

Growth of Iron-Steel and Cement Industries: Essential Stimulus for India's Economic Growth

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The composition of India's GDP has undergone a major change especially during the post reform period. The contribution of agriculture sector has decreased while that of service sector has increased and the industrial sector has remained almost constant. Although Indian economy is primarily agriculture based but industrial sector has a prominent place in the development of India, as industries provide tools and equipment for the agriculture and service sectors and also creates a huge demand for agricultural produce. Manufacturing accounts for 79.89% share in the industrial sector and 14.94% in GDP of India in 2013-14. Although all the manufacturing industries are important but iron-steel and cement industries are essential stimulus for not only the growth of industrial sector but also for the economic growth of India. This paper examines the importance and growth of manufacturing with reference to iron-steel and cement industries in India during the post-reform period.

Key Words: manufacturing, iron-steel industry, cement industry, economic growth, India

JEL Classification: O1, O14, O53

INTRODUCTION

The developing economies including India are facing inexorable problems of unemployment, poverty, inequality, technological backwardness, and insufficient availability of capital etc. since long which make them highly dependent on the developed countries. Industrialization is a key requisite for the developing economies to foster their rate of economic growth, and for the long-run solution of all the above problems. Industrialization may be defined as a process through which a nation transforms itself from an agriculture based economy to the one based on manufacturing of goods and services. It is a series of strategic changes taking place in production and may involve the mechanization of an existing enterprise, opening up of a new market, building of a new factory/industry and other such measures that leads to escalation in the production and deepening of the capital. Thus establishment and development of manufacturing is the core of industrialization. However, industrialization is not limited to setting up of manufacturing units only but it also involves all such reforms that upsurge the productivity of labour and production efficiency at all levels in a significant manner.

Industrialization sets the base for the economic growth and development of any economy as was experienced in all the western countries almost 200 years back and in the recent past in others parts of the world as China, Republic of Korea, Taiwan etc.

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Industrialization provides avenues for developing countries to employ their surplus labour. It helps to raise productivity of an economy directly or indirectly; promotes exports which improves the balance of payment (BOP); encourages savings and promotes capital formation, and thus raises the standard of living. Industries on the one hand provides tools, machineries, equipment etc. to the agriculture sector and on the other hand agro-based industries creates huge demand for the agricultural output. Industries provide large employment opportunities and can absorb the surplus labour of agriculture sector. Industries also provides base for the development of service sector. However, the entire industrial sector has significantly contributed in the development of the Indian economy but some core industries enjoy a distinct place and iron-steel and cement industries are among them.

OBJECTIVE

The objective of this paper is to assess the growth and significance of manufacturing sector in Indian economy with special reference to iron-steel and cement industries during post reform period.

RESEARCH METHODOLOGY

This paper is based on secondary data taken from Handbook of Statistics on Indian Economy, Reserve Bank of India, 2013-14 and various issues of Annual Survey of Industries, Ministry of Statistics and Programme implementation. Data on factory sector, and NIC (National Industrial Classification) 3-digit, and 3-digit & 4-digit have been used for the analysis of manufacturing sector, iron-steel, and cement industries respectively. The period of study is from 1991-92 to 2011-12. To obtain data on iron-steel and cement industries, a complete mapping on various NICs (NIC-2008, NIC-2004, NIC-1998, and NIC-1987) has been done as follows:

A. NIC mapping for iron-steel industry

Concordance between NIC-2008 and NIC-2004
NIC 2008 (241) = NIC 2004 (271)

Concordance between NIC-1998 and NIC-2004
NIC 2004 (271) = NIC 1998 (271)

Concordance between NIC-1998 and NIC-1987
NIC 1998 (271) = NIC 1987 (330+331+332)

B. NIC mapping for cement industry

Concordance between NIC-2008 and NIC-2004
NIC 2008 (2394) = NIC 2004 (2694)

Concordance between NIC-1998 and NIC-2004
NIC 2004 (2694) = NIC 1998 (2694)

Concordance between NIC-1998 and NIC-1987
NIC 1998 (2694) = NIC 1987 (324+327)

To analyse the trends and growth, annual average growth rate (AAGR) and compound annual growth rate (CAGR) have been used. AAGR has been calculated using geometric mean of annual percentage change and CAGR has been calculated as follows:

$$Y = ab^t e^{rt} \text{----- (1)}$$

where $b=1+r$ and r is the compound growth rate.
 Y - variable for which CAGR has been calculated
 t = time

The logarithmic transformation of the above function gives:

$$\log Y = \log a + t \log b + u \text{----- (2)}$$

And the values of u have been estimated using the following two normal equations:

$$\begin{aligned} \sum \log Y &= n \log a + \log b \sum t \\ \sum t \cdot \log Y &= \log a \sum t + \log b \sum t^2 \end{aligned}$$

