

Manufacturing East

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1. Introduction - How Important is manufacturing sector

1.1 Significance of manufacturing sector in Indian economy

The secondary sector has attained an important place in Indian economy over the years. Besides being a significant contributor to the GDP growth, it is the second largest employment provider to the country's educated labour force and a major export contributor. India needs a strong manufacturing sector for the following reasons:

- The Indian population is estimated to grow by 2.15% annually, whereas the growth of agriculture - the major employment providing sector - is meagre at 0.99% over past five years. Moreover, the availability of arable land in agriculture is also declining. Therefore, the labour force exiting from the agriculture sector can be absorbed only in manufacturing sector. Thus, the workforce in manufacturing sector must be increased in order to off set the pressure on agriculture sector and increase income levels especially in rural areas. Agriculture, engaging 60% of the working population, contributed only 21.7% of its gross domestic product in 2003-04. This mismatch between distribution of workforce and value added in agriculture is one of the main reasons for the large number of poor, which is expected to further widen in the coming decades. Therefore, considerable shift of workforce from agriculture to manufacturing will help improve rural incomes and reduce poverty levels.
- A comparison with other major Asian countries show that the size of the value added in the Indian manufacturing sector (\$66bn in 2000) was less than one fifth of the Chinese manufacturing sector (\$373bn) and even less than half of the Korean manufacturing sector (\$144bn), thus offering a large scope for its improvement.
- Share of the manufacturing sector in India's GDP has remained stable at around 17% while in China the manufacturing sector accounted for around 35% of the GDP and that of Korea was 31% in 2003-04.

1.1.1 Major GDP contributor

The Indian economy is witnessing a mixed trend in the changing equations of the importance of its constituent sectors (Agriculture, secondary and services). The importance of its primary sector is declining while secondary sector is gaining gradually and tertiary sector is fast growing; as is happening in all economies world over. The time series data on the sectoral composition of the Indian economy from 1950s to early 2004 shows the definitive structural transformation that characterised Indian economy (See Table-1.1). After 1980s, the growth of the Indian economy was fuelled by the ever growing service sector.

India's secondary sector comprises manufacturing, mining and quarrying and electricity sub-sectors. During past five decades, Indian economy's secondary sector has shown a fluctuating rate of growth, which started stabilising in early 2000. Similarly, the share of Indian manufacturing sector was fluctuating over years (from 1980-81 to 1994-95); it started stabilising in late 1990s and fluctuated thereafter. However, the share of manufacturing sector to secondary sector suffered a continuous decline from 84.55% to 77.50% (from 1980-81 to 1999-2000) but started increasing (though marginally) thereafter, and is still the major contributor to secondary sector's GDP.

| Year | Agricultural and allied sectors | Secondary | Tertiary sector | Manufacturing sector | Share of manufacturing sector to secondary sector GDP |
|-------------|---------------------------------|-----------|-----------------|----------------------|---|
| 1950-51 | 57.4 | 14.7 | 27.9 | | |
| 1979-80 | 37.9 | 24.4 | 37.7 | | |
| 1980-81 | 38.10 | 20.91 | 40.99 | 17.68 | 84.55 |
| 1985-86 | 34.63 | 23.02 | 42.25 | 19.37 | 84.14 |
| 1990-91 | 30.93 | 25.38 | 43.69 | 21.14 | 83.29 |
| 1991-92 | 29.96 | 24.68 | 45.35 | 20.19 | 81.81 |
| 1992-93 | 30.19 | 24.47 | 45.34 | 19.98 | 81.65 |
| 1993-94 | 29.50 | 24.88 | 45.62 | 20.44 | 82.15 |
| 1994-95* | 29.68 | 21.18 | 49.15 | 16.27 | 76.82 |
| 1995-96 | 27.64 | 22.27 | 50.08 | 17.39 | 78.09 |
| 1996-97 | 28.05 | 22.05 | 49.91 | 17.36 | 78.73 |
| 1997-98 | 26.44 | 22.32 | 51.24 | 17.65 | 79.08 |
| 1998-99 | 26.42 | 21.98 | 51.60 | 17.05 | 77.57 |
| 1999-00 | 24.99 | 21.56 | 53.45 | 16.71 | 77.50 |
| 2000-01 | 23.92 | 22.00 | 54.08 | 17.20 | 78.18 |
| 2001-02 | 24.03 | 21.53 | 54.44 | 16.85 | 78.26 |
| 2002-03 (P) | 21.50 | 22.03 | 56.47 | 17.27 | 78.39 |
| 2003-04 (Q) | 21.71 | 21.63 | 56.66 | 17.01 | 78.64 |

