineries affect their performance. These shows compare to other tools and machineries factor is major factor that affects the performance of CMIs.

4.3.2.1 Comparison of Factors

Even though, all the politico-legal, infrastructure, working place, technology, marketing, financial, management and tools and machineries factors affect the performance of CMIs, this does not necessarily mean that all factors have equal impact.

Table 4.13 Comparison of the major factors

	Strongly disagree	Disagree	Undecided	Agree	Strongly Agree	Rank of severity
Politico-Legal	1.6	45.3	45.3	7.8	0	8th
Working Place	0	29.7	51.6	15.6	3.1	5th
Technological	1.6	15.6	51.6	29.7	1.6	4th
Infrastructural	0	4.7	45.3	48.4	1.6	3rd
Marketing	0	10.9	71.9	15.6	1.6	6th
Financial	0	1.6	10.9	31.3	56.3	1st
Management	4.7	28.1	50.0	17.2	0	7th
Tools and Machineries	0	9.4	40.6	32.8	17.2	2nd

Source: Field survey, 2016

From the Table 4.13, it can be seen that financial and tools and machineries factors have the biggest potential to contribute to the performance, followed by infrastructural, technological, work place factors, marketing, management and politico-legal. In other words, the result shows that financial and tools and machineries factors are the two topmost factors that affect the performance of CMIs. This result is supported by Admasu Abera (2012:68) and Haftu Berihun et al. (2009:84-86) who found that lack of finance rank on top being reported as the major constraint by a large proportion of the Micro and Small Enterprises. It can, therefore, be concluded that finance and Tools and machineries factors do largely affect the performance of CMIs.

4.2.4 Results of Inferential Statistics

In this section, the results of inferential statistics are presented. To attain the objectives of the study, reliability analysis of Cronbach alpha and Pearson's Product Moment Correlation Coefficient was used. With the aid of these statistical techniques, conclusions are drawn with regard to the sample.

4.2.4.1 **Reliability Analysis**

In statistics, it is assumed that a questionnaire is reliable when an individual item or a set of some items renders the same result as the entire questionnaire. The simplest method to test the internal consistency of a questionnaire is dividing the scores a participant received on a questionnaire in two sets with an equal amount of scores and calculating the correlation between these two sets (Melanie, 2012).

A high correlation signals a high internal consistency. Cronbach became a faster and comparable method to calculate a questionnaire's reliability:

$$\alpha = (N^2M\,(Cov))/\,(\sum s^2 + \sum Cov)$$

Assumption behind this equation is that the unique variance within variables (s^2) should be rather small in comparison with the covariance between scale items (Cov) in order to have an internal consistent measure (Cortina, 1993).

Cronbach's alpha reliability coefficient normally ranges between 0 and 1. It should be noted that an alpha of .8 is probably a reasonable goal. As the rules of thumb: "> .9 – Excellent, > .8 – Good, > .7 – Acceptable, > .6 – Questionable, > .5 – Poor, and < .5 – Unacceptable" (George and Mallery, 2003)

Cronbach's alpha analysis is determining how each item individually contributes to the reliability of the questionnaire. In this questionnaire, all items positively contribute to the reliability of the questionnaire.

In this study Cronbach's alpha α is .83 which is "good" in internal consistency and the contribution of factors i.e. politico-legal factors, working place, marketing factors, financial factors, technological factors, management factors and tools and machineries factors are major contributing factors for the performance of CMIs.

4.2.4.2 **Pearson's Product Moment Correlation Coefficient**

In this study Pearson's Product Moment Correlation Coefficient was used to determine whether there is significant relationship between politico-legal, working premises, technological, infrastructural, marketing, financial, management and entrepreneurial variable with performance. The following section presents the results of Pearson's Product Moment Correlation on the relationship between independent variables and dependent variable. The table below indicates that the correlation coefficients for the relationships between performance and its independent variables are linear and positive ranging from substantial to strong correlation coefficients.

