

Trend of Capacity Utilization in Indian Manufacturing Sector

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Abstract

Capacity utilization in manufacturing sector is a key indicator which not only helps to determine the level of utilization of existing capacity but it also helps to define the required level of expansion of capacity for a targeted output. Growing population in India has worked as a push factor for augmenting the installed capacity in each industry group. The installed capacity method developed by Ball and Smolensky (1961) is applied to assess the trend of capacity utilization which takes into account actual output and installed capacity. An effective sample of 319 companies retrieved from BT-1000 has been taken for the time period of 2001-02 to 2014-15. Indian manufacturing sector has utilised 72.05% of its installed capacity during this time period. The results revealed that rate of capacity utilization was going up during the post reform period of 2001-02 to 2006-07, dropped in the years 2007-08 and 2008-09 (prime period of global meltdown) and started rising again from the year 2009-10 onwards. Rate of capacity utilization lagged behind on account of various reasons like inadequate supply of critical inputs like power, coal, steel, transport, imported inputs, spare parts and components, over aged plants, and lack of maintenance. So a good deal of the capacity that exists in the country used to remain unutilized for reasons other than lack of demand. But still Indian manufacturing sector is making efforts to improve its capacity utilization and attempts towards better utilization will prove fruitful to a considerable extent.

Keywords: capacity utilization, targeted output, installed capacity, global meltdown

1. Introduction

Capacity utilization in manufacturing sector is a key indicator which not only helps to determine the level of utilization of existing capacity but it also helps to define the required level of expansion of capacity for a targeted output. In India, the problem of underemployment and unemployment of labour have received wide attention, but the non-utilization or underutilization of installed capacity has not received much attention. This may appear surprising in view of relative scarcity of capital and abundance of labour. Indian manufacturing sector has witnessed radical policy changes starting from a command and controlled policy regime to a liberalized one. Changes in economic environment also alter short run decisions of the companies and impact on the observed capacity utilization (Gajanan, 2007). Liberalization, privatization and globalization of the regulatory process during the previous decade in the Indian economy have substantially changed the framework for the capacity utilization. On the other hand, the growing Indian market has worked as a push factor for augmenting the installed capacity. Capacity utilization works as a benchmark in measuring performance assuming that all the companies falling in one industry group behave alike and therefore industry level feature could attribute to all the companies operating in that industry group (Antony, 1992). Recession in the world economy brings about a considerable decline in demand for goods and services that in turn, generally lowers sales

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and cash flows (Srinivasan and Lilien, 2009). At the same time, inability or failure to use the full installed capacity results in considerable loss of profit for manufacturing industries.

The broad concept of capacity employed is "the maximum production possible with the available equipment during the year, assuming normal operative conditions, and all the products and their quantity mentioned against this should be capable of being produced together during the year." (Chandrasekhar, 1990)

2. Review of Literature

After the economic reforms initiated in 1991, most of the studies have focused on the analysis of total growth of Indian economy and very negligible attention was given to focus on the problem of underutilization of available capacity or resources. Few studies have been conducted to measure the capacity utilization not only in India but abroad too. Some of these are:

Lovell, C.A. Knox (May, 1968) revealed in his study the rate of capacity utilization in American manufacturing industries covering the period of 1949-63. He had divided the American manufacturing in 16 industries groups i.e., Food, Tobacco, Textiles, Apparel, Paper, Printing and Publishing, Chemicals, Petroleum, Leather, Lumber and Wood, Furniture and Fixtures, Fabricated Metals, Machinery except electrical, Electrical Machinery, Transportation Equipment and Instruments. He used input-output approach to calculate the rate of capacity utilization. He found that rates of neutral technological changes remained small and positive to affect the rate of capacity utilization but generally significantly greater than zero, in post-war U.S. manufacturing.

