TRENDS IN THE GROWTH OF CHEMICAL MANUFACTURING INDUSTRIES IN ETHIOPIA

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Abstract

This research aims to investigate the growth of chemical manufacturing industries by assessing their contribution to the manufacturing sector and to the national economy and the factors that affect the performance of CMIs. Their contribution was studied based on nearly 20 years of time series data on major macroeconomic variables, such as gross value of production (GVP), employment, government tax revenue and investment. The factors affecting the performance of chemical manufacturing industries was studied based on selected sample factories comprised of paint, soap and detergent, plastics, candle and pesticide factories. To achieve the objectives of this study, both primary and secondary data were employed. Secondary data were collected from different governmental institutions. Concerning gross value of production (GVP), employment, government revenue through tax and investment, Likert scale questionnaires were analyzed using statistical analysis such as descriptive and inferential analyses. The information was obtained through questionnaire from a sample of 64 operators and managers, and through interviews with 16 managers of CMIs. The respondents were selected by using stratified sampling techniques. The interview questions were analyzed using descriptive narrations. By using empirical studies, eight major challenges were identified 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. 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. The government should make available foreign currency or other 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.

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INTRODUCTION

Chemical industries are 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 everyday life of people around the world. Such products provide protection for crops and increase yields, prevent and cure diseases, 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 outputs from chemical companies are used by other chemical companies or other industries such as metal, glass, electronics; and chemicals produced by chemical industries 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 industries have 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).

Evidences show that the contribution of chemical industries to the global economy has been significantly increasing. For instance, some chemical companies are ranked amongst the largest industrial companies in the world, and 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 chemical industries are also major employers, with over 10 million people employed worldwide (Fortune, 2000:7). The global chemical industries are 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 telecommunication equipment and services and it accounts for 7% of global income and 9% of international trade (WEC, 1995).

In Ethiopia, currently, chemical manufacturing industries have become one of the strategic sectors in the Growth and Transformation Plan (GTP). The government invested 21.7 billion ETB to establish a Chemical Industry Corporation with the intention to oversee chemical industrial development in order to produce products from rubber trees, as well as, fertilizers, cements and a range of chemical products for domestic and foreign markets. The Corporation is also mandated to conduct feasibility studies and promote the establishment of new factories and to expand those that already exist. The primary reason behind government intervention in the development of the chemical industries is that the private sector has been reluctant to invest in the manufacturing of chemicals because it is a capital intensive venture. In a major import substitution scheme, the development of these industries serve as input supplier for other industry sectors, such as, textile and leather industries which depend on the availability of reasonably priced chemicals (Walta, 2013).

Supplies, such as, formic acid, hydrochloric acid, nitric acid, potassium chloride, potassium nitrate, magnesium chloride, polyethylene, calcium carbide, polyethylene terephatalate, poly vinyl chloride, talc, and titanium dioxide are commonly used in key economic activities such as preservatives and antibacterial agents in livestock feed, making of fertilizers, and in many manufacturing industries. They are also used as inputs to provide medicine, scientific applications, food processing, production of paper, plastic, pharmaceuticals, cosmetics, paint, rubber and ceramics, artificial flavorings and perfumes, purification and extraction of gold (FDRE Embassy to India, 2015).

In view of the significance of the sector, the main objective of this study is to examine the growth of Chemical Manufacturing Industries in Ethiopia.

RESEARCH METHODOLOGY

Research Design

The research techniques employed in this study were descriptive and explanatory methods. 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 of selected samples.

This study critically assesses the contribution of chemical manufacturing industries 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 an explanatory approach to assess 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 data in the sense that primary data was collected at a single point in time.

The reason for preferring a cross-sectional primary data in the 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 (Ruane, 2006). According to Mark, et al. (2009), mixing qualitative and quantitative approaches is to cover each method's weaknesses with strengths from the other method. Therefore, in this study a combination of qualitative and quantitative approaches of research was employed as recommended by Creswell (2009).

Questionnaire Design

The design of questionnaires takes into account the statistical requirements of data users. A list of variables was drawn 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 (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 is of great importance in any survey where the questionnaire

is to be completed by the respondent (John, 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).