Table 4.14 the relationship between independent variables and performance

Independent variables		**Performance**
Politico-legal factors	Pearson correlation	-.017
	p-value	.949
	N	16
Working place factors	Pearson correlation	.274
	p-value	.305
	N	16
Technological factors	Pearson correlation	.667**
	p-value	.005
	N	16
Infrastructural factors	Pearson correlation	.848**
	p-value	.000
	N	16
Marketing factors	Pearson correlation	.814**
	p-value	.000
	N	16
Financial factors	Pearson correlation	.980**
	p-value	.000
	N	16

Management factors	Pearson correlation p-value N	-.281 .292 16
Tools and machineries factors	Pearson correlation p-value N	.875** .000 16

** Correlation is significant at the 0.01 level (2-tailed).

Source: Field survey, 2016

As it is clearly indicated in the Table 4.14, a strong positive relationship was found between financial and performance (r =.980, p < .01), tools and machineries, and performance (r = .875, p < .01), and infrastructure and performance (r = .848, p < 0.01), which are statistically significant at 99% confidence level. This implies that at a 1% level of significance it was discovered that the finance, tools and machineries and infrastructure plays a significant role in determining the performance of CMIs in the selected chemical manufacturing companies. Moreover, the table presents the association between the selected variables and performance of CMIs for a sample of 64 operators.

There is substantial, however statistically significant relationship between marketing and performance (r = .814, p <.01). This would imply that, the more marketing the better performance of CMIs would be. The result on table above further indicates that, there is a substantial positive correlation between technological factors and CMIs performance (r = .667), which is statistically significant at 99% confidence level. This implies that CMIs with entrepreneurial skills performed considerably better. There exists weak positive relationship between working place factors and performance (r = .274, p = 0. 0.3), and there exists weak negative relationship politico-legal factor and performance (r = -.17, p = 0.9), and management factor and performance of CMIs (r = -.281, p = 0.2), which are statistically not significant at 99% confidence level.

CHAPTER FIVE

5. CONCLUSIONS AND RECOMMENDATIONS

5.1CONCLUSIONS

This research was conducted in one component of manufacturing sector i.e chemical manufacturing sub sector in Ethiopia with the prime intent of critically viewing its contribution to the sector and to the economy and assessing the factors affecting the performance of CMIs engaged in paint, soap and detergent, plastic and other chemical factories. Specifically, the study attempted to make relationship between the contributions and factors affecting the performance of CMIs and to recommend possible solution to alleviate the problem of CMIs. Based on the objectives and findings of the study, the following conclusions are worth drawn.

The contribution of CMIs to the sector and to the economy is insignificant in terms of gross value of production, employment, investment and government revenue through tax. However the trend shows its contribution increasing overtime in above mentioned variables.

This study attempted to relate the contribution and the factors that affect the performance and growth of CMIs and identifies the cause for insignificant contribution as follows.

The main factor for the performance and growth of CMIs is financial factor followed by tools and machineries factor. Due to high interest rate and collateral requirement, financial institutions have not been able to meet the credit needs of the CMIs.

The most important contextual factors identified are financial factors which include high collateral requirement from banks and other lending institutions, shortage of working capital, high interest rate charged by banks and other lending institutions, and too complicated loan application procedures of banks and other lending institutions.

Secondly, tools and machineries factors include long lived machines, unavailable spare parts, repeated machines breakage, high cost of machineries and equipment, lack of appropriate machineries and equipment and lower capacity of machines are main factors for the performance and growth of CMIs.

Infrastructural factors incorporate power interruptions, and lack of sufficient and quick transportation service that hinder the business performance of all sectors. Marketing factors include inadequacy of market, difficulty of searching new market, lack of demand forecasting, lack of market information and absence of relationship with an organization/association that conduct marketing research.