Sandesara, J.C. (July, 1969) analysed the capacity utilization into five food manufacturing Indian industries i.e., flour milling and grinding, biscuits, sugar (refined), sugar confectionery and manufacture of hydrogenated oil (vanaspati). He collected data for the period 1946-1966 from Monthly statistics of the Production of Selected Industries of India. He had taken capacity utilization as production expressed as percentage of capacity output. He analysed the data of installed capacity and actual production and observed higher capacity utilization i.e., 189.60% in Biscuits industry group whereas 108.96% in refined sugar followed by 63.09% in sugar whereas confectionary and 61.38% in vanaspati and 38.82% in flour milling and grinding. It showed high degree of variability in capacity utilization in flour milling, biscuits and sugar confectionery but low degree in the other two industries. It showed continuous improvement in biscuits industry and sugar confectionery.

Alagh, K. Yoginder and Shah, Jayashri (Feb., 1972) had classified Indian industries according to ISI and RBI study into 16 major industry groups and then collected data of input and output for the year 1967-68. They had compared data of potential production, actual production and excess capacity in these industry groups. The results showed that excess capacity of greater than potential production near to 1/3 in transport equipment and non-electrical equipment sector capacity of 1/3 to 1/5 of potential production found in electrical equipment, iron and steel, leather and leather products, food industries jute textiles, chemical fertilizers and glass, wood and non-metallic mineral industries.

Paul, S. (1974) studied the Indian industries to explain the variations in the level of capacity utilization of 39 industry groups for a particular year 1965. He found that there was a positive relationship between demand pressure and capacity utilization and a negative relationship between the effective rate of protection and capacity utilization. He concluded in his study that industries characterized by large-size firms and more capital-intensive units tend to have higher capacity utilization.

Paul, Samuel (Dec. 1974) considered the economic concept of capacity as the output corresponding to the minimum point on the average cost curve of the manufacturing unit. He had taken time period of 1960 to 1970 and compared the annual rates of growth of installed capacity and then utilization of installed capacity, for three Indian industries groups i.e.

Consumer Goods, Intermediate Goods and Capital Goods. The average growth of installed capacity observed in all industries was 5.7% whereas utilization of installed capacity remained 54.5 %. He further divided these three broader industries groups in 39 industry groups and collected data from Monthly Statistics of Production of Central Statistical Organization. The result showed that nearly half the industrial capacity in the country remained unutilized. In the period 1961-65 it remained at 54% which declined to 52% during the recession period 1966-68 and then again improved to 54% during 1969-71.

Ahmed, QaziKholiquzzaman (1978) had made an attempt to analyse the trends in output and capacity utilization in the manufacturing sector of Bangladesh for the period 1969/70 to 1976/77. He had taken indices of Industrial production as variable to check the trend of capacity utilization in 7 industries groups *i.e.*, (1) Food, Beverage and Tobacco, (2) Textiles (3) Paper and paper Products (4) Chemical and Rubber Manufactures (5) Non-metallic minerals (6) Basic Metal industries. The data had been retrieved from Bangladesh Bureau of Statistics. Overall industrial output appeared at 90% in 1969/70 but still remained lower in 1976/77 as compared to 1969/70. Two largest industries, jute manufacturing and textiles had tended to lag behind. The rate of capacity utilization level in most of the industries had tended to be low as reported as 15-20%. There was substantial underutilization of capacity in the year 1969/70 so Bangladesh industries were carrying considerable excess capacity.

Kibria, M.G. and Tisdell, C.A. (June 1986) studied the life time pattern of capacity utilization of Jute spinning industry in **Bangladesh**. They used defensible measure of capacity utilization *i.e.*, Index of capacity utilization = No. of spindles operated throughout the year/No. of spindles installed or $U1 = K / K^*$

They had taken the data relating to actual number of shifts an individual mill runs rather than on the absolute maximum number of shifts a mill can run (attainable *i.e.*, 3 shifts). They had taken data of 87 jute mills mostly government owned for the time period *i.e.*, (1971-1984). They found that after the commencement of a new mill, capacity utilization tended to rise (rapid learning phase) and reached its peak level usually 2-5 years (running in phase) after operation, then for a period of around 6-10 years capacity utilization declined slowly. Capacity utilization average stood at 15.91% for light yarn and 18.57% for heavy yarn.

