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Economic Reforms and Structural Change in India's Organised Manufacturing Sector

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Abstract

The paper tries to examine the structural changes in the organised manufacturing sector of India in post economic reform period. It assesses the structural changes in terms of gross value added, employment, and output with respect to industry divisions. The paper also makes an attempt to find out the shift of sector (industry divisions) shares during 2000-01 and 2010-11 over 1990-91. UNIDO recommendations of statistical indicators such as coefficient of absolute structural change, coefficient of relative structural change, integral coefficient of structural change, rank correlation etc. are used for understanding the degree and intensity of structural change in India's organised manufacturing sector during the period. Structural change with respect to resources used and technological change in organized manufacturing section in India is also studied in this paper. Annual Survey of Industries (ASI) data during 1990-91, 2000-01 and 2010-11 are used for the analysis. From the analysis it is evident that structural changes are taking place during the post reform period in India's manufacturing sector with respect to industry division. It is also observed that there is a shifting of industrial activities from low technology based industry to medium-high and high technology based industrial activities in organized manufacturing sector in India. regional disparity is also observed with respect to gross value addition in manufacturing sector in India.

Introduction

India's pre-reform period was almost a kind of closed economy and license-raj was prevailed in a strong way. It was the time led by the bureaucrats and absurd restrictions up to many agencies had to be satisfied before a firm could be granted a license to produce and the state would decide what was produced, how much, at what price and what sources of capital were used etc. The central focus of the development was confined to the internal controlled economy. There are limited areas in which private investors were allowed to operate. The industrial structure under this regime was highly inefficient and the industrial growth was not significant. Not only the industrial sector but also the other sectors like agriculture and services sector are also facing similar challenges. Overall, India's economy was in a sever crisis in 1990. In 1990 it was decided to brought out economic reforms in a broader way and particular to certain sectors such as industry, services, finance etc.

India's economic reform policy has been experienced over two decades since 1990's. Now we are in a position to examine the impact of economic reforms in the economy and

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in particular to industrial sector. There is significant economic growth observed during the reform period. It is also observed that the India's post-reform economy is growing almost 7 percent. There is also a significant sectoral difference in growth and development is also observed during the period. In this scenario industrial policy has been seen the greatest change, with most central government industrial controls being dismantled. It will be interesting to study the performance of industrial sector with reference to the structural change in the Indian economy during the reform period.

Structural change refers to the dynamism of the cross-sector relationships of the principal indicators and is measured as the shift of sector shares over a considerable period of time. Structural change is closely connected with industrial growth. On the one hand, structural change may accelerate growth while, on the other hand, any growth may result in significant structural change. Therefore, both share and growth indicators are presented, as well as an indicator of regional structure and the position of manufacturing in the total economy (UNIDO, 2010). This paper makes an attempt to study the structural change in India's organized manufacturing sector during 1990-91 to 2010-11 with the following objectives.

Objectives

1. To examine the structural change in India's organized manufacturing sector with respect to gross value added, output and employment.
2. To examine the sectoral change with respect to input and technology in organized manufacturing sector in India.
3. To find out the regional disparity index in organized manufacturing sector in India.

Data and Methodology

Annual Survey of Industries (ASI) data are available for the organized manufacturing sector and those industries are registered under the factories act 1948 is covered in the survey. The ASI data are also available for a long period of time. For studying the structural change in organized manufacturing sector data relating to industrial divisions during 1990-91, 2000-01 and 2010-11 are used. Over these periods NIC classifications are revised periodically. For studying the structural change over these periods industrial activities are suitably concorded to get a comparative picture. The NIC concordance are shown in the Annexure-I.

Methodology

UNIDO recommendations of statistical indicators such as coefficient of absolute structural change, coefficient of relative structural change, integral coefficient of structural change, rank correlation etc. are used for understanding the degree and intensity of structural change in India's organized manufacturing sector during the period. For understanding the sectoral changes in organized manufacturing sector in India the industrial divisions are suitably classified into agro-based, resource based and ICT goods production sector as per the UNIDO recommendations. Similarly, the sectoral change can

be measured on the basis of technology used. As per the UNIDO recommendations the industrial sectors are divided into low-technology, medium-technology and medium-high and high-technology.

Measurements of Structural Change

Change in sector share

At the most elementary level, structural change is the shift in the share of individual sectors over a certain span of time and can be measured by the difference in the share of a sector in the total value of the variable being analysed, as shown below:

$$d_s = S_{i1} - S_{i0}$$

where: d_s = the difference of the share between two periods, 0 and 1

Comparison of the share of sectors or group of sectors over time indicates the direction and intensity of the structural change in manufacturing.

The change in sector share described here refers to an individual ISIC branch or a group of ISIC branches. For an overall assessment of the structural change in manufacturing, we can measure the combined effect using various indicators described below:
    (i)   Coefficient of absolute structural change
    (ii)   Coefficient of relative structural change
    (iii)   Integral coefficient of structural change
    (iv)   Rank correlation

Coefficient of absolute structural change

This coefficient measures the structural change in industry by comparing the total difference of the change in shares for all sectors with respect to a variable of interest, such as employment, capital or output over two periods. It is an average value of absolute change across manufacturing branches. The coefficient of absolute structural change for a variable x in a given time is calculated as:

$$d(x)_{\text{abs}} = \frac{\sum_{i-1}^{n} \left| S^x_{i1} - S_{i0}^{\ x} \right|}{n}$$

S^x_i = share of the variable x for the i-th sector ;
0, 1 stands for period 0 and 1, respectively
n = number of sectors in observation

The coefficient equals zero if there is no change in any of the branches over the observed period. This coefficient may take a value upto 2/n at the maximum. Obviously, a lower value closer to zero indicates the lack of structural change and conversely, a higher value indicates more significant change in the structure of industrial sectors.