Finally, though newly governmental bodies established like Chemical Industry Corporation and Chemical and Construction Input Industry Development Institute to organize and support governmental and private chemical factories. However both institutes were not given the appropriate backing and as such the impact could not be felt in the performance and competitiveness of CMIs. This is mainly because of the newly established institutions lacking adequate skilled human power and other resource.

5.2 RECOMMENDATIONS

Suggestions for corrective and complementary measures to enhance the contribution and the potential performance of CMIs are essential. Such recommendations demand an in-depth analysis of the influence of different factors regarding the sub sector. Based on the findings and conclusions of the study, the following recommendations are forwarded.

First, the government should address the financial problem faced in providing with foreign currency, affordable alternative sources of finance for CMIs. This can be done by promoting export oriented sector and utilizing each hard currency in a proper way, providing various incentive packages such as temporary free interest rate and lowered collateral requirement by banks and other credit institutions to lessen their requirements for manufacturing industries, and relaxing loan application procedures. This should be done so that CMIs can get enough access to finance for their business activities.

Second, the government should encourage domestic factories working on repairing and manufacturing machineries to solve the problems related to tools and machineries make domestic Therefore, problems related to long-lived machines, unavailable spare parts, repeated machines breakage and lack of low cost and high cost of machinery and equipment will be solved.

The strengthening of government institutions would play a major role in positively influencing the development of CMIs, includes improved provision of necessary infrastructure and enabling the environment for business operations is generally an imperative. Uninterrupted power supply and quick transportations are basic to effective performance of these enterprises.

The government through various regulatory bodies should specialize more in taking up a facilitative role, especially by reviewing all the blockings by laws, to address issues of getting a license for registration of new product.

Marketing factors are frequently indicated as the explanatory factor for most problems faced by the studied CMIs. Therefore, it is necessary to solve this deep-rooted problem. Some of the ways of doing so can be promoting and searching export market so that the

CMIs will solve their foreign currency problem and shortage in working capital, smoothing unfair market environment through processing legal requirements for those who engage in illegal operation, above all providing skilled human power in the fields of chemical engineering and related study on higher education institution.

The manufacturers of chemical product should strength their association so called Ethiopian Chemical Products Manufacturers Association and make negotiation for the problems to be addressed by government. This is used to maintain their legal issues and creating fair market environment.

To make CMIs competitive and profitable, increasing the capacity and skill of the manpower through expanding more trainings institutions and integrating with technology universities, experience sharing from successful enterprises, and provision of advice and consultancy from advanced nations are crucial.

Finally, investigating different factors based on the right information are vital for the good performance of any business venture. This can be achieved by conducting more researches in related areas. It is the researcher's view that future research could therefore investigate further problem with different methodology and come up with specific findings which will potentially contribute a lot in the development of the country in general. This study dealt with the contribution as well as internal and external factors that affect the performance of CMIs. The field of CMIs is large and very diverse. It is an interesting area with many unresolved issues. It would be encouraging to get more solutions to many issues arising.

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APPENDIX A

QUESTIONNAIRE

St. MARY UNIVERSITY

SCHOOL OF GRADUATE STUDIES

DEPARTMENT OF DEVELOPMENT ECONOMICS

MA PROGRAM

QUESTIONNAIRE

Dear Respondent

This questionnaire is designed to gather information about the factors affecting the performance of chemical manufacturing industries growth in Ethiopia on selected factories. All responses will be used to conduct a study for the partial fulfillment of master's thesis in development economics. I would like to assure you that you will be guaranteed anonymity as your responses will not be used for any other purposes other than the intended purpose. I am grateful for your cooperation in advance!

N.B Please put tick mark (√) to all your responses in box provided besides each statement.