As equation (2) is a log-linear function, therefore, CAGR has been computed by using following formula:

$$\text{CAGR (r\%)} = (AL(\log b) - 1) \times 100$$

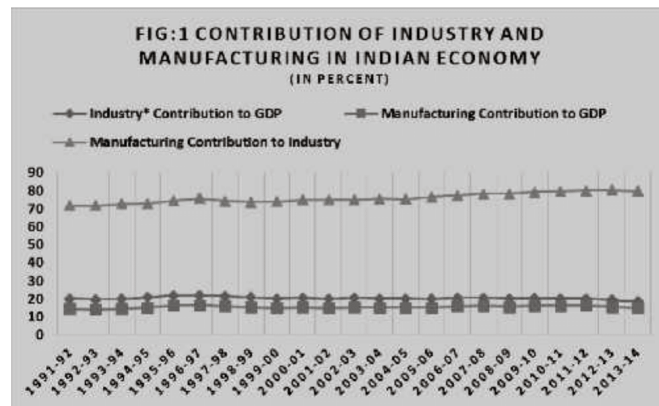
Industrial/Manufacturing Sectors in India: A Trend Analysis

India is a country with full of natural resources such as forests, land, minerals, fisheries, etc. along with large population (1.21 billion, Census 2011 and more than 1.26 billion in 2014). Although India is an agriculture based economy as agriculture provides employment to a large number people (47% of total people employed in 2012, World Bank database) and contributes 13.94% to India's gross domestic product (GDP) in 2013-14 (Handbook of Statistics on Indian Economy, RBI, 2013-14) but industrial development indicates a country's progress from a developing nation to a developed one.

Industrial sector has significantly contributed in the development of Indian economy since independence. The contribution of industrial sector to GDP of India was 11.42% in 1952-53, increased to 18.64% in 1981-82, and 20.22% in 1991-92 (Handbook of Statistics on Indian Economy, 2013-14). Industrial sector became more important for the development

of Indian economy with the introduction of New Economic Reforms on July 24, 1991 and New Industrial Policy of 1991. However after 1991-92, this contribution has been at about 20 percent till 2011-12 and decreased to 18.70%.

Manufacturing is the most important component of the industrial sector. As per Handbook of Statistics on Indian Economy, Reserve Bank of India (RBI), industrial sector comprises of mining & quarrying, manufacturing, and electricity, gas & water supply. Among all these components, manufacturing accounts for the maximum share. Fig 1 displays the contribution of manufacturing to GDP and industrial sector. 'The contribution of manufacturing sector to GDP of India was 9.10% in 1952-53, increased to 14.28% in 1981-82, 14.51% in 1991-92, and 14.94% in 2013-14. However, manufacturing contribution to industrial sector had decreased from 79.69% in 1952-53, to 76.65% in 1981-82, to 71.76% in 1991-92 but again it increased to 79.89% in 2013-14' (Handbook of Statistics on Indian Economy, 2013-14).



Source: Author's calculation from Handbook of Statistics on Indian Economy, RBI, 2013-14

Industry includes Mining & Quarrying, Manufacturing, and Electricity, Gas & Water Supply
as per the classification in Handbook of Statistics on Indian Economy, RBI, 2013-14

Table 1 Growth Rates of Selected Indicators of Factory Sector (Manufacturing) in Indian Economy during 1991-92 to 2011-12				
Growth Rate	Factories	Employment	Value of Output	Gross Capital Formation
AAGR	3.29	2.33	15.69	12.78
CAGR	2.20	1.50	14.40	11.60

Source: Author's Calculations from ASI, MOSPI, 2011-12

Table 1 shows the growth of factory sector (manufacturing) in Indian economy. Total number of factories were 112286 in 1991-92 which increased to 217554 in 2011-12 at a CAGR of 2.20% per annum. The factory sector (manufacturing) provided employment to 8319563 people in 1991-92 which increased to 13429956 people in 2011-12, produced output of Rs. 2991.96 billion in 1991-92 which increased to Rs. 57760.24 billion in 2011-12 and generated gross capital formation (GCF) of Rs. 384.45 billion which increased to Rs. 4070.31 billion in 2011-12. The CAGR of employment, value of output produced, and GFC in factory sector in India is 1.50%, 14.40%, and 11.60% respectively during 1991-92 to 2011-12.