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 individuals selected from each sample factory: one owner/manager, one head of operation department, one operator and one planning expert with the assumption of getting comprehensive and unbiased information about the factory. Besides, interviews were conducted with the owner managers who head the enterprises to clarify issues is easily and ensure 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) in

order to analyze the contribution of chemical manufacturing industries 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.

Sampling Strategy and Procedures

Due to the diverse nature of the products, sampling technique that would be relevant to study chemical manufacturing industries was stratified sampling. Most of them were working on soap and detergent, paint, candle, plastic, pesticide and other chemicals found in Addis Ababa as a study area for this research. The factories were selected based on their proximity and convenience to collect data in a short time. The largest concentration of chemical industries is in Addis Ababa and most of the data were obtained from the City.

Sampling Technique

Stratified random sampling was used to get information from diverse chemical manufacturing industries. 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 (2009), the correct sample size in a study is dependent on the nature of the population and the purpose of the study. A list of the population obtained

from Central Statistical Agency (CSA) data collected until May 2013. The total population of the study was 106 enterprises, which include manufacture of paint, varnish and mastics (13), manufacturer of soap and detergent, cleaning, polishing, perfumes, and toilet preparation (70); manufacturer of plastic products (19), and manufacturer of basic chemicals, except fertilizers and nitrogen compounds as well as chemical product not elsewhere classified (4). 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 respondents were selected from each enterprise. Therefore, [(13/106) x 16] = 2 paint factories 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, fertilizers and nitrogen compounds and other chemical products [(4/106) x 4] = 1 were selected.

The interviews were administered on the sample of 16 managers out of 64 respondents. A small number of interviewees was selected because of related responses from majority of respondents.

Variables and Measurements

The lack of universally accepted standard performance measures left the door open to business organizations to decide and choose their 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 industries.

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, chemical manufacturing industries are focusing more 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.

The variables are expected to have a cause-effect relationship where the data on the mentioned independent variables are used to assess the factors that affect the performance of chemical manufacturing industries. With these

data, therefore, one can estimate the parameters that measure the growth of chemical manufacturing sector in Ethiopia.

Data Processing and Analysis

Data Processing

First, primary data were analyzed by using the computerized Econometric Statistical Package of Social Science (SPSS) and other written programs. In the data processing procedure editing, coding, classification and tabulation of the collected data were used. 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 was used to summarize the raw data and displayed in the form of tables for further analysis.

Data Analysis

Further transformation of the processed data was undertaken to arrange into 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.

Descriptive Analysis

Descriptive analysis was used to reduce the data into 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.

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.

The Pearson Product Moment Correlation Coefficient

According to Phyllis and his associates (2007), inferences are very important in management research. 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
(-0.8 to -0.6]	Substantial Negative
(-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
[0.4 to 0.6)	Medium Positive
[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.

Instrument Development

Basically, the instruments were developed based on the objectives of the study and research questions.

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 translating from English to Amharic language is to help those who cannot clearly understand English language so that they can respond easily. The interview questions were designed in English language only, because the discussion was in Amharic while making interviews with operators.

Instrument Validity

Validity is the degree to which a test measures what it purports to measure (Creswell, 2009). Validity is 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. The relevant data was collected on the factors of the CMIs that can better indicate the relationship between factors and the performance of CMIs.

Instrument Reliability

Reliability 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.

RESULT AND DISCUSSION

Contribution of Chemical Manufacturing Industries

Gross Domestic Product of CMIs

When it comes to GDP the trend in growth of the manufacturing sector is generally more significant than the chemical manufacturing subsector, especially after 2009 (Fig. 4.1). There is little change in the contribution of CMIs to GDP growth between 1998 and 2014. In this regard, it signifies that the other sectors, like agriculture and service sectors, are more dominant.