GoldarBishwanath and V.S. Renganathan (1991) carried out an analysis of capacity utilization in 73 Indian industries for 1981-82 to 1990-91. He found that the rate of capacity utilization was regressed on variables representing market concentration, demand pressure, trade and tariff policies and the industrial policies of the government. The result also concluded that the government control on capacity utilization was not detrimental to capacity utilization. They reported that the trend of growth rate in Indian manufacturing came down from 1.89% p.a. to 1.28% during the period 1981-82 to 1990-91.

Mulega, G, and J.Weiss (1996) applied the methodology of ratio of electricity consumption to capital stock for different years in the period 1985 to 2004 for 17 major manufacturing groups. The actual ratio of electricity to capital had been compared with the ratio indicated by the adjusted trend line to compute capacity utilization. Data on electricity consumed by industry has been taken from energy statistics (2004-05), published by the Central Statistical Organization, (Ministry of Statistics and Programme Implementation, Government of India and the TERI Energy Data Directory and Yearbook published by the Energy and Resource Institute, New Delhi. As regards the estimates of net fixed capital stock of registered manufacturing at 1993-94 prices have been taken from the National Accounts Statistics. The result of this study indicates a downward trend in capacity utilization in Indian manufacturing in the latter half of 1990s. The trend became reversed in year 2001 but improved between 2001 and 2004.

Dembla, Priyanka (June, 2000) had made analysis of production in the Indian manufacturing Sector through panel data. She had taken sample size of 184 industry groups over the period from 1973-74 to 1995-96. She estimated the trend of production for each use-based sector-i.e., consumer goods, intermediate goods, capital goods and basic good on the basis of NIC (National Industrial Classification). Lack of power has been responsible for underutilized capacity. She concluded in this study that rise in agricultural prices relative to manufactures might have a negative influence on the corporate sector, adversely affected the profitability of agro-based industries. Relative increase in food grain prices pushed up the wage cost and also reduced the profitability.

UmiJeemol, N. Lalitha, Uma Rani (Oct. 2001) analysed trends of productivity in Indian manufacturing for three points of time i.e. 1984-85, 1989-90 and 1994-95. They collected data from Central Statistical Organization and Annual Survey of Industries. They had arranged data relating to value added, production, capital and employment according to the use group industrial classification NIC- 1970 comprising basic goods, intermediate goods, capital goods, consumer non-durable and durable goods industries. In India, the average rate of growth in employment during 1978-95 was just 1.3% whereas growth in capital was higher i.e. 6.6%. They observed a trend of increasing growth rate in value added over the whole period i.e., 8.2%. The growth in capital in the reforms period was observed across all the user-groups and the highest growth remained in non-durables.

Kibria, M.G. and Tisdell, C.A. (2002) reported on a typical time-pattern for the productivity progress of utilized capacity in manufacturing sector of Bangladesh Jute spinning mills. They had taken time series data from 40 nationalized jute mills individually for the time period. Capacity utilized in each jute was indicated by $K \times T$ where K = the effective number of spindles that operated throughout the year and T is the actual time of operation of the mill in a particular year measured in hours. They found that capacity utilization in Bangladesh jute spinning mills firstly rose up with their operations and then declined as with the increase in age. Operating efficiency had been measured as slowing down of the operating speed of the machinery which was found as the important factor contributing to the falling phase of the utilized capacity.

Goldar Bishwanath (2004) studied the trends of productivity in Indian manufacturing. He used total factor productivity approach (TFP) for the period 1979-80 to 1997-98 and collected data from Annual survey of Industries (ASI) brought out by Central Statistical Organization (CSO), Government of India. He used input-output ratio. For this purpose number of workers had been taken as measure of labour input and Net fixed capital stock of constant prices had been taken as measure of capital input. He used output variables as value of gross output deflated by the wholesale price index for manufactured product. He analysed growth rate of capacity utilization in ASI manufacturing sector and CMIE corporate sector manufacturing firms. There was decrease in growth rate of Indian manufactures in the post-reform period.

