Attaining Sustainable Development A-La Gujarat Model : What does Data Envelopment Analysis Testify?

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Abstract

In the last decade the Indian Industrial sector witnessed signs of growth due to many proactive industrial promotion and investment policies. The state of Gujarat conveyed a positive signal for India in terms of economic and industrial development leading the way for other states by attracting high volumes of industrial investment. Modiji's "Make in India" campaign is designed to transform India into a global manufacturing hub and to use manufacturing as a means for job creation. The plan includes a variety of measures from easing the regulatory burden to establishing special economic zones to awaken India's latent manufacturing potential.

The data for the study has been compiled from Annual Survey of Industry (ASI) for the period ranging from 2000- 2013. The technique of Data Envelopment Analysis (DEA) has been used to work out the Malmquist Productivity Index of Indian states. Total number of factories, Gross Fixed Capital Formation and number of workers have been considered as the inputs while Gross Value Added has been taken as the output. Thus, performance of select states has been analysed with the help of log growth rates and .Malmquist Productivity Index. It shows that few states performed well though Gujarat marked with an exemplary performance. The analysis brings in interesting insights.

Preamble

Ever since the implementation of the Five Year Plans in India, there had been a lot of efforts to boost up the investment in the industrial sector of the country and to enhance its share in Gross Domestic Product (GDP) and employment. However, industry oriented growth has been deviated towards service sector because of sceptical business environment, inadequate investment in the manufacturing industries, labour market rigidities, liberalization of service sector, IT and ICT revolution and owing to the presence of large chunk of skilled, semi-skilled and unskilled workers. In the absence of adequate industrial jobs, the unskilled workers opted for employment in the service sector characterised with low wages. There is no denying the fact that their massive contribution in varied service sector activities has contributed to large share of GDP. However, employment opportunities created in service sector are highly informal in nature and do not ensure maintaining quality standard of living. The inappropriate growth of manufacturing sector has been instrumental in diversification of industrial growth.

The Indian Industrial sector witnessed signs of growth due to the proactive industrial promotion and investment policies introduced and modified by many states . To name a few, Industrial Single Window Clearance Act of 2002 and provision of several economic incentives may be cited. (Mishra and Yadav, 2013). The establishment of

world class infrastructure congenial to industrial development by way of ports, airports, expressways, supply of power as well as water contributed in this regard.

How do the leading States in India perform?

The industrial sector of India has grown tremendously over the past decade, though during 2011-12 a downward trend was visible on account of the global economic meltdown. During 2000-01 to 2012-13, India's average growth rate of Net State Domestic Product (NSDP) in industry was 6.5 percent. Andhra Pradesh is also considered as a highly industrialised state. It's NSDP and per capita NSDP are high since it attained remarkable growth in all three sectors. . The major contributors of this growth are Gujarat, Maharashtra and Tamil Nadu . States such as Andhra Pradesh, Uttar Pradesh, West Bengal, Karnataka , Madhya Pradesh and Orissa have also contributed significantly to this impressive growth.

Regional Disparity in NSDP

While evaluating the regional disparity and dynamism in growth rate of different states in India it becomes clear that the provision of jobs in reducing the regional imbalances in development is extremely important. The regional disparity among states can be evaluated by their NSDP and its growth rate in the last decade. Table1 shows the NSDP of 18 states in India. The table shows NSDP at constant prices of 2004-05 is expressed in the table. The size of the state GDP helps us to understand how developed the economy of the state is . However, NSDP does not capture development in all areas. This comparison is based on the argument that higher NSDP leads to higher development which in turn enriches per capita income and ultimately results into improvement of standard of living. The states are classified on the basis of size of their NSDP from 1999-00 to 2012-13. The state of Maharashtra has the highest NSDP i.e.7390.40 billion whereas Himachal Pradesh has the lowest NSDP i.e.360.63, as indicated in Table 1 in the year 2012-13.

Table 1 : NET STATE DOMESTIC PRODUCT AT FACTOR COST - STATE-WISE(At Constant Prices)Billion Rupees

YEAR	ANDHRA	ASSAM	BIHAR	GUJARAT	HARYANA	HIMACHAL	JHARKHAND	KARNATAKA	KERALA	MADHYA
1999-00	1475.84	385.21	538.37	1269.24	585.58	154.70	434.80	1226.58	778.42	932.42
2000-01	1598.55	394.96	627.01	1185.44	632.12	164.57	383.51	1234.76	798.08	856.64
2001-02	1671.04	405.15	591.05	1281.78	680.94	172.95	409.94	1257.14	837.95	917.92
2002-03	1709.08	429.70	665.79	1393.53	722.68	181.38	421.41	1324.57	899.27	870.05
2003-04	1876.51	456.14	622.86	1625.63	793.78	193.53	453.30	1350.37	957.55	967.65
2004-05	2013.03	471.81	701.67	1722.65	862.22	211.89	530.56	1487.29	1047.76	999.40
2005-06	2209.01	486.02	684.19	1972.70	940.11	230.09	506.78	1640.31	1155.00	1049.75
2006-07	2445.87	507.97	802.60	2139.54	1047.00	248.19	515.27	1810.86	1246.25	1145.45
2007-08	2727.26	529.68	844.15	2392.53	1128.96	263.62	630.05	2038.10	1357.47	1199.58
2008-09	2922.58	561.23	972.84	2494.80	1215.88	276.49	604.72	2183.09	1440.94	1351.24
2009-10	3036.68	612.94	1019.38	2847.32	1367.80	291.49	664.65	2183.63	1571.23	1479.33
2010-11	3381.64	657.26	1175.03	3158.92	1460.53	315.90	761.34	2408.17	1671.78	1557.01
2011-12	3628.08	690.35	1295.21	3417.23	1585.24	339.55	801.57	2480.40	1808.12	1708.79
2012-13	3826.33	730.81	1433.12	3689.07	1673.89	360.63	868.61	2595.00	1960.77	1884.80