Coefficient of relative structural change

Structural change can also be measured in relative terms. For this purpose, the absolute difference is replaced by the ratio of selected variables for the later year to that of the earlier year. The above relation can be restructured to measure the relative change as given by:

$$d_{rel} = \sum_i \left(\left| \frac{S_{i1}}{S_{i0}} - 1 \right| * S_{i0} \right)$$

Instead of taking the absolute value to avoid the zero-sum of the structural change, the coefficient can be based on the squared differences.

$$d^2{}_{rel} = \sum \left(\frac{S_{i1} - S_{i0}}{S_{i0}} \right)^2$$

This coefficient shows the average deviation of the sector shares in the later year from that of the earlier year. Again, the value of squared difference will equal zero when there is no change across all the sectors. Any significant change in structure would result in a higher value of the coefficient (from zero).

Integral coefficient of structural change

This index measures the combined effect of the sector shifts on the overall structural change in industry. The formula of the coefficient is given below:

$$d_{int} = \sqrt{\frac{1}{n} \sum \frac{(S_{i1} - S_{i0})^2}{(S_{i1} + S_{i0})^2}}$$

The advantage of this index over those mentioned above is its interpretability. The value of the coefficient ranges from 0 to 1. The magnitude of the coefficient represents the scale of the structural change. The value of $d_{int} \leq 0.1$ would mean an identical structure in both time periods, $d_{int} \geq 0.9$ would indicate a complete reversal of sector distribution. For more realistic scenarios, a significant structural change would result in a value of $d_{int} \geq 0.5$

Rank Correlation

The rank correlation is a widely used method in the assessment of structural change, which shows the strength of the relation between the sector shares in two periods. The rank correlation coefficient of Spearman is given by:

$$\rho_s = 1 - \frac{6\sum d^2}{n(n^2 - 1)}$$

where: d = the difference of ranks of manufacturing sectors in observed time periods by a chosen variable
n = number of sectors in observation

The procedure for the computation of the rank correlation coefficient is as follows. First manufacturing branches are ranked from 1 to n by a chosen variable. Then, they are ranked again by the value of the same variable for the current year. Several sectors may have different ranks in the current year from those in the base year. The value of d^2 is computed as the absolute difference in the ranks in two periods, that is, $d^2 = (rank\_base - rank\_current)^2$. Further calculation is guided by the formula.

The interpretation of the coefficient is such that when sector shares do not differ much between the two periods, they show a high degree of correlation and the value of ρ is close to 1. The value of ρ tends to zero for less correlated data, consequently sector shares are more diverse and there is significant structural change.

Results and Discussion

Change in Sectoral Share

Gross Value Added (GVA)

In this paper fifteen broad groups of industrial activities are considered for analysis during 1990-91 to 2010-11. From table 1 it is observed that chemicals and chemical products, basic metals and textiles industrial activities have a significant share of GVA in 1990-91. In 2000-01, chemicals and chemical products, basic metals and food products & beverages have a significant share of GVA. But the share of chemicals and chemical products (21.06 percent) increased significantly in the total GVA in 2000-01. However, in 2010-11 the share of coke, refined petroleum products & nuclear fuel products (14.72 percent), chemical & chemical products (14.03 percent) and basic metals (12.32 percent) share of GVA is significantly high. From the figure 1 it is observed that in some of the industrial activities the share of GVA is increasing during the period whereas, some other the share is declining. In close observation, it is observed that industrial activities such as coke, refined petroleum products & nuclear fuel products, chemicals & chemical products, basic metals, transport equipments, food products & beverages, electrical

machinery & apparatus, machinery & equipment, and fabricated metal products the share of GVA is increasing during the period. However, the industrial activities namely textiles, paper & paper products including publishing & printing, tobacco products, leather products and wood & wood products the share is declining over the period. From the analysis it is evident that the sectoral share of GVA has changed significantly.

Fig. 1: Share of GVA in Organised Manufacturing Sector during 1990-91 to 2010-11
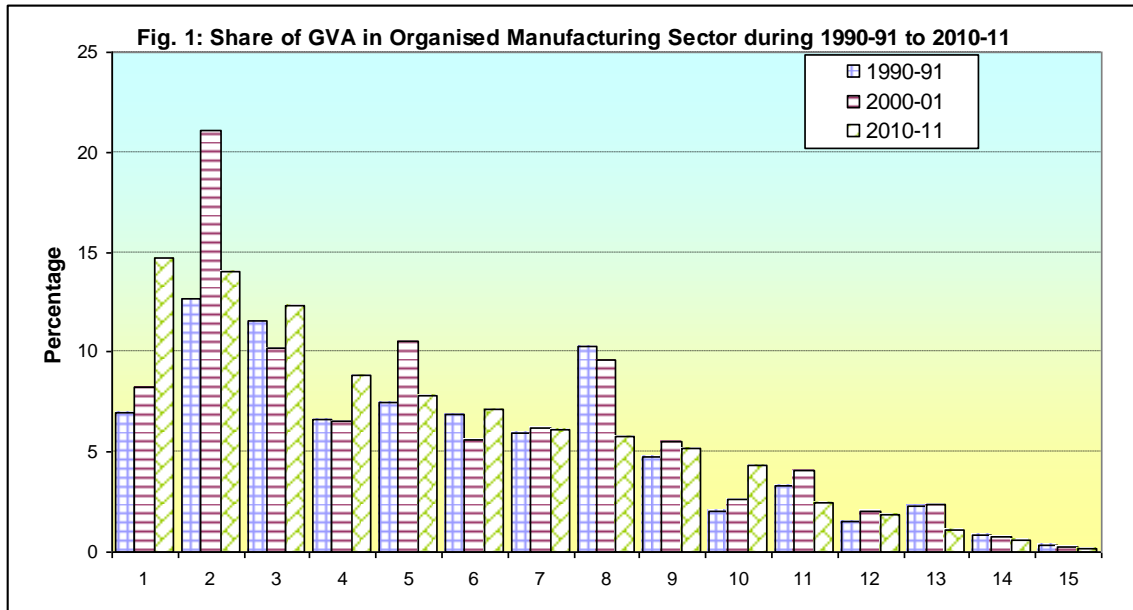
(In x-axis the serial no. are as per table 1)