Hien, Tang Thi (2007) studied the fishing capacity, its control and evaluation and utilization in order to reduce the overcapacity and excess capacity so as to create a stable development of marine resources in Vietnam. He used the concept of capacity utilization as $\text{Capacity utilization} = \frac{\text{Technical efficiency of output}}{\text{Technical efficiency of capacity output}}$. He had taken capacity utilization as an output oriented measurement and its value always remains less than or equal to one so $\text{unused capacity} = 1 - \text{C.U. rate}$. He used Data Envelopment analysis (DEA) technique to measure capacity output. The sample size of 65 small scale trawlers had been taken for two years i.e. 2005 and 2006. Then average and standard deviation has been calculated. He found that Trawler Fisheries had capacity of 1.903

and 1.649 in the year 2005 and 2006 respectively but rate of capacity utilization is 1.217 and 1.144 in the years, so vessels could increase revenue by operating at full capacity.

Goldar Bishwanath (2008) analysed trends in import penetration and capacity utilization in Indian industries in the post-reform period. He has taken 62 industrial firms for 8 years, 1996-97 to 2003-04 to assess the trend of capacity utilization in organized manufacturing fell between 1995 and 2001, but rose between 1995 and 2001. For this purpose he used Input-Output tables prepared by the Central Statistical Organization, Ministry of Statistics and Programmed Implementation Government of India. Capacity utilization was higher in older firms than the new firms.

Kumar, Sunil and Arora, Nitin (2009) analysed regional variations in capacity utilization of Indian sugar industry for the time period of 1974-75 to 2004-05. They used Kuruskall-Wallis test to analyse the variations. Average amount of excess capacity in Indian sugar industry found is 13% in the period of study. Levels of capacity utilization followed the path of deceleration during the entire period of study. He used concept of capacity utilization as ratio of actual output to capacity output. They stated that 46.04% of more intermediary inputs and 195.8% more labours required reaching at full capacity level.

Akpan, S.B., Udo, U.J. and Essien U.A. (2011) analysed the influence of firm related factors and industrial policy regime on technology based capacity utilization in sugar industry in Nigeria. He used the concept of capacity utilization as $\text{Capacity Utilization} = \text{Actual output} / \text{Capacity output}$ or 0 y/y^*

For this purpose they used other variables like average domestic output, average import, average total supply, price of industrial sugarcane, energy consumption, wage rate of skilled workers, capital-labour ratio, sales growth, number of labours, real research expenditure of industry for the time period 1971-2010 and collect data from Central Bank of Nigeria and National Bureaus of Statistics they used technique of panel data and applied F-test, Durbin-Watson test and multiple log linear regression. They concluded that rate of capacity utilization increase with increasing expenditure on research whereas increase in real energy consumption of the industry reduces the technology based rates of capacity utilization in industry.

Ray, Sarbapriya (2012) measured the capacity utilization of Indian automobile industry econometrically and assessed the impact of factors influencing capacity utilization. For this objective, he analysed production trend and sale trend of Indian Automobile Industry for the time period 1991-92 to 2005-06 (16 years). He collected data from Annual Survey of Industries (ASI) and National Accounts Statistics (NAS). He used percentage analysis to check the trend of capacity utilization as the ratio of actual output to capacity output and found that there is positive relationship in size of company and rate of capacity utilization and similarly between market share of industry and capacity utilization rate. Low rate of capacity utilization is correlated with high capital- output ratio and high rate of capacity utilization is correlated with high labour-capital ratio.

3. Objective of the study

To study the trend of capacity utilization in Indian manufacturing sector.

4. Research Methodology

This section discusses the selection of sample, techniques of data collection, the statistical tools used in for analysis purpose and explanation of variables used in the study of aforesaid objective.

Sample size:

BT-1000 companies from the private sector rated on the basis of their market capitalisation constitute the universe of the study. (BT-1000 India's most valuable private sector companies accessed as on November 4, 2012). An effective sample of 319 companies (constituting manufacturing sector) have been selected out of it and studied for this study.

Data Source: Secondary data has been used for this study. Data related to explanatory variables have been taken from Capitaline, PROWESS, the database of CMIE (Centre For Monitoring Indian Economy) and annual reports taken from Ministry of Corporate Affairs and websites of respective companies accessed from the site of SEBI (<http://sebidifair.nc.in/>).