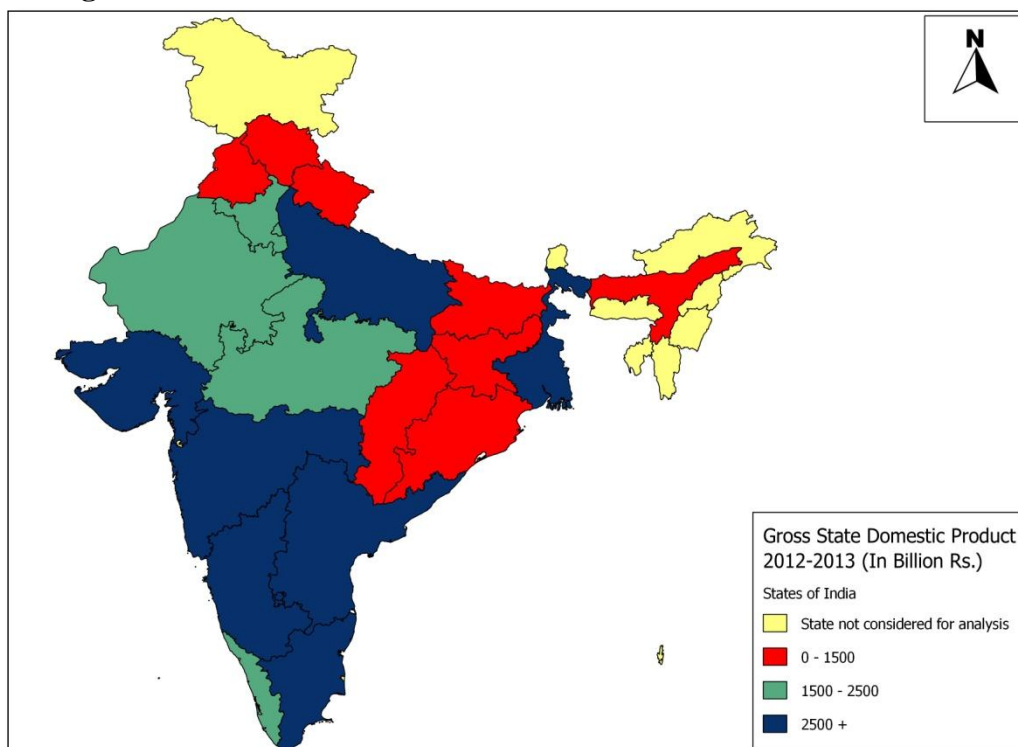| YEAR	CHHATTISGARH	MAHARASHTRA	ORISSA	PUNJAB	RAJASTHAN	TAMIL NADU	UP	UTTARAKHAND	WEST BENGAL
1999-00	314.45	2945.40	511.69	725.28	923.73	1566.28	1948.55	141.67	1465.34
2000-01	295.09	2854.92	498.19	749.39	893.71	1653.23	1988.39	159.34	1516.70
2001-02	336.39	2955.77	528.52	759.16	995.48	1621.20	2024.56	166.90	1626.23
2002-03	330.70	3159.61	524.72	772.09	875.89	1629.31	2090.07	182.53	1683.23
2003-04	392.83	3403.64	601.34	820.30	1154.59	1730.85	2200.12	196.97	1782.14
2004-05	413.87	3700.23	679.87	861.08	1126.36	1936.45	2310.29	222.88	1900.29
2005-06	420.63	4236.32	710.05	903.30	1202.02	2215.88	2445.14	254.48	2019.94
2006-07	500.65	4819.83	798.45	1000.72	1343.50	2562.86	2639.35	285.14	2178.49
2007-08	541.12	5380.81	866.92	1087.38	1404.71	2723.40	2808.51	334.98	2347.98
2008-09	576.62	5465.33	932.07	1147.66	1522.84	2867.44	3021.92	370.64	2442.62
2009-10	592.63	5993.38	939.57	1220.97	1611.59	3167.60	3209.89	434.07	2632.30
2010-11	649.77	6676.25	998.80	1299.83	1853.66	3599.61	3466.21	479.67	2791.91
2011-12	692.65	6980.86	1019.80	1369.87	1946.51	3865.08	3646.84	527.49	2894.34
2012-13	712.94	7390.40	1087.42	1425.27	2032.98	3974.71	3836.44	553.72	3077.20

During 1999-00, NSDP at factor cost of Gujarat was 1269.24 billion. It was subjected to a marginal decline during 2000-01 and is at a steady increasing trend till 2012-13 which amounted to 3689.07 billions. While considering the states of Andhra Pradesh, Maharashtra , Tamilnadu and West Bengal, NSDP was 1475.85   , 2945.40, 1566.28 and 1465.34 respectively in 1999-2000. It increased to 3826.33, 7390.4, 3974.71and 3077.20 respectively by 2012-13. It indicates that that Gujarat is much ahead of any other state in this regard.