Table-1: Sectoral Share of GVA in Organised Manufacturing Sector during 1990-91 to 2010-11

Srl. No.	Industrial Activities	1990-91	2000-01	2010-11	2000-01 over 1990-91	2010-11 over 1990-91
1	Coke, refined petroleum products & nuclear fuel and rubber & plastic product	7.00	8.21	14.72	1.22	7.73
2	Chemicals and chemical products	12.70	21.06	14.03	8.37	1.33
3	Basic metals	11.57	10.24	12.32	-1.33	0.75
4	Transport equipments	6.65	6.56	8.85	-0.08	2.20
5	Food products and beverages	7.45	10.53	7.85	3.09	0.41
6	Electrical machinery & apparatus n.e.c.	6.90	5.62	7.17	-1.28	0.27
7	Machinery and equipment n.e.c.	5.94	6.20	6.09	0.25	0.14
8	Textiles	10.30	9.60	5.82	-0.69	-4.47
9	Other non-metallic mineral products	4.72	5.55	5.14	0.83	0.42
10	Fabricated metal products, except machinery & equipment	2.01	2.67	4.30	0.66	2.30
11	Paper and paper products and publishing & printing	3.31	4.12	2.48	0.81	-0.83

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Table-1: Sectoral Share of GVA in Organised Manufacturing Sector during 1990-91 to 2010-11

Srl. No.	Industrial Activities	1990-91	2000-01	2010-11	2000-01 over 1990-91	2010-11 over 1990-91
12	Wearing apparel; dressing and dyeing of fur	1.56	2.04	1.87	0.48	0.31
13	Tobacco products	2.26	2.38	1.13	0.13	-1.13
14	Luggage, handbags, saddlery, harness & footwear; tanning and dressing of leather products	0.81	0.78	0.64	-0.04	-0.18
15	Wood and products of wood & cork except furniture; articles of straw & plating materials	0.36	0.21	0.18	-0.14	-0.17

Output

Table 2 presents the share of output in organized manufacturing sector during 1990-91 to 2010-11. From the table it is observed that industrial activities, namely, coke, refined petroleum products & nuclear fuel, basic metals, food products & beverages, chemicals & chemical products share of output in the total output in the country is more than 50 percent. The share of coke, refined petroleum products & nuclear fuel (17.84 percent) is increased significantly in 2010-11 over 1990-91. In food products & beverages, and chemicals & chemical products sector share is increased in 2000-01 over 1990-91 but in 2010-11 the share is declining. However, there are sectors such as, transport equipments, electrical machinery & apparatus, fabricated metal products, the share of output is upward trend during the period. But the industrial activities namely, textiles, paper & paper products, leather products, tobacco products and wood products the share of output is in downward trend.
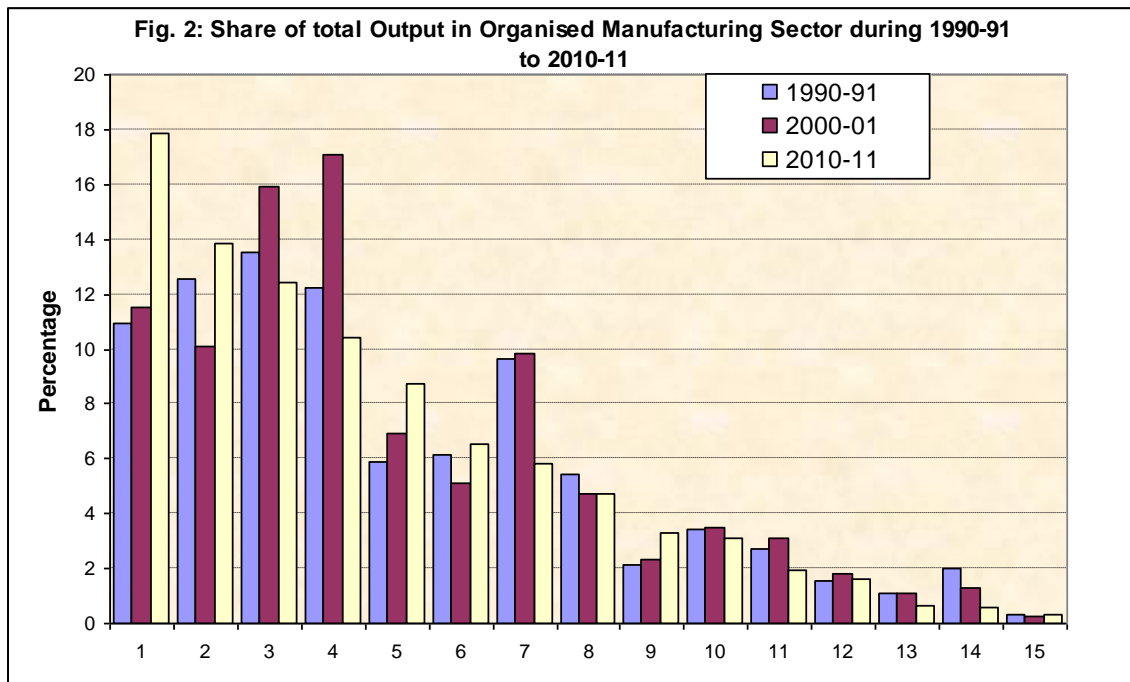
Table-2: Share of Output in Organised Manufacturing Sector during 1990-91 to 2010-11