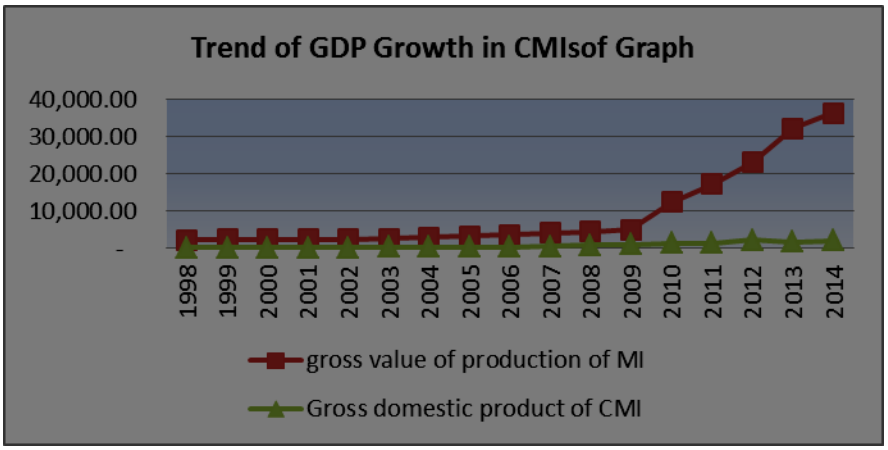

Figure 4.1: The trend of GDP growth of CMIs and Manufacturing Industries from 1995 to 2014 in Ethiopia

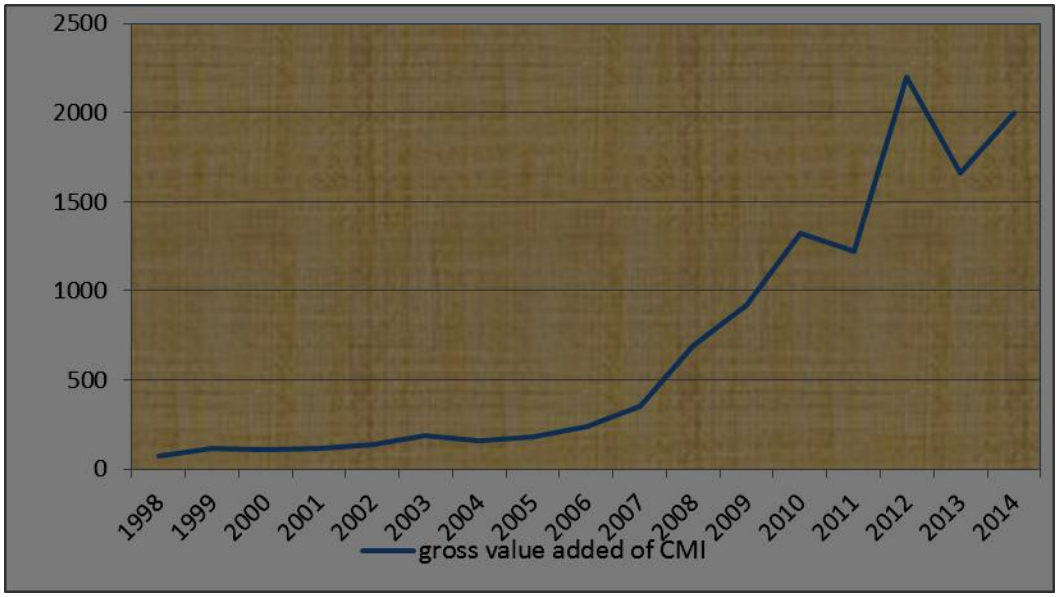

Figure 4.2 Gross value of production of CMIs

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

Contribution of CMIs to Employment

At aggregate level, the growth rate of employment at the entire manufacturing sector was relatively higher as of 2005. However, the contribution of chemical manufacturing subsector is insignificant (Fig. 4.3). But, it is clearly seen that the rate of absorbing employment is increasing over time. It is growing with the expansion of manufacturing industries in Ethiopia (Fig. 4.4). Employment in CMIs reaches its peak by 2012 but went into sharp decline in 2013.