Source:: National Accounts Statistics, 2005 and Asian Development Bank, 2004

1.1.2 Employment provider

To this day, the primary sector – comprising of agriculture and allied activities - is the largest employment provider (56.7% of workforce) but continues to decline over years. The labour force absorption by the secondary sector saw a fluctuation trend but started increasing from 15.8% in 1993-94 to 17.6 in 1999-2000 (See Table 1.2). However, it is noteworthy to mention that secondary sector is the largest employment provider to the semi-skilled, skilled and “half” educated labour force who is not absorbed in the tertiary sector. Tertiary sector, though providing employment to over 20% of the country’s workforce, can absorb only highly educated and skilled workforce. Primary sector generally absorbs uneducated and unskilled to semi-skilled workforce. Therefore, the secondary sector, with its labour-intensive industries is by far the largest employment provider to its large semi-skilled, skilled and less-educated labour force in a country like India. The manufacturing sub-sector of the secondary sector employs around 30% of the non-agricultural labour force. The sectoral employment growth trend over years shows that the significance of tertiary sector as a high growth, employment provider compared to other sectors is waning and employment growth potential of the primary sector ceased in later part of 1990s. The manufacturing sector is emerging as employment provider with high growth in the same period.

| Period | Primary | Secondary | Tertiary |
|-----------|---------|-----------|----------|
| 1983 | 63.2 | 15.6 | 21.2 |
| 1987-88 | 60.1 | 17.6 | 22.3 |
| 1993-94 | 60.4 | 15.8 | 23.8 |
| 1999-2000 | 56.7 | 17.6 | 25.7 |

Source: Asian Development Bank, 2004

| Period | Primary | Secondary | Tertiary | Total |
|---------|---------|-----------|----------|-------|
| 1983-87 | 1.6 | 5.0 | 3.6 | 2.6 |
| 1987-93 | 2.2 | 0.6 | 3.1 | 2.1 |
| 1993-99 | 0.0 | 2.4 | 2.1 | 0.9 |

Source: Asian Development Bank, 2004

The registered manufacturing units with the largest share of employment were in the food products and beverage with 12.9 lakh workers (16.4%) followed by 12.2 lakh in textiles (15.4%), chemicals with 7.5 lakh workers (9.5%), basic metals with 5.6 lakh workers (7.1%), non-metallic mineral products with 5.1 lakh workers (6.5%), and tobacco products with 4.5 lakh workers (5.7%). These six industries together accounted for 61% of the total employment in the registered manufacturing sector in 2002-03.

1.1.3 Significant export contributor

The manufacturing sector contributes significantly to the Indian export. The share of manufacturing sector goods to total exports has slightly decreased from 76.6% in 2002-03 to 73.7% in 2004-05 (Apr-Dec) mainly due to the reduction in the share of textile export share, which was marginally traded off by the increase in export share of engineering goods during the same period. The composition of the manufacturing export has also changed from agro-based raw materials and intermediate goods to processed and finished products. Therefore, it is suggested that the share of high value-added components should be increased.

| Products | 2002-03 | 2003-04 | 2004-05 (Apr-Dec) |
|------------------------------------|---------|---------|----------------------|
| Primary products | 16.6 | 15.5 | 14.1 |
| Manufacturing goods | 76.6 | 76.0 | 73.7 |
| I. Textile | 21.1 | 19.0 | 16.3 |
| II. Gems and jewellery | 17.2 | 16.6 | 17.5 |
| III. Engineering goods | 17.2 | 19.4 | 20.1 |
| IV. Chemicals and related products | 14.2 | 14.8 | 14.2 |
| V. Leather products | 3.5 | 3.4 | 3.0 |
| Petroleum, crude & products | 4.9 | 5.6 | 8.6 |
| Others | 1.9 | 2.9 | 3.5 |
| Total exports | 100.0 | 100.0 | 100.0 |

Source: Economic Survey of India, 2004-05

1.2 Importance of individual industries in Indian manufacturing sector

The importance of individual industries in Indian manufacturing sector is described statistically.