State-wise Categorisation of NSDP

Figure 1 displays the classification of NSDP of different states in three categories such as NSDP above 2500 Billion in 2012-13, Between 1500-2500 billion, GDP Below 1500 Billion. The states of Andhra Pradesh Gujarat Karnataka Maharashtra Tamil Nadu Uttar Pradesh and West Bengal have above NSDP 2500 Billion. The states of Haryana, Kerala, Madhya Pradesh and Rajasthan have NSDP between 1500-2500 Billion. The third category of states

such as Assam, Bihar, Himachal Pradesh, Jharkhand, Chhattisgarh, Orissa, Uttarakhand and Punjab have NSDP Below 1500 billion . The quantum of NSDP just provides vague picture of industrialised states and developed states, though, it does not focus on the standard of living of its habitant.

Figure 1 Classification of NSDP of states

Gross State Domestic Product 2012-2013 (In Billion Rs.)

States of India

- State not considered for analysis
- 0 - 1500
- 1500 - 2500
- 2500 +

Categorisation on the basis of PCI

Therefore, the Figure 2 evaluates classification on the basis of per capita income of the states. The per capita income based classification takes into consideration the population density of the state which enables us to understand the role of economic activities in improving the standard of living of people. The state of Maharashtra has the highest per capita income of Rs 64,218. Interestingly, per capita income of Haryana, Punjab and Uttarakhand are Rs 64,136, Rs 47,834 and Rs 54,462 respectively. These states have low population density and accordingly fruits of economic development are being shared in greater proportion by their population. The high population density in Uttar Pradesh and Bihar adversely affected the standard of living and quality of life as reflected by their per capita income of Rs 18,595 and Rs 14,361 respectively in the year 2012-13. The figure represents classification on the basis of per capita income. The states which have PCI Above 45000 Rupees in 2012-13 such as Gujarat Haryana Himachal Kerala Maharashtra Punjab Tamil Nadu Uttarakhand are represented in blue colour. The states which have PCI between 25000 to 45000 Rupees in 2012-13 such as Andhra Pradesh, Jharkhand, Karnataka, Madhya

Pradesh, Chhattisgarh, Orissa ,West Bengal and Rajasthan are shaded in green colour. Three states which have PCI below Rs 25000 like Bihar, Assam and Uttar Pradesh are shaded in red colour.

Figure 2 Classification of PCI of states
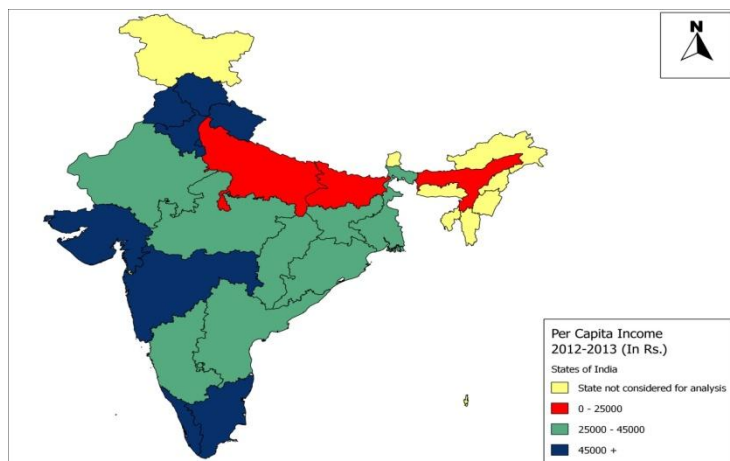
1.3 The Case of Gujarat

While considering the demographic and economic dividends',today , Gujarat is among the richest states in the country. As per 2011Census, the population of Gujarat is only 4.90 percent of the total population of India. The state contributes to 7.90 percent of the total domestic output. The national average of urbanised population constitutes 31.20 percent whereas the share of Gujarat is 42.60 percent.

Gujarat is highly industrialised state with the manufacturing sector constituting 25.23 percent of its Net State Domestic Product (NSDP) in   2012-13 which is the highest in the country. The share of India during the same period was hardly 15.75 percent. According to RBI (2013), the same trend has been observed from 1999-00 to 2012-13. Over the years, the state attained the unique distinction as an entrepreneurial and industry-friendly state. For most of the years from 1999-00 to 2012-13, the state of Gujarat secured the first position in NSDP in total manufacturing   where as Maharashtra held the second position. RBI (2013).However, the trend was reverse during the earlier period. Gujarat's share in NSDP of total manufacturing increased from about 23.34 percent in 1999-00 to 25.23 percent in 2012-13.

While considering the percentage contribution of manufacturing sector to GDP of the states, it may be seen that ever since 1999-2000, Gujarat maintained its steady pattern. The impact of an earthquake on January 26th 2001, at Bhuj had hardly any effect on the share of manufacturing to NSDP in this state. Even during Gujarat's riot period (2002) it almost remained the same. The share of the states of Maharashtra and Tamil Nadu reduced to 16.64 and 16.79 percent respectively. UP maintained the share of 11.08 which is not much less than 13.12 in 1999-2000 whereas West Bengal maintained its share of 8-9 throughout the period. The share of Andhra Pradesh reduced to 10.14 percent while that of Karnataka was 12.88 percent, as mentioned in Table 2.