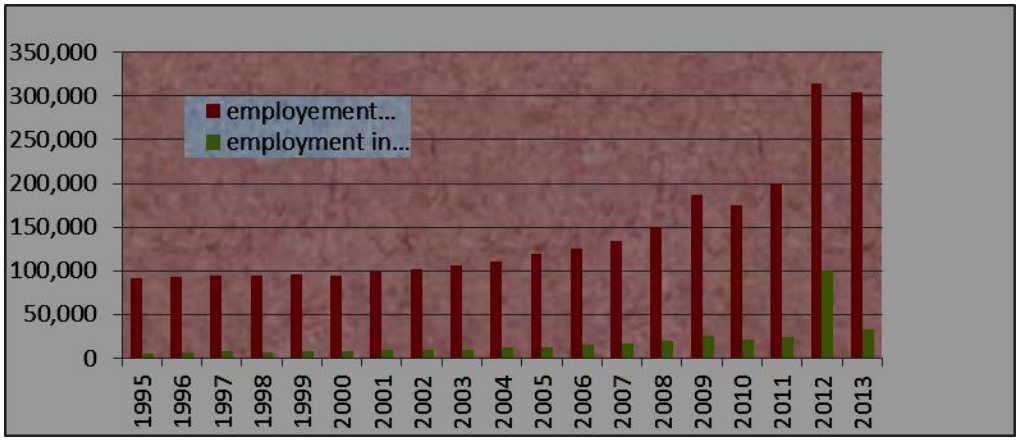

Figure 4.3 Contribution of CMI in terms of employment

Source: Central Statistical Agency (CSA: 2016)

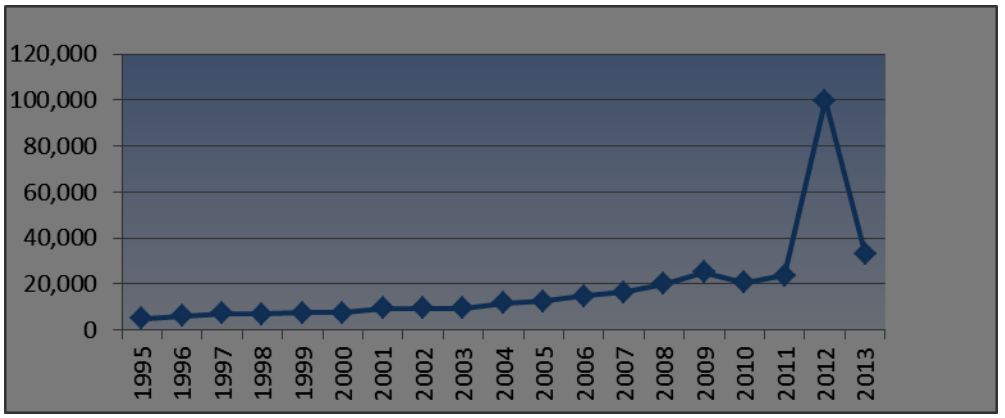

Figure 4.4 Trend of CMI employment

Source: Central Statistical Agency (CSA: 2016)

Trend in Tax Revenue Growth from CMIs

In general, the income generated from tax revenue from the Manufacture Industry Sector had shown rapid increment (Fig. 4.5). However, though it showed a growing trend, the tax revenue of CMIs was insignificant (Fig. 4.6).