1.2.1 Engineering industry

- This US\$22bn industry in India and employs over 4m skilled and unskilled work forces either directly or indirectly.

- Strengths include strong technical capabilities in electrical machinery, process plant machinery and general purpose machinery. It is a diversified industrial base with supporting ancillary industries.

1.2.2 Chemical industry

- Indian chemical industry ranked 12th in the world production of chemicals, accounts for 1.5% of global chemicals market. Sharing 1.3% of total chemicals trade worldwide, it is valued at US\$28bn.
- The rate of chemical industry growth over last 5 years has been double that of Asia's growth and 5 times the world growth rate for the sector.
- The net value added of chemicals industry is the highest within manufacturing sector with a share of over 22% of total value added.

1.2.3 Pharmaceuticals industry

- India is the world's 4th largest pharmaceuticals producer with share of 8% of global production by volume and 1.5% by value with a market value of US\$8bn in 2004-2005

1.2.4 Steel industry

- India is the world's 8th largest producer of steel and largest producer of sponge iron
- Export of steel in Apr–Dec 2002 was 2.75m tonnes, increase of 21.6% over previous year

1.2.5 Automobile and auto components industry

- Provides employment to 0.45m directly and 10m indirectly
- Extensive backward and forward linkages – strongly interwoven with machine tools and metals sectors
- Indian auto sector possess distinct cost advantage in terms of labour cost. Labour cost in India is 8-9% of sales as against 30-35% of sales in developed economies.

1.2.6 Oil and natural gas

- Current annual crude oil production - 32m tonnes; Current demand - 110m tonnes
- Refining capacity: 115m metric tonnes pa.
- Reliance Petroleum Refinery at Jamnagar is the world's largest single stream refinery
- Strong retail infrastructure comprising over 17,000 petrol stations; 6,500 kerosene depots and over 5,500 domestic LPG dealers
- Tremendous opportunities for synergies in:
 - I. Supply of crude oil and gas
 - II. LNG import and transportation
 - III. Setting up refineries, setting up petroleum infrastructure, storage facilities, pipelines etc
 - IV. Marketing petroleum products including LPG retail marketing of transportation fuels
 - V. Production sharing contracts for oil and gas exploration under New Exploration Licensing Policy (NELP)

1.2.7 Textile industry

- The sector accounts 19% of export earnings
- India accounts for 15% of world's total cotton crop production, largest producer of silk
- Large pool of skilled low-cost technologically experienced workers
- Major segment is the manmade fibres, accounting for 40% share in Indian textile industry

1.3 Trends in performance of secondary as well manufacturing sectors

The performance of the industrial sector is measured by the Index of Industrial Production (IIP) and its trend. The trends in the IIP of the major sub-sectors of Indian secondary sector shows that manufacturing and electricity sectors experienced higher growth in 2005-06 compared to that of same

months of previous year. The IIP for the manufacturing, mining and electricity sectors for the month of June 2005 are 223.7, 150.6 and 188.8 respectively, with a corresponding growth of 12.5%, 5.8% and 9.4% over June 2004. The cumulative growth of IIP during April-June, 2005-06, over the corresponding period of 2004-05 in the three sectors have been 11.2%, 4.5% and 7.6% respectively, with the overall growth in the General Index being 10.3%. Therefore, it could be inferred that India's manufacturing sector is performing well and one among the growth driving sectors.