Time Period: The growth of Indian manufacturing has always been below the target laid down in the successive five year plans even after the introduction of Liberalization, Privatization and Globalization. This study has considered time period from financial year 2001-02 to 2014-2015(15 years) which covers the post period of liberalization, privatization and globalization, then period of global meltdown and post- recession period too.

Variable Explained: Measurement of capacity utilization: There are different measures used by experts for calculating capacity utilization rate in their studies. These are:

Trend through Peak level of output given by L.R.Klein & Summers (1966)

The potential production and level of potential utilization ratio used by Divertia, V.V. and Verma, Ravi (1970)

Minimum Capital Output Ratio method used by National Industrial Conference Board And the Federal Reserve Board of U.S.A.

Production Function method as used by Klein and Preston (1961)

Multi-shift approach used by Smithis, A. (1957)

Installed capacity method developed by Ball and Smolensky (1961) and also used by Sconfeld (1966), Klein, Lawrence R. (1973), Greenwald, Douglas; Edmonson, Nathan; Perry George (1985)

Electricity consumption approach developed by Foss, M.F. (1963) in U.S. economy.

The survey method used by Gokhale Institute and National Council of Applied Economic Research.

For the purpose of the calculation of trend of capacity utilization in Indian manufacturing sector in this study, capacity utilization ratio has been used to assess the trend of capacity utilization. It is calculated as:

$$\text{Capacity utilization (\%)} = \frac{\text{Actual Production}}{\text{Installed capacity}} \times 100$$

This method of calculating percentage of capacity utilization has been used for each year of time period taken for study for every company of each industry group as reported by them in their annual reports.

Statistical Technique Used:

Average of capacity utilization for all companies, Compounded Annual Growth Rate of capacity utilization and t-value has been calculated. These measures have been used in the studies conducted by Kumar (1982), Kaur (1997), Shergill and Sarkaria (1999), Kakani et.al. (2001) and Sarkaria (2001), Aggarwal (2010). To estimate the compounded annual growth rate of capacity utilization, the following model was used:

$$\ln Y = \gamma + \beta t + U \quad (1)$$

Where

Y=value of the variable; T= time variable; U=stochastic disturbance term.

The compounded growth rate is worked out with the following formula:

$$R = (\text{Antilog} \beta^{\wedge -1}) * 100 \quad (2)$$

Where β^{\wedge} is the ordinary least square of β in model (1)

5. Analysis and Interpretation

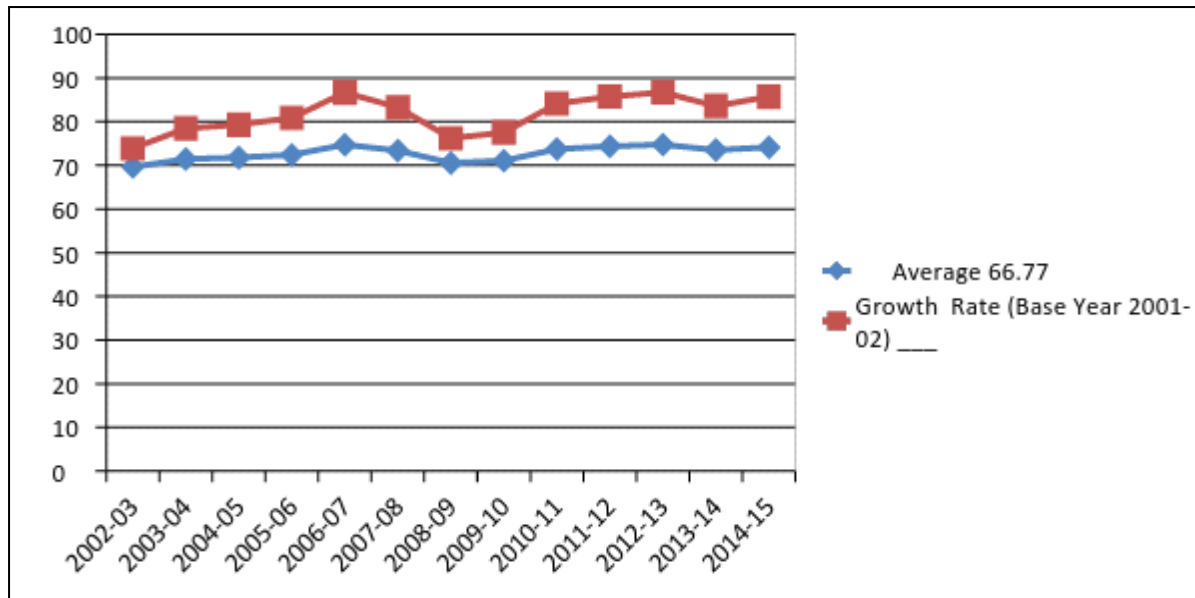
Table 1.1: Average Capacity Utilization, Growth rate on the Basis of the year 2001-02, Number of Companies - 319.