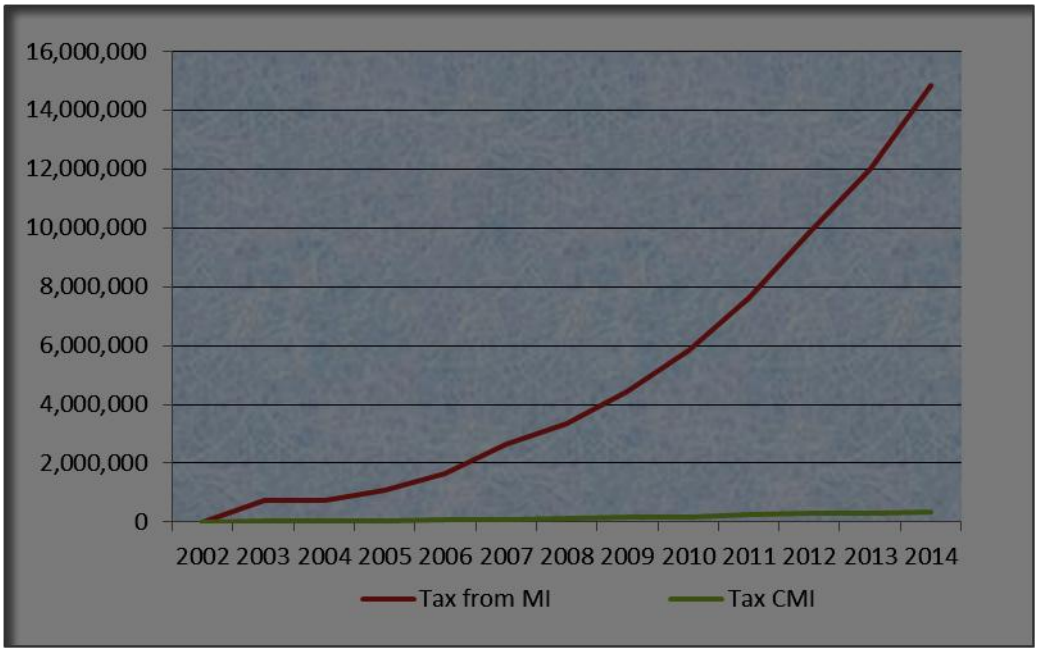

Figure 4.5 Trend of Tax revenue growth in ETB

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

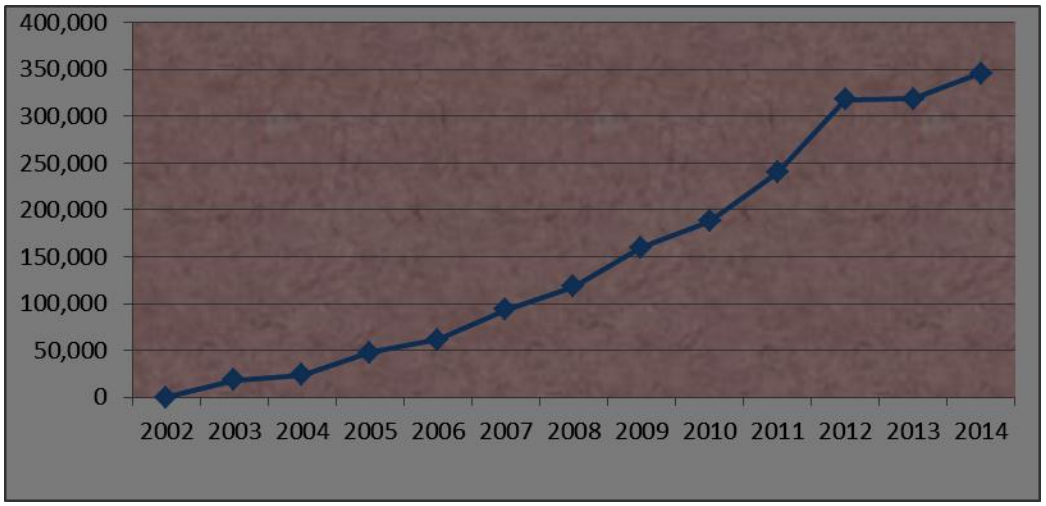

Figure 4.6 Trend of government tax revenue from CMIs

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

Trend in CMIs Investment Growth

The number of CMI investments follows the same pattern with other manufacturing industries (Fig. 4.8). Even though there have been ups and downs in investment flow, on average, investment flow has increased through 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 (Belay: 2015).