Table 2 : Manufacturing as a Percentage of NSDP

Year	MADHYA	MAHARASHTRA	ORISSA	PUNJAB	RAJASTHAN	TAMIL NADU	UTTARAKHAND	UP	WEST BENGAL
1999-00	12.63	21.99	6.90	15.24	14.32	18.11	8.50	13.12	8.75
2000-01	12.83	19.62	6.35	15.19	13.92	18.43	10.91	12.14	8.83
2001-02	11.39	18.07	5.08	13.85	11.44	16.34	9.33	11.61	8.54
2002-03	10.28	18.99	6.13	14.42	12.59	16.73	11.75	12.12	9.19
2003-04	9.19	19.67	6.59	14.07	9.83	17.83	11.76	11.84	8.97
2004-05	9.81	18.20	9.22	14.02	11.27	16.95	11.21	11.85	9.34
2005-06	10.13	20.92	7.64	14.55	11.82	17.19	14.83	11.64	8.47
2006-07	12.33	22.05	8.98	16.43	13.38	17.77	15.59	13.14	9.01
2007-08	12.13	21.72	10.55	18.44	12.94	16.65	19.73	13.11	9.49
2008-09	12.84	19.36	11.34	17.87	12.98	15.05	19.95	11.03	8.91
2009-10	12.69	19.17	5.82	19.24	14.19	18.15	20.45	12.61	8.94
2010-11	11.03	19.74	4.54	19.79	11.13	18.32	21.76	12.81	9.29
2011-12	10.34	17.83	5.16	19.01	10.99	17.25	22.33	11.79	8.26
2012-13	9.56	16.64	5.03	18.79	10.64	16.79	22.47	11.08	8.08

Year	ANDHRA	ASSAM	BIHAR	CHHATTISGARH	GUJARAT	HARYANA	HIMACHAL	JHARKHAND	KARNATAKA	KERALA
1999-00	10.89	7.32	7.07	13.11	23.34	19.83	10.82	24.73	12.78	9.74
2000-01	9.73	5.90	5.56	12.74	21.38	19.46	11.16	13.56	12.55	9.58
2001-02	9.91	6.72	5.35	10.63	18.73	19.09	10.67	9.97	13.66	8.52
2002-03	10.71	8.40	5.12	14.61	20.98	19.24	10.95	19.16	15.49	8.27
2003-04	10.71	9.07	5.23	15.79	20.76	18.83	10.77	19.92	16.75	8.14
2004-05	10.28	9.17	4.90	19.82	23.37	18.88	10.54	33.04	15.73	7.72
2005-06	9.88	8.09	4.64	13.92	23.73	18.73	9.84	25.31	14.29	7.14
2006-07	10.42	7.49	4.25	19.31	24.52	18.15	10.60	20.64	17.00	7.10
2007-08	9.66	6.35	5.31	20.41	23.78	17.77	9.04	29.78	15.75	7.87
2008-09	10.29	5.55	5.74	18.69	23.39	16.50	10.93	18.02	16.48	7.30
2009-10	9.98	6.86	5.02	14.91	27.29	16.73	13.86	17.84	14.71	6.68
2010-11	10.42	6.72	5.51	11.48	24.79	16.52	14.26	17.29	14.22	7.05
2011-12	11.34	6.56	4.31	9.07	25.79	15.82	14.21	14.55	14.02	6.80
2012-13	10.14	6.30	3.82	6.84	25.23	15.83	13.81	13.23	12.88	6.85

Gujarat has emerged as highly investor-friendly state by attracting large volumes of industrial investment . The state is well known as the most favoured investment destination in the country. The investment climate and industry friendly policies of' Gujarat converted it into the role model in the country which leads in creation of jobs. The operation and management coupled with proactive policy framework of high investment-oriented regions and industrial areas in Gujarat resulted in their development as global hubs in economic activities. The positive impact of economic liberalization is very much evident in the industrial scenario of Gujarat vis-a-vis certain other states .Gujarat has conveyed an encouraging signal for the rest of the country in terms of economic and industrial development by remaining as role model for other states to emulate. (Mishra and Yadav, 2013). From 2003 onwards the Vibrant Gujarat Global Investment Summit is organised to highlight the state as a major investment destination.

Industrialisation for creation of Employment Opportunities

India is characterised with the problem of high incidence of unemployment. The country's economic growth was not efficacious enough to generate meaningful jobs for its expanding working-age population. Dead-end rural construction jobs have offered the only area of expansion. As a result, millions of families depend on low productivity agriculture for their livelihood.

The demographic dividend is indicative of a higher proportion of workers and higher per capita income. It paves the way to higher disposable incomes, greater consumption and faster growth. It also leads to increase in the domestic savings, producing a larger pool of capital to finance investment and development. If India can create numerous high productivity, higher quality jobs, the demographic dividend will support higher growth levels than would ordinarily be possible.

The productivity rates in construction have declined since the surplus labour from rural and urban areas is merely spilling over from one occupational activity to another. (Green 2014).It is a well known fact that India produces twice as many graduates as its labour market can absorb. India's large chunk of labour force is engaged in low-productivity agriculture-oriented occupations and the sector contributes little to GDP.

Thus, the employment potential in informal manufacturing is sizeable, but its contribution to the economy is not proportional. The informal manufacturing has developed largely due to restrictions on formal manufacturing. A round 85.00 percent of informal manufacturing firms and slightly less than half of employment in the sector of informal manufacturing consist of single-person microenterprises as per NSSO estimates. (68th Round, 2011-12).

2.2 Manufacturing Sector and Creation of employment

The formal manufacturing sector presents a more hopeful picture in creation of employment opportunities. It provides more formal sector jobs than modern services. For instance, manufacturing as a whole has not been instrumental in creating much employment growth in the last decade. Employment in formal manufacturing, on the other hand, has also grown impressively during the same period.