Srl. No.	Industrial Activities	1990-91	2000-01	2010-11	2000-01 Over 1990-91	2010-11 over 1990-91
1	Coke, refined petroleum products & nuclear fuel and rubber & plastic product	10.91	11.53	17.84	0.62	6.93
2	Basic metals	12.53	10.08	13.86	-2.45	1.33
3	Food products and beverages	13.56	15.90	12.45	2.34	-1.10
4	Chemicals and chemical products	12.25	17.09	10.44	4.84	-1.82
5	Transport equipments	5.87	6.91	8.76	1.03	2.89
6	Electrical machinery & apparatus n.e.c.	6.15	5.11	6.57	-1.04	0.41
7	Textiles	9.67	9.81	5.82	0.14	-3.86
8	Machinery and equipment n.e.c.	5.43	4.70	4.75	-0.72	-0.68
9	Fabricated metal products, except machinery & equipment	2.16	2.36	3.31	0.20	1.15

**Table-2: Share of Output in Organised Manufacturing Sector during 1990-91 to 2010-11**

Srl. No.	Industrial Activities	1990-91	2000-01	2010-11	2000-01 Over 1990-91	2010-11 over 1990-91
10	Other non-metallic mineral products	3.41	3.52	3.13	0.12	-0.28
11	Paper and paper products and publishing & printing	2.73	3.09	1.92	0.36	-0.81
12	Wearing apparel; dressing and dyeing of fur	1.58	1.79	1.64	0.21	0.05
13	Luggage, handbags, saddlery, harness & footwear; tanning and dressing of leather products	1.07	1.07	0.67	0.00	-0.40
14	Tobacco products	1.98	1.29	0.57	-0.70	-1.41
15	Wood and products of wood & cork except furniture; articles of straw & plating materials	0.33	0.24	0.34	-0.09	0.01

Figure 2 clearly shows the share of total output in organized manufacturing sector in India during 1990-91 to 2010-11. From the figure it is clearly shown the share of coke, refined petroleum products & nuclear fuel and rubber & plastic product, basic metals and transport equipments there is significant change in total output during the period.

Fig. 2: Share of total Output in Organised Manufacturing Sector during 1990-91 to 2010-11

(In x-axis the serial no. are as per table 2)

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No. of Employees

Fig. 3: Share of Total Employment in Organised Manufacturing Sector during 1990-91 to 2010-11
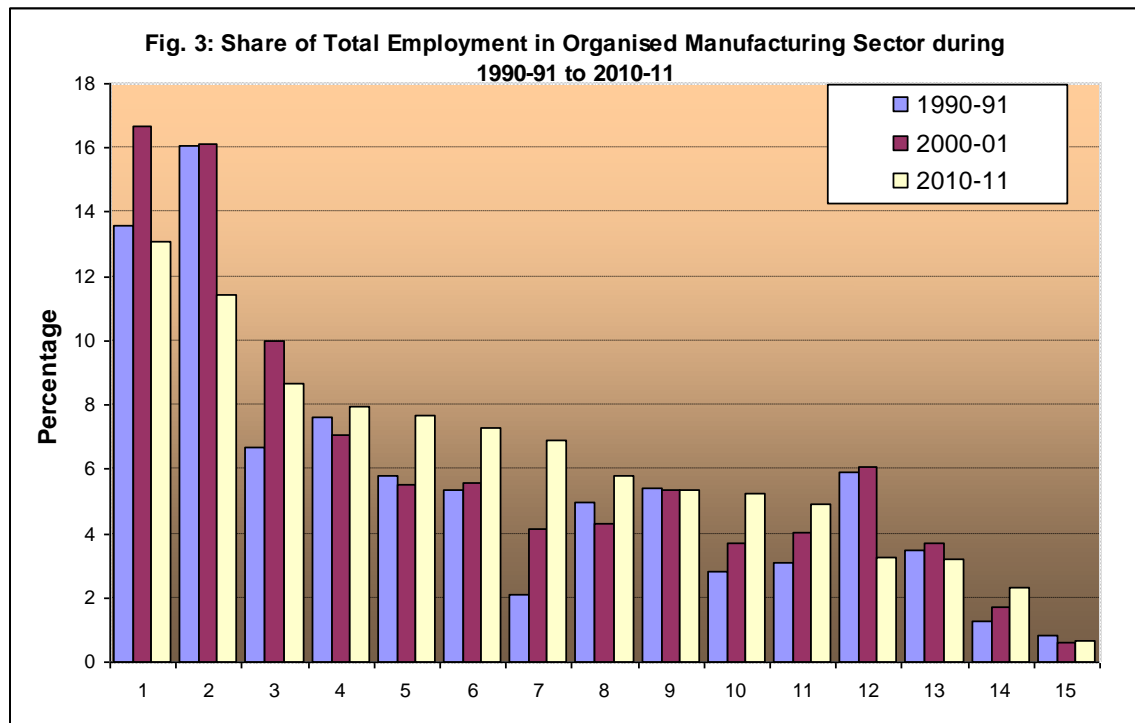
(In x-axis the serial no. are as per table 3)

Table 3 presents the share of number of employees in organized manufacturing sector with respect to industrial activities. From the table it is observed that the share of number of employees in industrial activities namely, in food products & beverages, textiles, and chemicals & chemical products are significantly high. In close observations it is observed that the share of number of employees is increased significantly during 2000-01 over 1990-91 in industrial activities namely, food products & beverages, textiles and chemicals & chemical products. But the share of number of employees in these industries declined significantly in 2010-11 over 2000-01. However, industrial activities namely, transport equipments, non-metallic mineral products, wearing apparel, electrical machinery, and fabricated metal products the share of number of employees is increasing during the period. The industrial activities namely textiles, machinery equipment, tobacco products, paper & paper products and wood & wood products the share of number of employees is declining. From the above analysis, there is a change in share of number of employees is observed with respect to industrial activities. In labour intensive industrial activities such as textiles, food products & beverages, tobacco products and wood products the share of number of employees is declining during the period (fig. 3). It might happen that in recent years the labour intensive industrial units are changing their style of work by implementing latest available technology in their production process.