Table-1.5 Trend in IIP during 2004-05 and 2005-06 (%)

| | Manufacturing | | Mining | | Electricity | | General | |
|--|---------------|---------|---------|---------|-------------|---------|---------|---------|
| Weight | 79.3 | | 10.5 | | 10.2 | | 100 | |
| | 2004-05 | 2005-06 | 2004-05 | 2005-06 | 2004-05 | 2005-06 | 2004-05 | 2005-06 |
| Apr | 196.1 | 214.9 | 147.8 | 151.8 | 181.3 | 187 | 189.5 | 205.5 |
| May | 199.8 | 222.9 | 149.7 | 157.2 | 177.8 | 196.4 | 192.3 | 213.3 |
| Jun* | 198.9 | 223.7 | 142.3 | 150.6 | 172.5 | 188.8 | 190.3 | 212.5 |
| Jul | 207.1 | | 147.5 | | 186.3 | | 198.7 | |
| Aug | 207.5 | | 142 | | 179.2 | | 197.8 | |
| Sep | 213.3 | | 143.6 | | 182 | | 202.8 | |
| Oct | 213.9 | | 152.5 | | 179.8 | | 204 | |
| Nov | 212.4 | | 153.8 | | 177.3 | | 202.7 | |
| Dec | 231.4 | | 165.4 | | 187.5 | | 220 | |
| Jan | 230.4 | | 165.3 | | 187.4 | | 219.2 | |
| Feb | 221.3 | | 152.5 | | 170.7 | | 208.9 | |
| Mar | 242.9 | | 178.1 | | 196.3 | | 231.4 | |
| Average | 214.6 | 220.5 | 153.4 | 153.2 | 181.5 | 190.7 | 204.8 | 210.4 |
| Cumulative IIP growth during Apr-Jun, 2005-06 over that of 2004-05 (%) | | 11.2 | | 4.5 | | 7.6 | | 10.3 |

Source: Ministry of statistics and Programme implementation, GOI

* Quick estimate

The manufacturing sector's high growth in the new millennium (except 2001-02) helped the industrial sector to maintain a higher growth rate in the corresponding years (table below).

Table-1.6 Annual growth rates of IIP during last decade

| | Manufacturing | Mining & quarrying | Electricity | Overall |
|-------------------|---------------|--------------------|-------------|---------|
| Weight | 79.4 | 10.5 | 10.2 | 100.0 |
| 1994-95 | 9.1 | 9.8 | 8.5 | 9.1 |
| 1995-96 | 14.1 | 9.7 | 8.1 | 13.0 |
| 1996-97 | 7.3 | -1.9 | 4.0 | 6.1 |
| 1997-98 | 6.7 | 6.9 | 6.6 | 6.7 |
| 1998-99 | 4.4 | 0.8 | 6.5 | 4.1 |
| 1999-2000 | 7.1 | 1.0 | 7.3 | 6.7 |
| 2000-01 | 5.3 | 2.8 | 4.0 | 5.0 |
| 2001-02 | 2.9 | 1.2 | 3.1 | 2.7 |
| 2002-03 | 6.0 | 5.8 | 3.2 | 5.7 |
| 2003-04 | 7.4 | 5.2 | 5.1 | 7.0 |
| 2004-05 (Apr-Dec) | 9.0 | 4.8 | 6.4 | 8.4 |

Source: *Economic Survey of India, 2004-05*

Table 1.7 suggests that after close to two decades of depressed growth, the growth of manufacturing sector recovered to 6.2% during the decade starting in 1985-86. That rate of growth was creditable, even if it touched below that during the decade-and-a-half immediately after the launch of planned development. Further, this creditable rate of growth of manufacturing appears to have been sustained during the subsequent years as well. Interestingly, after 1994-95, the manufacturing sector pulled the overall growth of secondary sector while the other two sectors show slump in their IIP.

| Period | Manufacturing | Mining & Quarrying | Electricity | Total |
|------------------|---------------|--------------------|-------------|-------|
| 1950-51 to 64-65 | 7.1 | 5.9 | 13.6 | 7.2 |
| 1965-66 to 79-80 | 3.8 | 6.9 | 6.2 | 4.7 |
| 1965-66 to 74-75 | 2.7 | 9.4 | 3.8 | 4.3 |
| 1975-76 to 84-85 | 4.3 | 6.6 | 7.3 | 4.9 |
| 1985-86 to 94-95 | 6.2 | 4.2 | 8.3 | 6.2 |
| 1994-95 to 03-04 | 6.1 | 2.6 | 5.3 | 5.7 |
| 2004-05 (Apr-De) | 9.0 | 4.8 | 6.4 | 8.4 |