Year	Average	Growth Rate (Base Year 2001-02)
2001-02	66.77	—
2002-03	69.62	4.27
2003-04	71.45	7.00
2004-05	71.79	7.52
2005-06	72.41	8.45
2006-07	74.74	11.93
2007-08	73.38	9.90
2008-09	70.55	5.66
2009-10	71.07	6.44
2010-11	73.72	10.40
2011-12	74.37	11.38
2012-13	74.75	11.95
2013-14	73.5	10.08
2014-15	74.15	11.58
Average C.U.	72.31	—
CAGR	—	0.829
t-value	—	3.1207

Table 1.1 indicates the trend of capacity utilization of top 319 companies in the Indian manufacturing sector. This sector has increasing trend of capacity utilization from the year 2002-03 to 2006-07. In the year 2001-02, capacity utilization was 66.77 %. It increased to 69.62% in the year 2002-03 and rising up to 74.74% in the year 2006-07. The trend of capacity utilization fell down to 73.38 % in the year 2007-08 followed by another fall to 70.55 % in the year 2008-09. It again recovered in the year 2009-10 and showed 71.07 % capacity utilization. This trend further increased to 73.72 % in the year 2010-11 followed by slight increase of 0.65% in the year 2011-12 and reached at 74.37 % .In the year 2012-13, it again rose up to 74.75% but followed by further slight downfall of 1.25% in the year 2013-14 by achieving 73.5%. But this rate of capacity utilization again improved in the year 2014-15 by scoring 74.15%. The trend of capacity utilization of Indian Manufacturing sector showed overall 72.31 % capacity utilization during the time period of 2001-02 to 2014-15. Growth rate in table 1.1 has been calculated by taking 2001-02 as base year. This rate was 4.27 % in the year 2002-03 and 7 % in the year 2003-04 and increased up to 11.93 % in the year 2006-07. The decline in growth rate had been recorded in two years consecutively i.e. 9.90 % in the year 2007-08 and 5.66% in the year 2008-09 but again it recovered in the year 2010-11 up to 10.40% and increased to 11.38% in the year 2011-12. The growth rate further increased slightly up to 11.95% followed by negligible downfall of 1.87% in the year 2013-14 but recovered in the year 2014-15 by achieving 11.58% growth rate. Compounded Annual Growth Rate (CAGR) of capacity utilization for this decade has been recorded as 0.829% and t- value is 3.1207 which is significant at 5%.

The graphical presentation of data on capacity utilization indicates that level of capacity utilization revolves around 65% to 75% only. The growing trend of capacity utilization of Indian manufacturing sector from the year 2001-02 to 2006-2007 witnessed the post effect of the regime of liberalization, privatization and globalization.