Table-3: Share of No. of Employees in Organised Manufacturing Sector during 1990-91 to 2010-11

Srl. No.	Industrial Activities	1990-91	2000-01	2010-11	2000-01 Over 1990-91	2010-11 over 1990-91
1	Food products and beverages	13.56	16.68	13.09	3.13	-0.47
2	Textiles	16.07	16.13	11.43	0.06	-4.64
3	Chemicals and chemical products	6.67	10.01	8.67	3.33	1.99
4	Basic metals	7.60	7.06	7.97	-0.54	0.37
5	Transport equipments	5.78	5.53	7.69	-0.25	1.91
6	Other non-metallic mineral products	5.34	5.56	7.29	0.22	1.95
7	Wearing apparel; dressing and dyeing of fur	2.12	4.14	6.88	2.02	4.76
8	Electrical machinery & apparatus n.e.c.	4.96	4.30	5.80	-0.66	0.84
9	Machinery and equipment n.e.c.	5.43	5.34	5.34	-0.09	-0.09
10	Fabricated metal products, except machinery & equipment	2.82	3.69	5.25	0.87	2.44
11	Coke, refined petroleum products & nuclear fuel and rubber & plastic product	3.07	4.01	4.93	0.94	1.86
12	Tobacco products	5.92	6.05	3.25	0.13	-2.67
13	Paper and paper products and publishing & printing	3.50	3.73	3.21	0.22	-0.29
14	Luggage, handbags, saddlery, harness & footwear; tanning and dressing of leather products	1.27	1.73	2.31	0.46	1.03
15	Wood and products of wood & cork except furniture; articles of straw & plating materials	0.84	0.62	0.64	-0.21	-0.20

Sectoral Changes

In order to obtain meaningful results from the structural change analysis, UNIDO has developed a number of classification based on grouping several ISIC branches together, such as:

1) Resource-based industries
2) Agro-industries
3) Production of ICT goods
4) Manufacturing sectors based on technology

In the early stage of industrialization, the structure of manufacturing is such that the processing of raw materials produced by the primary sectors plays a dominant role. At the advanced stage, production becomes technology-intensive and the share of agro-based and resource-based sectors in total production gradually declines. Even there is a shift in low technology based industry to medium-low-technology and medium-high and high technology sectors. For understanding the structural change based on industrial sectors and technology, all India GVA is used during 1990-91 to 2010-11.

Fig. 4: Percentage Share of GVA based on Industrial Sectors
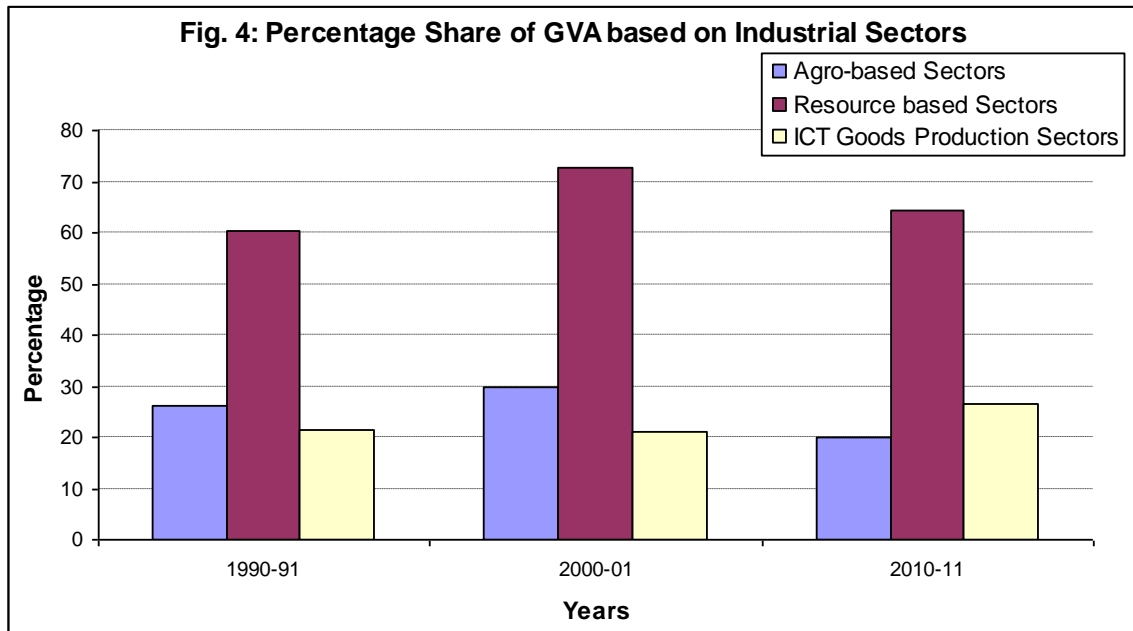
Figure 4 presents the percentage share of GVA based on industrial sectors. Here industrial sectors are agro-based sectors, resource based sectors, and ICT goods production sectors. These classifications are based on the UNIDO recommendations and given in Annexure II. From the figure it is evident that the GVA share of agro-based sectors declined during the period. It is observed that the share of GVA in agro-based sectors was 25 percent and 30 percent during 1990-91 and 2000-01 respectively, and it declined to 20 percent in 2010-11. Similarly, it shows that the GVA share of resource-based sectors, which process the primary products from agriculture and mining & quarrying, gradually declined from 70 percent in 2000-01 to around 60 percent in 2010-11. It is also evident that the GVA share in ICT goods production sectors is gradually increasing from around 20 percent in 1990-91 to around 25 percent in 2010-11.