Source: *Macroscan, 2004, Economic Survey of India, 2004-05*

This picture of industrial buoyancy is not just corroborated but strengthened by figures on trends in GDP in the manufacturing sector. The table below shows that the Indian manufacturing sector managed to maintain its annual GDP growth rate over 6% except during 1965-66 to 1974-75 and 1975-76 to 1984-85. The GDP in registered manufacturing not only grew at a faster rate (of 6.9%) during 1985-86 to 1994-95 than suggested by the IIP, but that rate of growth rose by a full percentage point to 7.9% during 1994-95 to 2002-03. This brought it close to what was achieved during the first three Five Year Plans. The unregistered manufacturing sector, data for which is as expected less reliable, is also reported to have grown in recent years at rates higher than recorded during any time in India's post-Independence history. Therefore, it can be concluded that this high growth rates of manufacturing sector contributed well to the overall growth of secondary sector.

| Period | Manufacturing | Registered | Unregistered |
|------------------|---------------|------------|--------------|
| 1950-51 to 64-65 | 6.7 | 8.2 | 5.2 |
| 1965-66 to 79-80 | 6.5 | 7.2 | 5.3 |
| 1965-66 to 74-75 | 4.2 | 4.5 | 3.9 |
| 1975-76 to 84-85 | 5.4 | 6.2 | 4.2 |
| 1985-86 to 94-95 | 6.1 | 6.9 | 4.8 |
| 1994-95 to 02-03 | 6.1 | 7.9 | 5.7 |

Source: *Macroscan, 2004, Economic Survey of India, 2004-05*

On export front also, the performance trend of manufacturing sector export has been worth mentioning. Since the manufactured products' exports have increased at a faster rate than overall exports, the share of manufacturing in India's exports has increased steadily -from around 52% in 1970, 59% in 1980 and 71% in 1990 to 77% by 2000-01; but later decreased slightly to 76.0% in 2003-04. This reflects the transition in India's export basket from largely agro-based raw materials to processed items.

Notwithstanding a slight decrease in export share of manufactured goods (See Table1.4), following were the sub-sectors which performed well: Engineering goods (mainly machinery and instruments, transport equipment, iron and steel, non-ferrous metals, manufacture of metals and electronic goods), chemical and related products (mainly drugs, pharmaceuticals and fine chemicals, dyes/ intermediates and coal tar chemicals and plastics and linoleum), leather and manufactures (mainly leather goods and footwear) and

gems and jewellery in particular. While rise in the exports of engineering goods could be attributed to the rising demand from countries in East Asia and China, improvement in off-take and recovery in major markets like US and Europe contributed to increase the exports of gems and jewellery. Under textiles, while exports of manmade yarn, fabrics and made-ups increased, those of cotton yarn and fabrics were stagnant.

On the other hand, the growth in imports was contributed by robust increases in imports of food and allied products (mainly edible oils), capital goods, raw materials and manufactured intermediate and consumer goods in 2003-04. The pick up in domestic industrial activity fuelled a surge in imports of several intermediate manufactures and raw materials like iron and steel, non-ferrous metals, chemical materials and products, artificial resins and plastic materials and metalliferous ores and metal scraps. Import of capital goods, which had accelerated in 2002-03, surged in 2003-04 by 40.3%, buoyed by imports of transport equipment, machinery, machine tools and manufacture of metals. However, import of project goods, which reflect technological maturity and industrial capabilities of a country, continued to decline for the fifth successive year. All these signs together indicate the steadily growing manufacturing sector of India.

2. Towards Double Digit growth - Role of Manufacturing

| | | | |
|-------------------------------|-------------------|-------------------|-----------------|
| GDP | 8% | 9% | 10% |
| Manufacturing | 11.32% | 15.03% | 18.73% |
| GDP Composition (sector wise) | Agriculture-21.2% | Manufacturing-27% | Services- 51.8% |

Source: Cygnus Research

Assuming that Agriculture and Service grows constantly at 4.32% and 7.75% respectively