Section 1 Background of the company

Name of company_____

Address Region_____ sub city_____ wereda_____

Section 2 Background of the Respondent

Department _____

Position _____

Sex M ☐ F ☐

Age _____

Educational background_____

Years of Experience_____

Section 3. **FACTORS AFFECTING THE PERFORMANCE OF CHEMICAL MANUFACTURING INDUSTRY.**

The major factors that affect performance of chemical manufacturing industries are listed below. Please indicate the degree to which these factors are affecting the performance of your business enterprise. After you read each of the factors, evaluate them in relation to your business and then put a tick mark (√) under the choices below. Where, **5** = strongly agree, **4** = agree, **3** = undecided, **2** = disagree and **1**= strongly disagree.

1. Please indicate the degree to which you agree with the following statements concerning politico-legal factors.

S.No.	Politico- legal factors	5	4	3	2	1
1.1	Government rules and regulations on chemicals					
1.2	Environmental regulations on chemicals					
1.3	The tax levied on my business is not reasonable					
1.4	Bureaucracy in products registration and licensing					
1.5	Lack of government support and incentive					
1.6	Political intervention					
1.7	Lack of accessible information on government regulation that are relevant to my business.					
1.8	land lease policy					

2. Please indicate the degree to which you agree with the following statements concerning working place factors.

S.No.	Working place factors	5	4	3	2	1
2.1	Low Wage and salary					
2.2	Absence of own premises					
2.3	Current working place is not convenient					
2.4	The rent of house is too high					

3. Please indicate the degree to which you agree with the following statements concerning technology factors.

S.No.	**Technological Factors**	5	4	3	2	1
3.1	Lack of skills to handle new technology					
3.2	Lack of money to acquire new technology					
3.3	Unable to select proper technology					
3.4	Technology owners less interested to cooperate and work together					

4. Please indicate the degree to which you agree with the following statements concerning infrastructural factors.

S.No.	**Infrastructural factor**	5	4	3	2	1
4.1	Power interruptions					
4.2	Insufficient and interrupted water supply					
4.3	Lack of business development services					
4.4	Lack of sufficient and quick transportation service					
4.5	Lack of appropriate expired raw materials and product sewerage system					

5. Please indicate the degree to which you agree with the following statements concerning marketing factors.

S.No.	**Marketing Factors**	5	4	3	2	1
5.1	Low Market demand					
5.2	Lack of demand forecasting					
5.3	Lack of market information					
5.4	Competition with local and imported goods					
5.5	Inefficient in export marketing					
5.6	Limited raw materials suppliers					
5.7	inadequate market for products					

5.8	Unfair market environment					
5.9	Searching new market is so difficult					
5.10	Inefficient in marketing research					
5.11	Raw materials are not locally available					
5.12	Lack of promotion to attract potential users					
5.13	Poor customer relationship and handling					

6. Please indicate the degree to which you agree with the following statements concerning financial factors.

s.no	**Financial Factors**	5	4	3	2	1
6.1	Access to finance & Availability of foreign currency					
6.2	inadequacy of credit institutions					
6.3	Lack of cash management skills					
6.4	Shortage of working capital					
6.5	High collateral requirement from banks and other lending institutions					
6.6	High interest rate charged by banks and other lending institutions					
6.7	Loan application procedures of banks and other lending institutions are too complicated					

7. Please indicate the degree to which you agree with the following statements concerning management factors.

s.no	**Management Factors**	5	4	3	2	1
7.1	Poor Management skills					
7.2	Lack of clear division of duties and responsibility among employees					
7.3	Poor organization and ineffective communication					

7.4	Poor selection of associates in business					
7.5	Lack of well trained and experienced employees					
7.6	Lack of low cost and accessible training facilities					
7.7	Lack of strategic business planning					

8. Please indicate the degree to which you agree with the following statements concerning **Machineries** factors

s.no	**Tools and Machineries Factors**	5	4	3	2	1
8.1	Long-lived machines					
8.2	Unavailable spare parts					
8.3	Repeated machines breakage					
8.4	High cost of machinery and equipment					
8.5	Lack of appropriate machinery and equipment					
8.6	Lower productive capacity of machines					