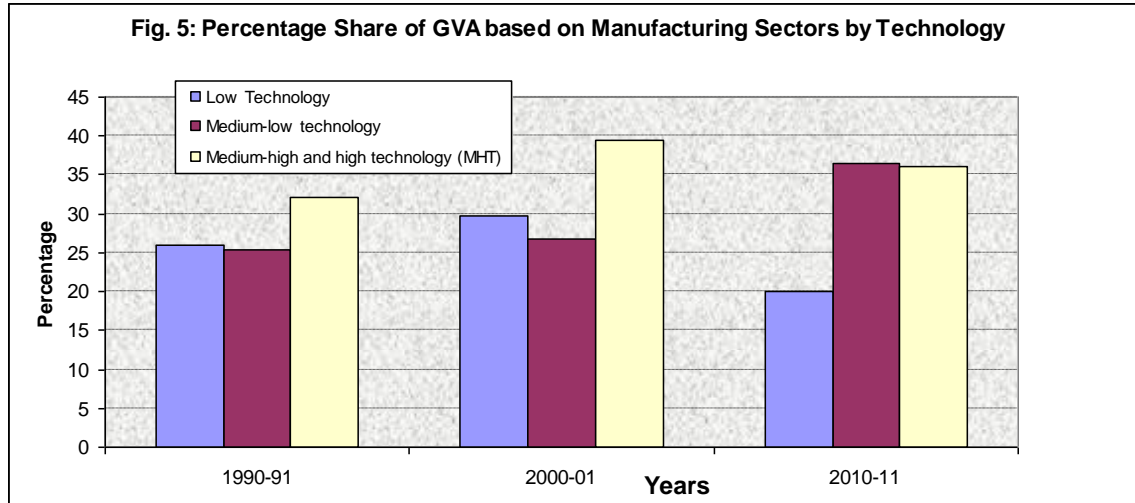**Fig. 5: Percentage Share of GVA based on Manufacturing Sectors by Technology**

Figure 5 presents the percentage share of GVA based on manufacturing sectors by technology. From the figure it is clearly evident that share of GVA for low technology based industry is declining during the period. But share of GVA for industries based on medium-low and medium-high and high technology is increasing during the period. It is apparent that in 1990-91 the share of GVA in medium-low technology was around 25 percent but in 2010-11 the share of GVA is increased to 35 percent. Similarly, the share of GVA in medium-high and high technology was around 30 percent and it increased to 40 percent in 2000-01 and 35 percent in 2010-11. This shows that there is technological shifting from low technology to medium and high technology taking place in organized manufacturing sector during the period.

In the above discussion the change in sector share based on individual industrial activities or a group of activities taken together. For an overall assessment of the structural change in manufacturing sector, we can measure the combined effect using various indicators as described below. GVA, total output and number of employees are used for the analysis. Table-4 presents the coefficients of structural change in organized manufacturing.

Coefficients of Structural Change

Coefficient of absolute structural change

The coefficient of absolute structural change is an average value of absolute changes across manufacturing sectors. The coefficient of absolute structural change for GVA is 1.29 and 1.51 in 2000-01 and 2010-11 over 1990-91. This indicates that more significant change in the structure of organized manufacturing sectors. This is also true for total output and number of employees.

Table-4: Coefficients of Structural Change in Organised Manufacturing Sector

Indicators	GVA		Output		Employees	
	2000-01 Over 1990-91	2010-11 over 1990-91	2000-01 Over 1990-91	2010-11 over 1990-91	2000-01 Over 1990-91	2010-11 over 1990-91
Coefficient of absolute structural change	1.29	1.51	0.99	1.54	0.88	1.70
Coefficient of relative structural change	1.15	3.49	0.55	1.89	1.63	7.51
Integral coefficient of structural change	0.12	0.20	0.10	0.20	0.13	0.22
Rank correlation	0.98	0.89	0.97	0.95	0.96	0.80

Coefficient of relative structural change

Now the structural change can also be measured in relative terms. From the table-4 it is observed that the coefficient of relative structural change is significantly higher than zero for GVA, Output and number of employees. This strongly indicates the structural change in organized manufacturing sector in India during the period.

Integral Coefficient of Structural Change

The advantage of this index over those mentioned above is its interpretability. The value of coefficient ranges from 0 to 1. From the table-4 it is observed that the integral coefficient of structural change was around 0.1 in 2000-01 over 1990-91. But the integral coefficient of structural change is around 0.2 in 2010-11 over 1990-91. This indicates the structural change in organized manufacturing sector in India during the period.

Regional Disparity Index

This index measures the extent of disparity in industrial development among the regions of a country. The index can be constructed in terms of any major indicators referring to resources utilized or results achieved. It is based on the deviation of actual value from the equal distribution of variables selected. The index is calculated as:

$$I_z = \frac{n}{2(n-1)} \sum_{i=1}^{n} |Z_i|$$

and $Z_i = S_i - \frac{1}{n}$

where:
I_z = index of regional disparity for z measure
n = number of regions in observation
S_i = share of the i-th region in total value of selected variable

For understanding the regional disparity in manufacturing sector in India all the States/UTs are considered for the analysis. The share of GVA is considered during 1990-91, 2000-01 and 2010-11 with respect to each State/UTs. Figure 6 and 7 presents the distribution of GVA in manufacturing sector with respect to States/UTs during 1990-91 and 2010-11. From the figure it is clearly shown that the share of GVA in manufacturing sector is concentrated in some of the states, namely, Maharashtra, Tamil Nadu, Gujarat, Andhra Pradesh, Uttar Pradesh and Karnataka. These six states contribute in around 65 percent of the GVA in manufacturing sector in the country. But over the period states, namely, Gujarat and Karnataka there is significant increase in the share of GVA in manufacturing sector.