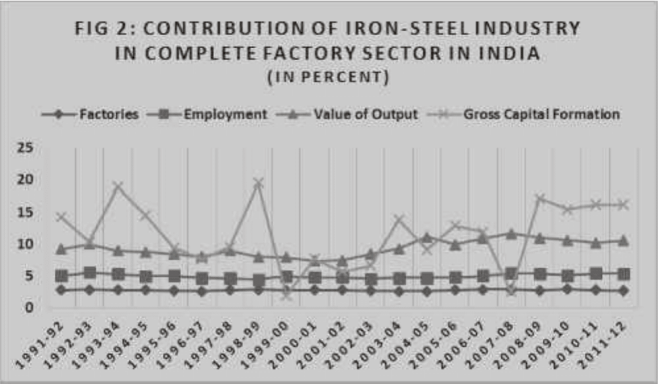
Iron-Steel and Cement Industries in India: A Trend Analysis

Although all the manufacturing industries are important but infrastructure industries or core industries have their own importance. The infrastructure industries include electricity, coal, iron-steel, cement, crude oil, petroleum refinery products, natural gas and fertilizers. The weight of all the above infrastructure industries in total industrial production is 37.90 Base 2004-05:100 (Handbook of Statistics on Indian Economy, RBI, 2013-14). Among all these infrastructure industries, iron-steel and cement industries occupy a distinct place as these produce industries are the most important materials for developing the physical infrastructure. These industries are among the basic-heavy industries contributing maximum for building a nation's physical infrastructure and industrial base. They help in overall growth of the country by providing key inputs for all the sectors

ranging from primary to tertiary. They act as crucial ingredients in the development of any modern economy and are considered to be the backbone of human civilization. The weights of iron-steel industry in total industrial production are 6.68 (Base 2004-05:100) against 5.13 (Base 1993-94:100) and 5.21 (Base 1980-81:100) respectively. While the weights of cement industry in total industrial production are 2.41 (Base 2004-05:100) against 1.99 (Base 1993-94:100) and 1.60 (Base 1980-81:100) respectively. This shows that the contribution of both of these industries in total industrial production has increased over the years.

The iron-steel industry accounts for the 6.684% weightage in the whole industrial sector of the country Base 2004-05:100 and 'contributes about 3% of the gross domestic product (GDP), and presently provides employment to more than 0.5 million people' Annual Report (2012-13), Ministry of Steel, Govt. of India. 'Production of finished steel has increased from mere 1.04 million tonnes in 1950-51 to 14.234 million tonnes in 1991-92 and 73.416(P) million tonnes in 2011-12' Joint Plant Committee (JPC), Ministry of Steel, Govt. of India. 'In 2012, world's total crude steel production reached to 1546.8 million tonnes. India ranked 4th in 2012 producing 77.6 million tonnes (5.02%) after China 716.5 million tonnes (46.32%), Japan 107.2 million tonnes (6.93%), and United States 88.7 million tonnes (5.73%) as against 8th in 2003. India is the largest producer of sponge iron or direct reduced iron (DRI) in the world and produced 27.71% of the world total DRI in 2012. Consumption of steel has also increased rapidly as apparent domestic consumption (ADC) of finished steel increased from 17.7 kg in 1991-92 to 56.9 kg in 2011-12' World Steel Association.

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Source: Author's calculation from Unit Level Data, ASI, MOSPI, Various Issues

Table 2 Growth Rate of Selected Indicators of Iron-Steel Industry (Factory Sector) in India 1991-92 to 201-12

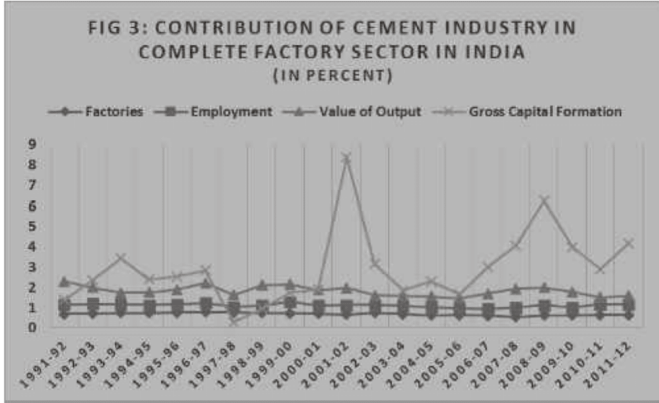
Year	Factories	Employment	Value of Output	Gross Capital Formation
CAGR	2.10	1.70	11.90	15.90

Source: Author's calculation from Unit Level Data, ASI, MOSPI, Various Issues

Fig. 2 displays the contribution of iron-steel industry in the complete factory sector (manufacturing) in India during 1991-92 to 2011-12. Iron-steel industry contributes 2.64% in total factories, 5.32% in total employment provided, 10.52% in the total value of output produced, and 16.24% in total GFC by complete factory sector (manufacturing) in the year 2011-12. Table 2 shows the growth of iron-steel industry (factory sector) in India. Total number of iron-steel factories were 3108 in 1991-92 which increased to 5747 in 2011-12 at a CAGR of 2.10% per annum. The iron-steel factories (factory sector) provided employment to 416352 people in 1991-92 which increased to 714307 people in 2011-12, produced output of Rs. 275.94 billion in 1991-92 which increased to Rs. 6078.46 billion in 2011-12 and generated GCF of Rs. 54.86 billion which increased to Rs. 660.84 billion in 2011-12. The CAGR of employment, value of output produced, and GFC in iron-steel factories (factory sector) in India is 2.10%, 1.70%, and 11.90% respectively during 1991-92 to 2011-12.