Many a times, low employment implies high productivity in formal sector manufacturing. It also highlights the fact that Indian manufacturing has relied to a greater extent on capital when compared to labour for its growth. Indian firms operate in more capital-intensive industries than predicted from the experience of other countries with similar labour supplies, development levels, and institutional quality. (Hasan etal, 2013). According to NSSO estimates, the four largest manufacturing industries by output are also the four least employment- intensive. (68th Round, 2011-12)Within the same industry, they use more capital and less labour than comparable firms in other countries.(Hasan etal, 2013). With effect from 2004, India's labour intensity was declining, in contrast to what was observed in several other Asian economies. (Kochar etal, 2009) The reasons for the small size and capital intensity of formal-sector Indian manufacturing have been widely documented. (Kochar etal, 2009)· Among the most salient reasons are inflexible labour regulations, poor infrastructure, unfriendly government policies and the difficulty in

acquiring land.

Yet another aspect of capital intensity indicates that successful capital- intensive formal-sector manufacturers often assign the labour-intensive activities on the contractual basis. This allows them to keep workers off their books to avoid exposure to further regulatory interference and provision of social security measures.

The urgency to improve efficiency determines the rate of growth of productivity followed by better wages. When these industries grow further in strength to impact broader labour markets, they spurt wages and hike incomes across the economy. For this reason such industries are named as "elevator industries." (Green, 2013). They are inextricably associated with the development process. However, provision of jobs by certain such industries have almost exhausted in India.

The modern services that offer the best jobs have not been successful in provision of jobs in large quantities. Even formal sector jobs in traditional services, the largest source of those jobs, constitute only about 6.00 percent of all jobs in the economy (NSSO, 68th Round). Furthermore, almost half of formal sector jobs in traditional services are derived from sectors like public administration and education, which is not likely to drive major productivity gains in the present scenario. NSSO, 68th Round, 2011-12

As a result the job growth has been much slower than output growth, and has been concentrating in segments requiring high-skilled, educated workers. If India successfully adapts and follows global trends in education progress, in twenty years, it should see a doubling of the number of people with the post-secondary education necessary to be qualified for a professional job in the modern service sector. That would mean roughly one-third of workers who are the new entrants to the labour market in forthcoming two decades would be highly educated. Certainly not all can find suitable jobs in the modern service sector.

An adequate supply of skilled labour poses one potential limitation on growth. Despite the education forecast cited above, India Skills Report by the Confederation of Indian Industries' (2014) research shows that the information technology industry will face a shortage of 3.5 million skilled workers by 2022. Wage costs in modern services have shooted up at a drastic rate than inflation, indicating difficulty in acquiring adequate staffing.

The strategies to attain job growth in India focuses on the potential of manufacturing sector to provide large-scale quality jobs. The argument dates back to Simon Kuznets. It originates from the fact that every developed country passed through a period when output and employment were dominated by manufacturing sector. In the previous century, the growth based on manufacturing sector in countries such as Japan, South Korea, and Taiwan was characterized by high investment ratios, small public sectors, export orientation, labour market competition, and government intervention. (Kuznets, 1988) Almost all the developed economies have passed through the same track and those currently making the best progress, like China too embraced the same route.

The strongest argument in favour of pursuing the attainment of development through manufacturing path for India is it's increasing labour force. As Green (2014) puts it, most of the economies that relied on manufacturing for development began with relatively less educated workforce predominantly engaged in agricultural operations. They started

by developing labour-intensive industries like textiles, toy making, and low-end electronics assembly, which make use of cheap, low-skilled labour force abundant in supply.

To make use of the labour force which is abundant in supply for low-value chain manufacturing, labour- intensive manufacturing has to become much more competitive when compared to what it is today. Manufacturers will need to build large-scale operations tied into global supply chains.

Two major types of constraints confront the formal manufacturing sector. The first is the policy environment according to Green (2014). The formal manufacturing has to go ahead by exposing itself to the unsuitable policies than the modern service sector. Further, it is much more dependent on the measures taken by the government a n d delivery of public goods like infrastructure. Presumably, removing these obstacles could generate tremendous growth. Sceptics argue that India would require a major shift in the amount of FDI flowing into manufacturing to acquire both the capital and technical know-how to start a large export industry. Also, care has to be taken to ensure the entry of right type of FDI so as to curb the undesirable effect occurring due to indiscriminate entry of FDI into the country.(Dolly ,)

India possesses an advantage that only China can compete with. It is t h e potentially massive domestic market. Shifting operations to India not only allows access to its labor force, but also provides a comfortable position from which to access the domestic market. For instance, the attractiveness of servicing the domestic auto market is the prominent reason why many auto parts firms engage in (capital-intensive) export-oriented operations from India despite a difficult business climate. This bonus will help India to cross cost thresholds more easily, potentially overcoming other disadvantages.

Labour reform stands out as such a singular impediment to manufacturing job growth that it deserves particular attention. (Jha, 2014) India has the strictest labour regulations in the world. There are umpteen number of central laws and large number of state laws governing labour issues, making reform a complex one.

2.3 Modiji's Make In India Campaign

Inspired with the success of Gujarat State, National Manufacturing policy (2011) was devised to increase manufacturing activities and greater ease of conducting business which includes both formal and informal to the extent of 25.00 percent of GDP and to create 100 million manufacturing jobs by 2022.The initial measures taken by Modi government give some ray of hope. But the follow up measures require investigation, creativity and persistence to identify business- friendly procedures that still meet necessary public policy objectives.