Fig. 6: Distribution of GVA in Manufacturing Sector by States/UTs in 1990-91

Fig. 7: Distribution of GVA in Manufacturing Sector by States/UTs in 2010-11
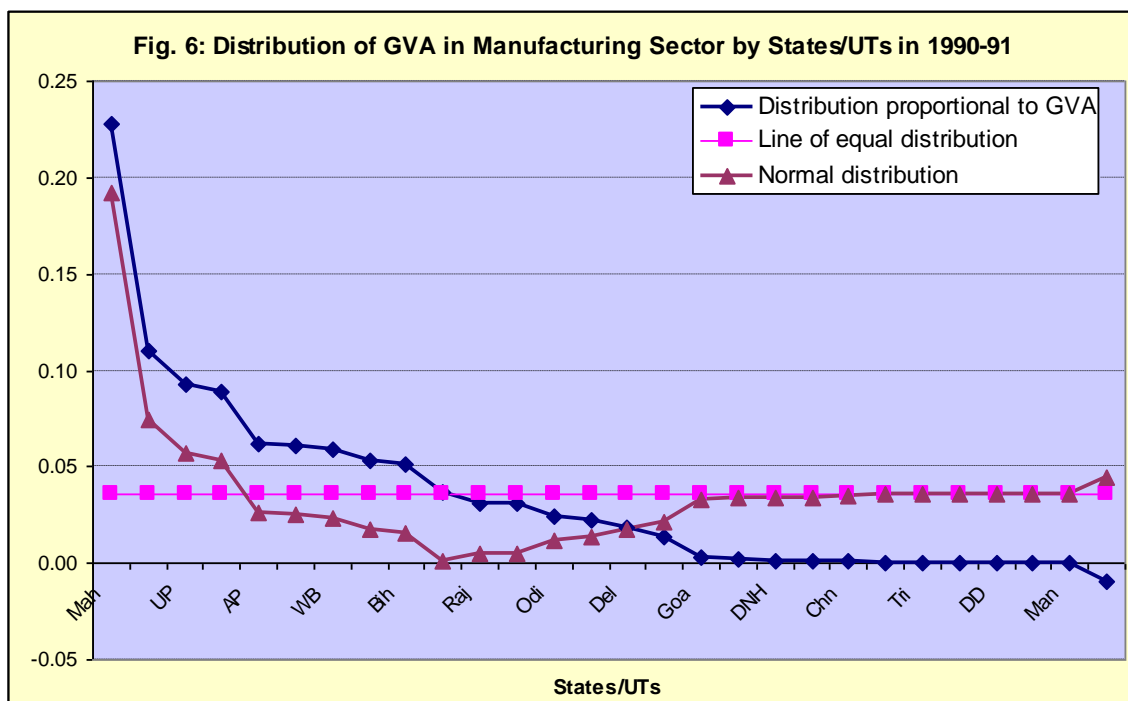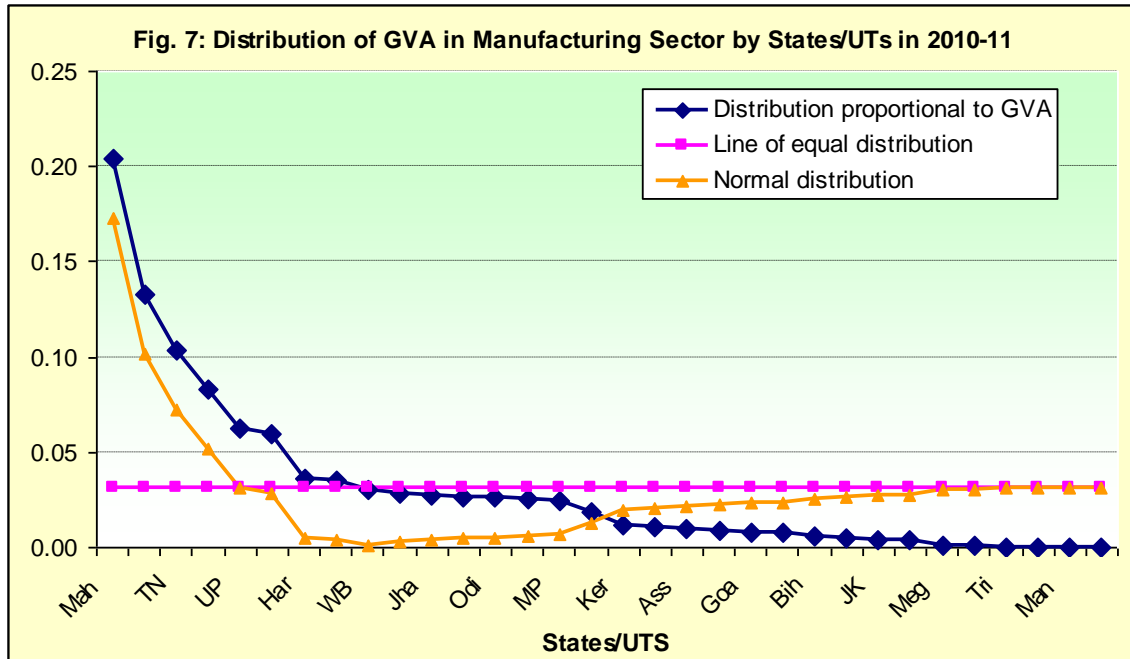
The index has the advantage of simplicity for interpretation. When the distribution is fully equal over all regions, the value of z for each region is zero. Subsequently the index is 0, which means there is no disparity. The index is equal to 1 when one region has all the value and all other regions have 0, which would mean a complete disparity. Table 5 presents the regional disparity index in manufacturing sector in India by considering each States/UTs and their share in GVA. From the table it is evident that the regional disparity exists with respect to States/UTs in India. The disparity index value 0.51 implies that the concentration in some of the regions/states. From the above figure 7 it is clearly shown that manufacturing sector is concentrated in some of the States/UTs in India.