Graphical Presentation of data given in table1.1



While in the Indian Economy, GDP growth rate was 5.39% in the year 2001-02 which increased to 7.97% in the year 2003-04, 9.48% in the year 2005-06 and 9.57% in the year 2006-07 (CSO Release, 29th November, 2014). Simultaneously industry growth rate which was 2.61% in the year 2001-02 increased to 7.32% in the year 2003-04 and 9.72% in the year 2005-06 and 12.17% in the year 2006-07 (RBI orderly data, March 2010). Trend of export and gross fixed capital formation also witnessed the growing pattern as Export growth rate which was -1.76% in the year 2001-02 which increased to 20.36% in the year 2002-03, then 23.23% and 28.51% in the year 2003-04 and 2004-05 respectively and gross fixed capital formation rate which was 7.4% in the year 2001-02 followed by 13.6% in the year 2003-04 and 20.7% in the year 2004-05 (FICCI survey on Indian Manufacturing Sector, March 2010). It indicates that due to economic reforms, along with growth in economic parameters like GDP growth rate, industry growth rate, gross fixed capital formation and export, average rate of capacity utilization also tend to increase during this time period. The impact of economic reforms per se is significant though the policy changes may influence supply and demand side factors determining the level of economic capacity utilization (Erumban, 2005). Industrial output rose steadily at an average annual rate of 2.3% from the year 2004 through 2007, then fell sharply in 2008 at a rate of negative 6.7 percent (Iyer 2009). But the global financial crisis has not left Indian manufacturing sector unscathed. Rate of capacity utilization had been continuously rising but after the occurrence of subprime crisis which caught the world economy, it also had the impact on Indian economy and almost all manufacturing sector of Indian economy received the impact of global slowdown. Growth rate slipped in the two years 2007-08 and 2008-09 i.e. 9.32% and 6.72% respectively leading to fall in the growth rate of industrial production up to 4.44% from 12.17% in the year 2006-07 (CSO Release, 29th Nov. 2010). Although the crisis started in the year 2005-06, it has become more visible during the year 2007-08. The trade deficit reached at alarming

proportions, reduction in demand in the OECD countries affected the Indian economy (Arash, 2010). Growth rate has slipped dramatically to 5.3% in the year 2007-08 as from over 9% in the previous year. Goods exports dropped 33% from a year earlier to \$11.5 billion in April 2009. However, according to a report which could weigh down the rate of domestic savings to a moderate 33% and further to 32.8% during the year 2008-09 and 2009-10 from around 37.7% in the year 2007-08 (Diwan,2010).

Then Indian government and banking system had taken remedial steps in form of economic reforms to move the country forward. With the help of various incentives and special packages, a favourable environment for better industrial performance was created for fast recovery which helps to improve the trend of capacity utilization from the year 2009-10 to 2014-15 witnessing maximum double digit growth in the post-recession period.

As a result of reforms, the Indian manufacturing sector has an investment boom and shows that although lumpy investment raised output sharply, demand did not expand as much as capacity and this led to underutilization of installed capacity has an adverse effect on productivity (Uchikawa, 2011). The trend of capacity utilization has been generally increasing but the rate of increase is not so sharp, rather Indian manufacturing sector is affected by global slowdown and faced the lack of demand not only in international market but in domestic market too. GDP growth rate and industrial growth rate also started to increase after the prime recession period. GDP growth rate was 8.59% in the year 2009-10 which was 6.72% in the year 2008-09 and industry growth which was 4.44% in the year 2008-09 and increased to 9.16% in the year 2009-10(RBI orderly Book,2010). Growth of these economic parameters are also accountable for improving the rate of capacity utilization in the post period of global meltdown but Indian manufacturing sector is still witnessing considerable unutilized (excess) capacity ranging from 25% to 28% during the time period covered under the study. Hundred per cent utilization of capacity is not really possible due to various shortages, reasons and operating interruptions. These factor which lagged behind the full utilization of installed capacity are like paucity or inadequate supply of critical inputs, shortage of power, tariff on power supply, transportation, inadequate supply of imported inputs, infrastructural bottlenecks, components and spare parts, lack of maintenance of installed capacity and use of over aged plant and machinery. Inadequate investments and consumer products also remain as the major constraints impeding the full optimal utilization of installed capacity. In spite of adopting new technology and modernization, no attention has been paid to improve and maintain the existing technology. Lack of technological dynamism and inefficiency on the part of management has been the major bottlenecks in the higher utilization ratios. These shortages or interruptions are due to sometimes unavoidable reasons of lack of demand, breakdown of machinery and slow growth of actual production as along with faster expansion in capacities (Kaur, 1992). These shortages or interruptions can be overcome to reduce their impact upon capacity utilization, but perhaps these interruptions cannot be altogether eliminated.