ቅ.ማርያም ዩኒቨርሲቲ
የግብርና ኢኮኖሚክስ ት/ቤት
የልማት ኢኮኖሚክስ ት/ክፍል
ድህረ ምረቃ ት/ቤት

<u>መጠይቅ</u>

ይህ መጠይቅ የተዘጋጀው በኢትዮጵያ ውስጥ በሚገኙ እና በተመረጡ የኬሚካል ማምረቻ ኢንዱስትሪዎች በሚታዩ ተግዳሮቶች ላይ መረጃዎችን ለማሰባሰብ ሲሆን የሚገኙ ምላሾችን በማስተርስ ደረጃ ዴቨሎፕመንት ኢኮኖሚክስ ጥናት ጽሑፍ ለማዘጋጀት ብቻ የሚውሉ ሲሆን የሚሰበሰበው መረጃ ከላይ ከተጠቀሰው አላማ ውጪ የማይውል መሆኑን ላረጋግጥ እፈልጋለሁ። ስለ መልካም ትብብርዎ በቅድሚያ አመሰግናለሁ!

እባክዎ ቅጹን በተዘጋጀው ጥያቄ መሰረት ይሙሉ። ለምርጫ ጥያቄዎች የራይት ምልክት *(√)* ይጠቀሙ።

ክፍል 1 ድርጅቱን በተመለከተ

የድርጅቱ ስም _____

አድራሻ ክልል _____ ክፍለ ከተማ _____ ወረዳ_____

ክፍል 2. መላሹን በተመለከተ

የሚሰሩበት የስራ ዘርፍ/ክፍል_____

የስራ መደብ_____

ጾታ ወ ☐ ሴ ☐

እድሜ_____

የትምህርት ደረጃ_____

የስራ ልምድ /በአመት/_____

ክፍል 3. <u>የኬሚካል ማምረቻ ኢንዱስትሪዎች በሚታዩ ተግዳሮቶች</u>

በኢትዮጵያ የኬሚካል ማምረቻ ኢንዱስትሪዎች በሚታዩ ተግዳሮቶች ከታች የተዘረዘሩት ናቸው፡፡ ከታች ከተዘረዘሩት በድርጅትዎ ላይ ያጋጠሙ ችግሮችን ይለዩ፣ በመቀጠል የተለዩትን ችግሮች ሳጥን ውስጥ ከተቀመጡት አማራጮች መካከል የራይት ምልክት (√) በማድረግ ደረጃ በደረጃ ያስቀምጡ፡፡ በዚህም መሰረት 5 = በጣም እስማማለሁ ፣ 4 = እስማማለሁ ፣ 3 = ለመወሰን እቸገራለሁ ፣ 2 = አልስማማም ፣ 1 = በጣም አልስማማም

ተ.ቁ	ህጋዊና ፖለቲካዊ ጉዳዮች	5	4	3	2	1
1.1	ለስራ የማያመች በኬሚካል አመራረት ላይ የወጣ የመንግስት ህግና ደንብ					
1.2	በኬሚካል አመራረት ላይ የወጣ የአካባቢ ጥበቃ ደንብ					
1.3	ተመጣጣኝና ምክንያታዊ ያልሆነ የስራ ግብር፡፡					
1.4	በቢሮክራሲያዊ ማነቆ የተተበተበ የምዝገባና የንግድ ፈቃድ አሰጣጥ ሂደት፡					
1.5	በቂ ያልሆነ የመንግስት ማበረታቻ፡					
1.6	ተገቢ ያልሆነ የፖለቲካ ጣልቃ ገብነት፡፡					
1.7	ከስራዬ ጋር ተዛማጅ የሆኑ ህጎች፣ ደንቦችና አዋጆች ተደራሽ አለመሆን፡፡					
1.8	ለስራ የማያመች የመሬት ሊዝ ፖሊሲ					