Table-5: Regional Disparity Index in Manufacturing Sector in India

Years	Regional Disparity Index
1990-91	0.51
2000-01	0.51
2010-11	0.49

Conclusions

From the above analysis it is evident that in organized manufacturing sector structural changes are taken place in broad way. It is found that the major industrial activities such as textiles, tobacco products, paper and paper product industries etc. the share of GVA, output and number of persons employed are declining over the period. Moreover, there is an indication of growth of ICT goods industrial activities and medium-high and high technology industry. Alternatively, agro-based and resources based industries are

declining during the period. On the issue of regional disparity it is observed that manufacturing sectors are concentrated in some of the States/UTs. States, namely, Maharashtra, Tamil Nadu, Gujarat, Andhra Pradesh, Uttar Pradesh and Karnataka significantly high proportions of GVA is observed. It is also evident that there is a steep competition among these states with respect to manufacturing sector. On the other hand there are States/UTs, namely, Assam, Daman & Diu, Goa, Delhi, Bihar, Puducherry, Jammu & Kashmir, Sikkim, Meghalays, Chandigarh, Tripura, Nagaland, Manipur, Andaman & Nicobar Island are significantly backward in manufacturing sector and there is no change during 1990-91 to 2010-11.

References:

UNIDO, 2010. Industrial Statistics Guidelines and Methodology, Vienna, United Nations.

Annexure-I

				Concordance of NIC
Sr. No.	**NIC-1987**	**NIC-1998**	**NIC-2008**	**Description**
1	20+21	15	10+11	Food products and beverages
2	22	16	12	Tobacco products
3	23+24+25	17	13	Textiles
4	26	18	14	Wearing apparel; dressing and dyeing of fur
5	29	19	15	Luggage, handbags, saddlery, harness & footwear; tanning and dressing of leather products
6	27	20	16	Wood and products of wood & cork except furniture; articles of straw & plating materials
7	28	21+22	17+18	Paper and paper products and publishing & printing
8	30	24	20+21	Chemicals and chemical products
9	31	23+25	19+22	Coke, refined petroleum products & nuclear fuel and rubber & plastic product
10	32	26	23	Other non-metallic mineral products
11	33	27	24	Basic metals
12	34	28	25	Fabricated metal products, except machinery & equipment
13	35	29	28	Machinery and equipment n.e.c.
14	36	31+32	26+27	Electrical machinery & apparatus n.e.c.
15	37	34+35	29+30	Transport equipments

Industry classifications for data analysis derived from ISIC rev 3

1. Agro-industrial sectors
Division 15 Manufacture of food products and beverages
Division 16 Manufacture of tobacco products
Division 17 Manufacture of textiles
Division 18 Manufacture of wearing apparel; dressing and dyeing of fur
Division 19 Tanning and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear
Division 20 Manufacture of wood and of wood products
Division 21 Manufacture of paper and paper products
Group 251 Manufacture of rubber products

2. Resource-based sectors
Division 15 Manufacture of food products and beverages
Division 16 Manufacture of tobacco products
Division 17 Manufacture of textiles
Division 19 Tanning and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear
Division 20 Manufacture of wood and of wood products
Division 21 Manufacture of paper and paper products
Division 23 Manufacture of coke, refined petroleum products
Group 251 Manufacture of rubber products
Division 26 Manufacture of other non-metallic mineral products
Division 27 Manufacture of basic metals

3. ICT goods production sectors
Division 30 Manufacture of office, accounting and computing machinery
Group 313 Manufacture of insulated wire and cable
Division 32 Manufacture of radio, television and communication equipment
Group 331 Manufacture of instruments and appliances for measuring, checking, testing, navigating and other purposes

4. Manufacturing sectors by technology
Low technology
Division 15 Manufacture of food products and beverages
Division 16 Manufacture of tobacco products
Division 17 Manufacture of textiles
Division 18 Manufacture of wearing apparel; dressing and dyeing of fur
Division 19 Tanning and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear
Division 20 Manufacture of wood and of wood products

Division 21 Manufacture of paper and paper products
Division 22 Publishing, printing and reproduction of recorded media
Division 36 Manufacture of furniture; manufacturing n.e.c.
Division 37 Recycling
Medium-low-technology
Division 23 Manufacture of coke, refined petroleum products and nuclear fuel
Division 25 Manufacture of rubber and plastics products
Division 26 Manufacture of other non-metallic mineral products
Division 27 Manufacture of basic metals
Division 28 Manufacture of fabricated metal products, except machinery and equipment
Medium-high and high technology (MHT)
Division 24 Manufacture of chemicals and chemical products
Division 29 Manufacture of machinery and equipment n.e.c.
Division 30 Manufacture of office, accounting and computing machinery
Division 31 Manufacture of electrical machinery and apparatus n.e.c.
Division 32 Manufacture of radio, television and communication equipment and apparatus
Division 33 Manufacture of medical, precision and optical instruments
Division 34 Manufacture of motor vehicles, trailers and semi-trailers
Division 35 Manufacture of other transport equipment

Sources: UNIDO, 2013