The problem of infrastructure development must be addressed so as to ensure growth. Mallet (2014) mentions where logistics costs for manufacturing firms exceed their entire wage bill. Allcot (2014) opine that owing to disturbed supply of electricity, productivity was adversely affected. These aspects should be considered seriously when tackling the infrastructural bottlenecks .

Modiji with his renowned administrative ability to enforce accountability with CEO-like leadership, and his plans to replicate his success in Gujarat on a larger stage in India are positive signals in this regard. At Gujarat, Modiji was successful in managing the state's complex bureaucracy for maintaining positive relations with business. His ability to

make efficient business-government interactions was widely appreciated.

After assuming charges as Hon'ble Prime Minister of India, Modiji has prioritized manufacturing growth through the "Make in India" campaign. His government has already enacted some moderate labour reform legislation and has made a concerted push for the tax on Goods and Services . But overall the main strategy appears to be devising the Gujarat way of development at the Centre. This approach focused on marginal improvements rather than large scale reforms, to improve processes and reduce inefficiencies.

Modi'jis "Make in India" campaign is designed to "transform India into a global manufacturing hub" and to use manufacturing as a means for job creation. Steps to boost up the performance of industrial sector such as establishment of Special Economic Zones (SEZs), Special Investment Regions (SIRs), enactment of Gujarat Special Investment Regions Act of 2009 , provision of world class infrastructure as well as proactive policy framework are praiseworthy. The plan includes a variety of measures starting from easing the regulatory burden to establishing Special Economic Zones to awaken India's latent manufacturing power. The modern service sector and the formal manufacturing sector are the true growth sectors for India. One of the challenging goals of the Indian government is the economic inclusion by bringing more citizens into the modern, productive economy. In order for poverty alleviation and for improving health and educational indicators, it is important to enrich economic outcomes by creating formal sector jobs, which ensures steady and higher wages. The formal sector workforce accounts for 14.00 percent in India.

The cooperation of state governments is essential to attain the target, since two-thirds of regulations affecting manufacturing are at the state level.(Planning Commission,2014). In practice, land acquisition is almost entirely a state and local government issue. The massive undertaking of infrastructure improvement relies heavily on state and local governments. In future, the service sector is unlikely to generate high-quality jobs. It may grow well if the broader domestic economy performs well. Neither export markets look as promising as in the past. But there is no argument to suggest that it will increase its employment intensity. It is more reasonable to expect a continuation of the same pattern of the past two decades. In such a scenario, manufacturing sector offers myriad opportunities.

Research Methodology and Data Analysis

The data for the purpose of the analysis has been compiled from Annual Survey of Industry (ASI) for the period ranging from 2000 to 2013 for different states."

Calculation of Log Growth Rate

The data on NSDP from 1999 to 2013 has been analysed by calculating the log growth rate in order for having a deeper understanding on issues related to varying pattern on growth in different states. The logarithmic growth describes a phenomenon whose size or cost can be expressed as a a logarithmic function of some input. e.g. $y = C \log (x)$. According to Szecsei, (2006) Logarithmic growth can be termed as the inverse of exponential growth where the speed is very slow.

Data Envelopment Analysis

The technique of Data Envelopment Analysis (DEA) is used to work out the Malmquist Productivity Index. Total number of factories, Gross Fixed Capital Formation (GFC) and number of workers have been taken as inputs while gross value added has been taken as output. Certain states where number of factories was observed to be less than 1000 in the financial year 2012-13 have been excluded from the analysis by treating them as an outlier .The reason for exclusion is that they may perform well in terms of other large industrialised states. Other than the Union Territory (UT) of Delhi, rest of the union territories have less number of factories. So UTs are excluded from the analysis because of their negligent contribution to the industrial outcome compared to states with strong industrial base. The state of Bihar is also excluded as it reported to have negative Gross Fixed Capital Formation. The reason is that the DEA technique does not accept negative value in the analysis. The nominal GVA and GFC have been deflated using Wholesale Price Index (WPI) of manufacturing product. Thus, performance of 18 Indian states has been analysed by using Malmquist Productivity Index.

Softwares Used

The analysis has been done with the help of DEAP Frontier software developed by Joe Zhu and two softwares such as GIS and Eviews.

Construction of Malmquist Productivity Index (MPI)

MPI uses linear programming technique so as to estimate the productivity of the firms over the period of time. This method was originally developed by **Sten Malmquist** in 1953 and further improved by Fare, Grosskopf and Lovell in 1994 to represent DEA based productivity measure. Firms in the Data Envelopment Analysis are referred as Decision Making Units (DMU) and in the present study each state is referred to as DMU. DEA uses relative efficiency to assess the performance of the firms and hence the analysis is based on the comparative performance of the states. Further, the analysis in based on input oriented measure. Input oriented measure attempts to answer by how much input quantities proportionally reduced for producing the same level of output (Coelli,1996). Following Zhu (2003), suppose each DMU j (j = 1,2,3,……n) produces a vector of outputs $y_j^t = (y_{1j}^t,………,y_{sj}^t)$ by using a vector of inputs $x_j^t = (x_j^t, ……., x_{mj}^t)$ at each time period t, t =1 ,….,T. From t to (t +1), DMU $_o$'s efficiency may change or the frontier may shift. The output oriented MPI is defined as

$$M_o = [\frac{\theta_o^t(x_o^t,y_o^t)}{\theta_o^t(x_o^{t+1},y_o^{t+1})} \ \frac{\theta_o^{t+1}(x_o^t \ y_o^t)}{\theta_o^{t+1}(x_o^{t+1},y_o^{t+1})}]^{1/2}$$