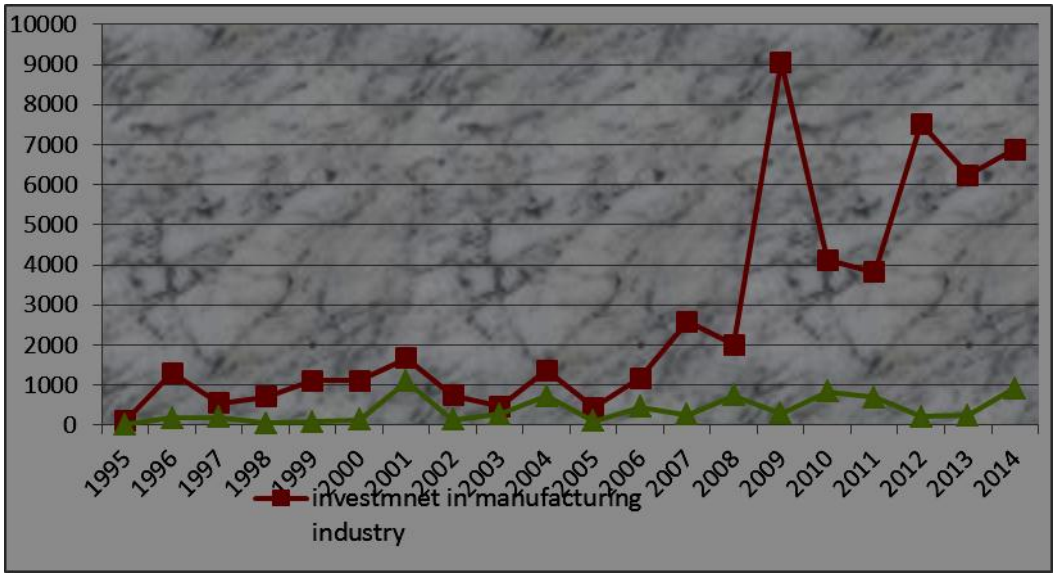

Figure 4.7 Trends in investment growth of Manufacturing Industries and CMIs in "million ETB "

Source: Ethiopian Investment Commission (EIC: 2016)

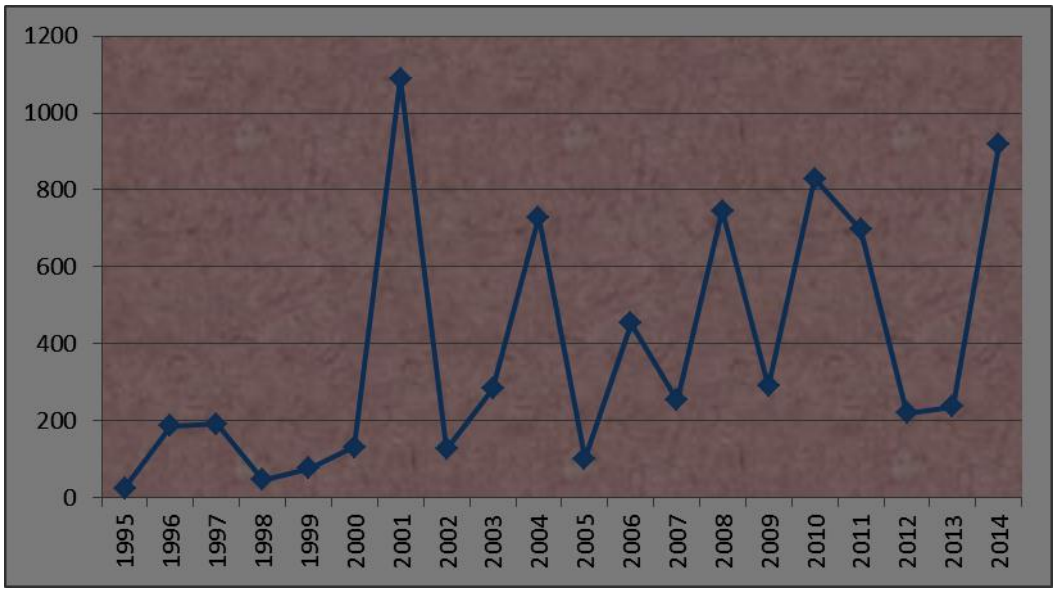

Figure 4.8 Trend of investment growth of CMI

Source: Ethiopian Investment Commission (EIC, 2016)

4.3 Factors Affecting the Performance of Chemical Manufacturing Industries

The CMIs were operating in three areas of the economy. Most (62.5%) of them were engaged in soap and detergent industries, followed by plastic (18.75%), paint (12.5%) and other chemical factories (6.25%) (Fig. 4.9). This division of CMIs by specialty type was believed to be helpful in studying the critical factors that affect the performance of CMIs. 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.