ተ.ቁ	የስራ ቦታና ተዛማጅ ችግሮች	5	4	3	2	1
2.1	ዝቅተኛ የሰራተኛ ደመወዝ					
2.2	ስራ የሚያካሄድበት የግል ቦታ አለመኖር፡፡					
2.3	ድርጅቱ ያለበት ቦታ ለስራ አመቺ አለመሆን፡፡					
2.4	ከፍተኛ የሆነ የቤት ኪራይ መጠን፡፡					

ተ.ቁ	ቴክኖሎጂና ተዛማጅ ችግሮች	5	4	3	2	1
3.1	በቂ የሆነ የቴክኒክ ክህሎት አለመኖር፡፡					
3.2	በገንዘብ እጥረት ምክንያት አዳዲስ የቴክኖሎጂ ውጤቶችን አለማግኘት፡፡					
3.3	ለስራው ተገቢ የሆነ የቴክኖሎጂ ውጤት መምረጥ አለመቻል፡፡					
3.4	የቴክኖሎጂ ባለቤቶች በትብብር ለመስራት ያላቸው ፍላጎት አናሳ መሆን፣					

ተ.ቁ	ከመሰረተ ልማት ጋር የተያያዙ ችግሮች	5	4	3	2	1
4.1	የኤሌክትሪክ ሀይል መቆራረጥ፡፡					
4.2	የተቆራረጠና በቂ ያልሆነ የውሃ አቅርቦት፡፡					
4.3	የቢዝነስ ልማት አገልግሎት እጥረት፡፡					
4.4	በቂ እና ፈጣን የሆነ የትራንስፖርት አገልግሎት አለመኖር፡፡					
4.5	ጊዜ ያለፈባቸው ጥሬ እቃዎችና ምርቶች ማስወገጃ ስርዓት አለመኖር፡፡					

ተ.ቁ	ገበያ ተዛማጅ ችግሮች	5	4	3	2	1
5.1	በቂ የሆነ የገበያ እድል አለመኖር፡፡					
5.2	የወደፊት የገበያ ፍላጎትን መተንበይ አለመቻል፡፡					
5.3	በቂ የሆነ የግብይት መረጃ አለመኖር፡፡					
5.4	በሀገር ውስጥ እና ከውጭ ከሚገቡ ምርቶች ጠንካራ የሆነ ውድድር መኖር፣					
5.5	በውጭ ገበያ ውጤታማ አለመሆን፣					
5.6	ውሱን የጥሬ እቃ አቅራቢዎች መኖር፣					

5.7	ፍትሐዊ ያልሆነ የውድድር ስርዓት፣					
5.8	አዳዲስ ገበያ ለማግኘት መቸገር፣					
5.9	በቂ ያልሆነ የገበያ ጥናትና ምርምር					
5.10	ጥሬ እቃዎች በሃገር ውስጥ ያለመገኘት፣					
5.11	ምርቶችን በአግባቡ አለማስተዋወቅ፡፡					
5.12	ደካማ የሆነ የደንበኛ አያያዝ፡፡					

ተ.ቁ	ከገንዘብ ጋር የተያያዙ ችግሮች	5	4	3	2	1
6.1	የውጭ ምንዛሪ ለማግኘት አዳጋች መሆን፣					
6.2	በቂ የሆኑ የብድር ተቋማት አለመኖር፡፡					
6.3	የብር አያያዝ ክህሎት ችግር፡፡					
6.4	የስራ ማስኬጃ ገንዘብ እጥረት፡፡					
6.5	ባንኮችና ሌሎች አበዳሪ ተቋማት ለማበደር የሚጠይቁት ከፍተኛ የማስያዣ መጠን፡፡					
6.6	ባንኮችና ሌሎች አበዳሪ ተቋማት የሚጥሉት ከፍተኛ የብድር ወለድ መጠን፡፡					
6.6	ባንኮችና ሌሎች አበዳሪ ተቋማት ለማበደር የሚከተሉት ውስብስብና አሰልቺ ሂደት፡፡					