M_o measures the productivity change between period t and (t +1). Productivity declines if

$M_o > 1$, remains unchanged if $M_o = 1$ improves if $M_o < 1$. The modification in M_o makes it possible to measure the change of technical efficiency and the movement of the frontier in terms of a specific DMU_o.

$$M_o = \frac{\theta_o^t(x_o^t,y_o^t)}{\theta_o^{t+1}(x_o^{t+1},y_o^{t+1})} \cdot [\frac{\theta_o^{t+1}(x_o^{t+1},y_o^{t+1})}{\theta_o^t(x_o^{t+1},y_o^{t+1})} \ \frac{\theta_o^{t+1}(x_o^t \ y_o^t)}{\theta_o^t(x_o^t,y_o^t)}]^{1/2}$$

The first term on the right hand side measures the magnitude of technical efficiency change between the periods t and (t+1). The second term measures the frontier or technology change.

Results of Data Analysis

The methods of data analysis performed are narrated in the following sessions.

Log Growth Rates of State Domestic Products

The log growth rate of NSDP of all the states indicates that Gujarat has done quite well as their NSDP share is increasing very fast. The NSDP Growth rate remained highest for the state of Gujarat during 2012-13 i.e.7.65 as indicated in Table 3. It is followed by the State of Orissa with 6.42.Among other states, West Bengol is significant with NSDP growth rate of 6.13, followed by Himachal Pradesh which 6.02. Assam's growth rate during the same period is 5.70.

The log growth rates of NSDP of the states with reference to different years are displayed in the following table.

Table 3 : Log Growth Rates of State Domestic Products in Select States

	Andhra	Assam	Gujarat	Haryana	Himachl	Karnataka	Chhattisga	Maha	Orissa	Punjab	Rajasthan	Tamil	Up	UTTARA	WEST BENGAL
2000-01	7.99	2.50	-6.83	7.65	6.18	0.66	-6.35	-3.12	-2.67	3.27	-3.30	5.40	2.02	11.75	3.44
2001-02	4.43	2.55	7.81	7.44	4.97	1.80	13.10	3.47	5.91	1.30	10.78	-1.96	1.80	4.64	6.97
2002-03	2.25	5.88	8.36	5.95	4.76	5.22	-1.71	6.67	-0.72	1.69	-12.80	0.50	3.18	8.95	3.45
2003-04	9.35	5.97	15.41	9.38	6.48	1.93	17.22	7.44	13.63	6.06	27.63	6.05	5.13	7.61	5.71
2004-05	7.02	3.38	5.80	8.27	9.06	9.66	5.22	8.35	12.27	4.85	-2.48	11.22	4.89	12.36	6.42
2005-06	9.29	2.97	13.55	8.65	8.24	9.79	1.62	13.53	4.34	4.79	6.50	13.48	5.67	13.26	6.11
2006-07	10.19	4.42	8.12	10.77	7.57	9.89	17.42	12.90	11.73	10.24	11.13	14.55	7.64	11.38	7.56
2007-08	10.89	4.19	11.18	7.54	6.03	11.82	7.77	11.01	8.23	8.31	4.46	6.08	6.21	16.11	7.49

	2008-09	2009-10	2010-11	2011-12	2012-13
	6.92	3.83	10.76	7.03	5.32
	5.79	8.81	6.98	4.91	5.70
	4.19	13.22	10.39	7.86	7.65
	7.42	11.77	6.56	8.19	5.44
	4.77	5.28	8.04	7.22	6.02
	6.87	0.02	9.79	2.96	4.52
	6.35	2.74	9.20	6.39	2.89
	1.56	9.22	10.79	4.46	5.70
	7.25	0.80	6.11	2.08	6.42
	5.40	6.19	6.26	5.25	3.96
	8.07	5.66	13.99	4.89	4.35
	5.15	9.96	12.79	7.12	2.80
	7.32	6.03	7.68	5.08	5.07
	10.12	15.80	9.99	9.50	4.85
	3.95	7.48	5.89	3.60	6.13

Average log growth

The log growth rates of NSDP are displayed in the following table. The average log growth between 2000-01 to 2012-13 for the states brings in more realistic picture in this regard. The state of Gujarat maintained the highest position with 8.21 percent followed by the state of Haryana with 8.08 as displayed in Table 4 . Maharashtra could attain only seventh position with 7.08 percent whereas Tamil Nadu's share which was on 5th position was 7.16 percent. The lowest average log growth is displayed by the state of Assam which amounts to 4.93 percent.

Table 4 : Average log growth rate between 2000-01 and 2012-13

Gujarat	8.21
Haryana	8.08
Bihar	7.53
Andhra Pradesh	7.33
Tamil Nadu	7.16
Kerala	7.11
Maharashtra	7.08
Himachal Pradesh	6.51
Chhattisgarh	6.30
Rajasthan	6.07
Orissa	5.80
Karnataka	5.76
West Bengal	5.71
Madhya Pradesh	5.41
Jharkhand	5.32
Uttar Pradesh	5.21
Punjab	5.20
Assam	4.93