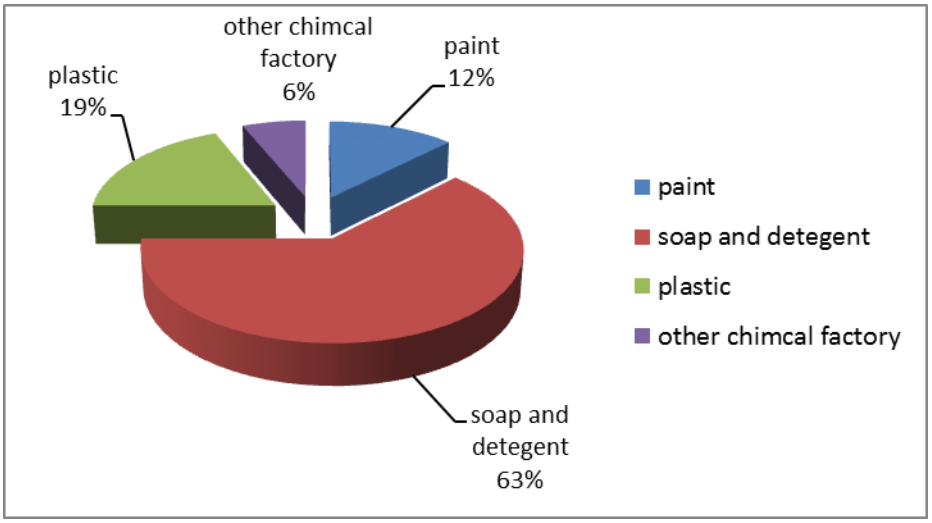

Figure 4.9 Sector respondents engaged in CMIs

Source: Field survey, 2016

4.3.2 Challenges in the performance of CMIs

There are a number of `challenges that affect performance of CMIs. Marketing factors, which includes access to finance and 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 (Table 4.10).

Out of 64 respondents 87.5% percent reported that access to finance and availability of foreign currency was a bottleneck. The same percentage of respondents stated that shortage of working capital. High collateral requirement from banks and other lending institutions, complicated loan application procedures of banks and other lending institutions are also major factors affecting the performance of their organization (Table 4.10).

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

Comparison of Factors

Even though the politico-legal, infrastructure, working place, technology, marketing, financial, management and tools and machineries factors affect the performance of CMIs, it does not necessarily mean that all factors have equal impact (Table 4.12) .

Table 4.12 Comparison of the major factors in affecting the performance of CMIs

	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

As shown on table 4.12 above, financial factors and availability of machineries were the main problems hindering the development of CMIs. According to respondents, infrastructural, technological, working place environment, marketing, management and politico-legal factors had played a role in hindering development of CMIs. This result is supported by Admasu (2012:68) and Haftu, et al. (2009:84-86) who found that lack of finance rank on top and reported as the major constraint by a large proportion of the Micro and Small Enterprises.

Results of Inferential Statistics

To ascertain the internal consistency of the questionnaire, reliability analysis of Cronbach alpha was performed. Pearson's Product Moment Correlation Coefficient was also calculated to determine the existence of significant relationship among the factors affecting the performance of CMIs. .

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.

Pearson's Product Moment Correlation Coefficient

As stated above, 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 results of Pearson's Product Moment Correlation on the relationship between independent variables and dependent variable are presented below. 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 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	-.281
	p-value	.292
	N	16
Tools and machineries factors	Pearson correlation	.875**
	p-value	.000
	N	16

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

Source: Field survey, 2016

As shown above on Table 4.14, a strong positive relationship was found between financial factors 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 finance, tools and machineries and infrastructure play a significant role in determining the performance of selected chemical manufacturing companies. The table presents the association between the selected variables and performance of CMIs for a sample of 64 operators.

There is substantial, 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. There is also 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), weak negative relationship between politico-legal factor and performance (r = -.17, p = 0.9), and poor relationship of management factor and performance of CMIs (r = -.281, p = 0.2), which are statistically not significant at 99% confidence level.

CONCLUSION

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 relation to above-mentioned variables.

The main factor for poor 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 old or outdated machines, unavailability of 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 poor 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 markets, difficulty of getting new market, lack of demand forecasting, lack of market information and absence of relationship with an organization/association that conduct marketing research.

Hopefully, the newly established governmental bodies, such as Chemical Industry Corporation and Chemical and Construction Input Industry Development Institute, could provide the necessary support to rectify the challenges governmental and private chemical factories faced.

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