Factors responsible for underutilization of capacity in Indian manufacturing sector

In developing countries like India, there is need to acquire more and more sophisticated technology to cover up the technological gap but it is associated with business risk. The reasons of underutilization of installed capacity are described as (Antony, M.T.1992):

- **Inadequacy of demand:** Scarcity of capital adversely affects the utilization of installed capacity and planned development. There are many companies possessing in capacity but suffer from lack of demand for their products. Certain projects facing shortages of investment also stop the supply of certain material or equipment which create underutilization in many companies.

- **Inadequacy of raw material:** Natural shortage of raw material in our country also restricts the supply of raw material in adequate quantities so large companies have to face the situation of underutilization of capacity.
- **Inadequacy of power:** This is a serious problem hampering the fuller utilization of available capacity. India is still facing power famine in 21st century. States are without any policy to allocate power to the companies established in their region to make themselves more industrial developed so causing underutilization of capacity.
- **Poor performing infrastructure:** Frequent disruption in electric power and water supplies alongwith poor performance of infrastructure of facilities is a major constraint in utilising available capacity. Companies are forced to carry high cost structure and high cost of transportation system to which reduces efficiency and result in loss of competitiveness for their production.
- **Policy instability:** Development in manufacturing sector require long range planning so consistent and stabilized economic policies are mandatory. But the inconsistency in policy formulation, its execution and implementation affects the corporate planning adversely.
- **High cost of production:** This is a major constraint in operating and utilising the installed capacity. High interest on invested capital, fluctuating exchange rate, increasing labour cost squeeze liquidity and low effective demand for goods are the factors which lead to high cost of production and decreasing rate of capacity utilization.
- **Industrial relations and unrest:** Labour unrest in India is another cause responsible for underutilization of capacity. This has been mainly due to lack of delegation to the various branches of company, or different companies of one industry groups or different companies of one family industry group or frequent intervention by central agencies. Various amenities are offered by companies to their employees but even then they are unable to get the best out of them. It has greater influence on the rate of capacity utilization.
- **Inflationary pressures:** Indian economy is witnessing inflationary pressures, black marketing and hoarding. It encourages speculative activities and diverts resources from productive ventures.
- **Inefficient management:** Managerial shortcomings also hinder the utilization of capacity. Lack of farsightedness, lack of co-ordination among general manager and works manager create problem to use the installed capacity at its fullest. Effective operational management, proper structuring of organizations and better maintenance of equipment, effective planning and control of production system, effective management of inventory and all other available resources help to increase rate of capacity utilization.
- **Incorrect choice of technology:** Sometimes company purchase newly developed technology which is still to be proven elsewhere in the world but purchased without careful analysis in our country where working environment is not compatible to that technology then it results into underutilization of capacity.

As body temperature is a significant indicator of the health of a normal person, in the same way, Capacity utilization is an efficient indicator of any national economy and manufacturing sector could never reach the level of full utilization of capacity with the presence of these weaknesses. Therefore, dynamic plant design, efficient management team, sound industrial relations and research and development activities help to improve the rate of capacity utilization.

6. Recommendations and Conclusion

India had started economic reforms in early nineties to transform our economy into a Developed Economy. But capacity utilization in Indian manufacturing sector cannot achieve

the level of optimum utilization of installed capacity even after the reforms taken under the process of liberalization, privatization and globalization. The reformatory programmes could not meet the desired success. The underutilization of installed capacity in a developing country such as India amounts to wastage of available scarce resources. Indian manufacturing sector is affected by global slowdown and faced the lack of demand not only in international market but in domestic market too. But India's turnaround was sharper and swifter, backed by its strong financial system and regulatory norms. Under the leadership of Shri Narinder Modi, in 2014, the process of economic upheaval of India has taken new dimensions. The vision of making India as Economic Super Power under the programme of "**Make In India**" is possible only if Indian government notice that Indian manufacturing sectors is backbone of our country so problems faced by these sectors must be given attention and be solved which help to achieve higher utilization leading to solve the problem of unemployment. The performance of any industry or company is possible mainly on account on improved capacity utilization, increase in sales and value added products and all manufacturing sector must make efforts to improve its capacity utilization and attempts towards optimal utilization of capacity will prove fruitful to a considerable extent.

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