Empirical Results of DEA

In short, industrial development has remained uneven in the country ever since the attainment of independence. The states that succeeded in industrialisation have ensured better livelihood with the provision of physical and social infrastructures to its people. There has been large scale migration of skilled as well as unskilled labour into these states in search of employment and better employment opportunities. The analysis attempts to gauge the relative

performance of the chosen states in comparison of other states. Since it is very difficult to single out the best state from this analysis, an attempt is made to evaluate the states which have outperformed the other states with the given constraint and resources by using the technique of DEA by developing MPI. Table 5 shows the state-wise result which is a Geometric Mean of Total Factor Productivity Change, Technological Change and Efficiency Change ranging from the years of 2000-01 to 2012-13. The states of Gujarat, Maharashtra, Tamil Nadu, Uttarakhand, Assam, Chhatisgarh and Jharkhand have performed better than other states as the value of MPI is less than one. Productivity has declined with regard to all other states since the value of MPI is greater than 1. The result is based on the value of input oriented MPI which indicates that inefficient states need to reduce the quantum of input keeping the output level constant so as to ensure optimum use of inputs. The result explains the fact that while comparing the actual number of the variable of Gross Value Added, the states of Gujarat, Maharashtra, Tamil Nadu have remained among the top five states. Moreover, these states employ maximum number of industrial workers in the country. These states are performing better with the given inputs than rest of the states whose MPI value is greater than 1. Though the states of Jharkhand, Chhattisgarh, Assam, Himachal Pradesh, Uttaranchal and Delhi have also performed well during the period of analysis, the extent of industrialisation is far less in comparison with other three states. The next two columns are indicative of the reasons for the change in the total factor productivity. The productivity change occurs due to two factors. Firstly, due to the changes in the technological aspect which ensures higher output and secondly because of optimum utilization of resources of the firms. Optimum utilization of the existing resources affirms that same output can be produced with lesser resources. Column two explains the efficiency change in the utilization of the resources. The value is less than 1 only for the state of Assam. The result indicates that the rest of the states have not performed well on the efficiency frontier since the resources were not optimally utilised. This case is true even for industrialised Gujarat, Maharashtra and Tamil Nadu which were showing positive results as per the MPI.

A closer look at the third column of the Table 5 explains that driving force of the Indian industries is the technological shift in the production process. Eleven states have progressed adopting technological shift as indicated by their respective results where the value is lesser than 1. The states of Punjab , Haryana, Rajasthan, Madhya Pradesh , Andhra Pradesh, Karnataka and Kerala have not performed well in both the categories. These states are lagging behind other states because they are not making use of their resource in the optimum way and their technological upgradation is not keeping pace with other states. The performing states are using proportionally lesser input to produce the same level of output in comparison to non performing states. Thus, the result tentatively suggests that Indian industrial sector adopts capital intensive methods for the attainment of greater output. Rigid labour laws have exacerbated the industrial climate, since adoption of suitable methods necessitate reforming of the relevant policies.

Table 5: Total factor Productivity Change from 2000-01 to 2012-13

State	Malmquist Index	Efficiency Change	Frontier Shift

Himachal Pradesh	0.939	1.000	0.939
Punjab	1.020	1.014	1.006
Uttaranchal	0.964	1.000	0.964
Haryana	1.019	1.008	1.010
Rajasthan	1.062	1.042	1.019
UP	1.041	1.050	0.991
Assam	0.919	0.937	0.981
West Bengal	1.026	1.051	0.977
Jharkhand	0.966	1.000	0.966
Odisha	1.010	1.017	0.994
Chhatisgarh	0.968	1.026	0.944
Madhya Pradesh	1.047	1.041	1.006
Gujarat	0.996	1.019	0.977
Maharashtra	0.980	1.013	0.968
Andhra Pradesh	1.048	1.045	1.003
Karnataka	1.021	1.016	1.005
Kerala	1.016	1.004	1.012
Tamil Nadu	0.991	1.005	0.987

Source : Derived by DEA

In the above mentioned circumstances, industries opt for technological upgradation instead of employing extra labour. Modern technology-enabled services have accelerated the progress of Indian economy during the last two decades. It must be stressed that industries have upgraded their machines and have been using more capital intensive technology in the recent past but the technology is not innovative enough that it produces desirable economic output under the given conditions. Certainly there is an urgency for the states and industries to find out innovative production methods to provide more productive employment. The services have grown owing to increase in domestic demand. However, when compared to the size of the labour force, the number of such jobs is quite small.The growth of modern service sector may be attributed to the high-quality jobs.in light of this The Modiji government is right to prioritize creation of high-quality jobs as a key to economic inclusion. India needs to achieve two objectives: creating new jobs and shifting more workers into high-productivity sectors. Achieving both these objectives can provide tremendous economic prosperity to the Indian economy for several decades.

It may be noted that the ten states which elected the most members of parliament for His Excellency Prime Minister Narendra Modi's party, the Bharatiya Janata Party , are characterised with higher fertility rates.Many look forward to Modiji as miraculous problem solver with a magic band. In order to fulfil the aspirations of people, it points towards the necessity of creating new jobs which are larger in number for not only these states but for rest of India as well.

The argument that formal-sector manufacturing could provide a new, labour-intensive

acceleration to the economy is based on two facts. Primarily, India's massive low-skilled labour force and the potential labour force which is growing in quantum as well as in terms of levels of education . Secondly the formal manufacturing has not yet had a chance to meet its potential since appropriate policy measures are not formulated for this purpose. Removing the constraints by the application of suitable policy measures could transform the Indian manufacturing sector in toto.

Though the manufacturing sector has not held as much promise as a driver of economic development as it used to ,because of factors such as changing global consumption patterns or slower global growth. India has a large domestic market of its own which would help to expand its manufacturing sector. Close access to the domestic market makes India as an attractive destination to locate factories for both domestic as well as foreign investors.

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