Cement is the most essential raw material in any kind of construction activity. Accordingly, cement industry plays a crucial role in the infrastructural development of the country. Given the vast geographical size and massive population of the country, various construction activities undertaken by the Central Government, State Governments, Public Sector Undertaking and other organisations, including private sector generate huge demand for cement. In addition, provision for housing is the first and foremost requirement of every household and, therefore, market demand of cement for private consumption is increasing constantly. According to the background note submitted by the Ministry of Commerce and Industry 'presently India is the second largest cement producer in the world, next only to China. India's share in the world's cement production is about 6%. It comprises 154 large cement plants, with an installed capacity of 230.82 million tonnes, employing 1.35 lakh persons directly'.

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Source: Author's calculation from Unit Level Data, ASI, MOSPI, Various Issues

Table 3 Growth Rate of Selected Indicators of Cement Industry (Factory Sector) in India 1991-92 to 201-12

Year	Factories	Employment	Value of Output	Gross Capital Formation
CAGR	1.00	0.90	13.20	16.70

Source: Author's calculation from Unit Level Data, ASI, MOSPI, Various Issues

Fig. 3 displays the contribution of cement industry in the complete factory sector (manufacturing) in India during 1991-92 to 2011-12. Cement industry contributes 0.65% in total factories, 1.16% in total employment provided, 1.59% in the total value of output produced, and 4.17% in total GFC by complete factory sector (manufacturing) in the year 2011-12. Table 3 shows the growth of cement industry (factory sector) in India. Total number of cement factories were 779 in 1991-92 which increased to 1414 in 2011-12 at a CAGR of 1.0% per annum. The cement factories (factory sector) provided employment to 94741 people in 1991-92 which increased to 155783 people in 2011-12, produced output of Rs. 69.15 billion in 1991-92 which increased to Rs. 921.10 billion in 2011-12 and generated GCF of Rs. 5.37 billion which increased to Rs. 169.75 billion in 2011-12. The CAGR of employment, value of output produced, and GFC in iron-steel factories (factory sector) in India is 0.90%,

13.20%, and 16.70% respectively during 1991-92 to 2011-12.

CONCLUSION

This study is an attempt to highlight the growing importance and significance of manufacturing sector with reference to iron-steel and cement industries in the Indian economy for enhancing its rate of economic growth. The countries which have developed manufacturing sector and technologically advance iron-steel and cement industries such as China, Japan, and United States of America etc. are in the category of developed nations. The established iron-steel and cement industries had facilitated the growth of physical infrastructure in these countries which is an essential prerequisite for the overall growth of any nation. India had followed various growth models during different time periods since independence such as

Mahalanobis model of economic growth during the Second Five Year Plan (1956-61) which emphasised upon the development of heavy industries or New Economic Reforms of 1991. The economic growth rate of Indian economy was 7.21% per annum during the first decade of 21st century and 6.20% thereafter till 2014. However, recession of 2009 affected the economic growth of all the countries and India was among the few least affected economies.

Manufacturing sector contributes 14.94% in India's GDP in 2013-14. Iron-steel & cement industries together contribute 3.29% of total factories, 6.48% in total employment, 12.11% in value of total output, and 20.41% in total GCF in India's total factory sector in 2011-12. These figures show the importance of manufacturing in Indian economy and the significance of iron-steel and cement industries in manufacturing sector of India. Considering this importance of manufacturing sector in Indian economy and iron-steel & cement industries in manufacturing sector, India requires to develop the manufacturing sector and especially infrastructure industries among which iron-steel and cement are the most important to increase its rate of economic growth in double digits. For its growing population and development requirements, India does not have the ample physical infrastructure and it is dependent upon foreign countries/companies. Considering the above hard facts, India must accelerate the pace of establishing sound infrastructure in terms of roads, railway network, ports, communication etc. Therefore it is imperative for India to focus on the development of infrastructure industries especially iron-steel and cement along with other infrastructure industries such as electricity, coal, crude oil, petroleum refinery products, natural gas, and fertilizers and consumer goods industries.

The recently announced 'Make in India' plan by the present government which focuses on the development of manufacturing sector, will definitely help in establishing India as one of the most favoured destinations for investment by world class manufacturing companies.

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