ተ.ቁ	የስራ አመራር ክህሎት ጋር የተያያዙ ችግሮች	5	4	3	2	1
7.1	ደካማ የአመራር ክህሎት					
7.2	በሰራተኞች መካከል ግልፅ የሆነ የስራና ሀላፊነት ክፍፍል አለመኖር፡					
7.3	ደካማ አደረጃጀትና ውጤታማ ያልሆነ የግንኙነት አሰራር፡					
7.4	ደካማ የሆነ የስራ ባልደረቦችን መምረጥ፡፡					
7.5	የሰለጠኑ እና ልምድ ያላቸው ሰራተኞች አለመኖር፡፡					

7.6	በዋጋቸው ተመጣጣኝና ተደራሽ የሆኑ የስልጠና እጥረት፡፡					
7.7	የረዥም ጊዜ የቢዝነስ እቅድ አለመኖር፡፡					

ተ.ቁ	የመሳሪያዎችና ማሽኖች ጋር የተያያዙ ችግሮች	5	4	3	2	1
8.1	እድሜ ጠገብ ማሽኖች					
8.2	መለዋወጫ ያለመኖር					
8.3	ተደጋጋሚ የማሽኖች ብልሽት፣					
8.4	ከፍተኛ የመሳሪያዎችና የማሽኖች ወጪ					
8.5	ለስራው ተገቢ ያልሆነ ማሽን እና መሳሪያ					
8.6	አንስተኛ የማሽኖች የማምረት አቅም					

APPENDIX B
Interview Questions
Interview questions with CMIs operators

1. What problems did you face while running your business activity in relation to:
   A. Contextual factors
      - Politico-legal factors [government policy , bureaucracies (in relation to company registration and licensing) taxation and the like)
      - Working place place factors
      - Technology factors
      - Infrastructural (power, transportation, water supply and the like)
      - Marketing factors (relationship with suppliers, customers and others)
      - Financial factors (foreign currency, interest rate, collateral requirements etc)
   B. Internal factors
      - Management and related factors
      - Tools and machineries factors
2. What are other problems did you faced regarding the overall functioning of your activity?

Appendix C

Correlation MATRIX										
		performance	Politico legal	Working place	technology	infrastructure	marketing	finance	management	tool_and_machineries
performance	Pearson Correlation	1								
	Sig. (2-tailed)									
	N	16								
Politico- legal	Pearson Correlation	-.017	1							
	Sig. (2-tailed)	.949								
	N	16	16							
working place	Pearson Correlation	.274	.413	1						
	Sig. (2-tailed)	.305	.112							
	N	16	16	16						
technology	Pearson Correlation	.667**	.346	.133	1					
	Sig. (2-tailed)	.005	.190	.623						
	N	16	16	16	16					
infrastructure	Pearson Correlation	.848**	.033	.353	.649**	1				
	Sig. (2-tailed)	.000	.903	.180	.006					
	N	16	16	16	16	16				
marketing	Pearson Correlation	.814**	.228	.458	.541*	.870**	1			
	Sig. (2-tailed)	.000	.396	.075	.031	.000				
	N	16	16	16	16	16	16			
finance	Pearson Correlation	.980**	.082	.325	.692**	.805**	.804**	1		
	Sig. (2-tailed)	.000	.764	.220	.003	.000	.000			
	N	16	16	16	16	16	16	16		
management	Pearson Correlation	-.281	-.004	-.164	-.190	-.269	-.368	-.280	1	
	Sig. (2-tailed)	.292	.989	.544	.481	.313	.160	.294		
	N	16	16	16	16	16	16	16	16	
Tool and machineries	Pearson Correlation	.875**	.071	.218	.513*	.709**	.754**	.826**	-.094	1
	Sig. (2-tailed)	.000	.795	.418	.042	.002	.001	.000	.730	
	N	16	16	16	16	16	16	16	16	16

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).