2.1 Achieving a double digit growth rate

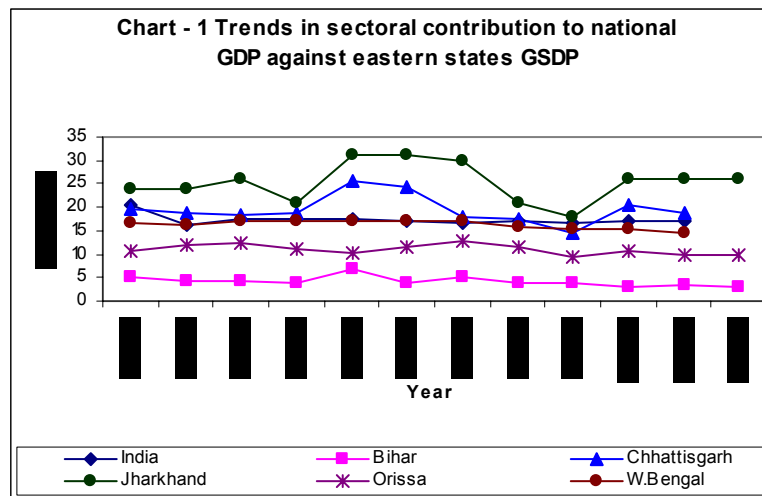
The following issues need serious attention in order to attain and maintain the high growth rate of manufacturing sector that would in turn help to drive the Indian economy in the double digit growth path.

- Product innovation - improving quality and differentiated products and up-gradation of models and develop products that are suited for Indian conditions; test before entering international markets
- Interchain innovation – moving to new and more profitable product segments
- Process Innovation – improving the efficiency of transforming inputs into outputs
- Removing all regulatory constraints
- Reducing cascading effect of taxes
- Capital availability - Enhancing flow of funds to industry including funds from Development Financial Institutions and non-recourse funding and structured finance from banks
- Exit and restructuring
- An effective synergy between internal and external reforms
- Infrastructure reforms
- Labour reform
- Enhance competitiveness
- Cost disability factors such as high input cost in Indian industry

3. Manufacturing in India - Status Quo East

3.1 Performance of manufacturing sector in eastern India against National trend

The trends in growth rates of manufacturing sector at national-level against the same in eastern Indian states collectively shows that the manufacturing sector of eastern Indian suffered a negative growth in 2001 and 2002. It however managed to grow at 12.3% in 2003, which was even higher than the growth of service sector in eastern India as well as overall India. However, it plunged again in 2004 and grew at same rate of Indian manufacturing sector. The negative growth of manufacturing sector in eastern states of Bihar, Orissa and Chhattisgarh in 2001 and in Bihar and Orissa in 2002 could be attributed to negative growth of manufacturing sector of eastern India.

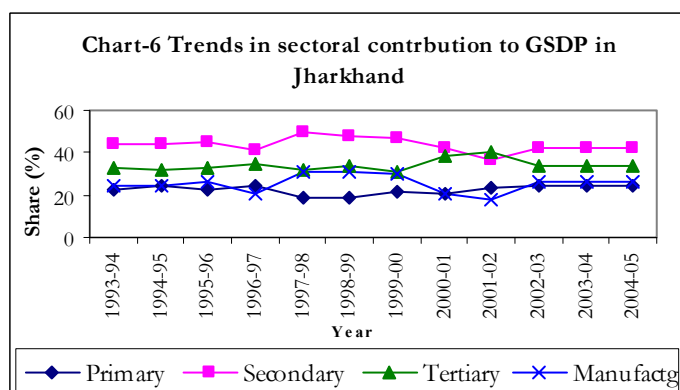
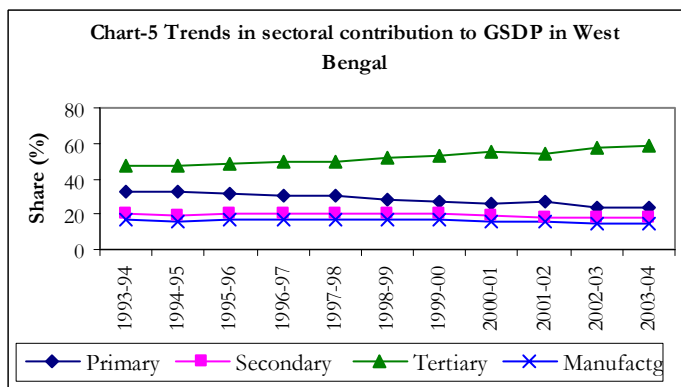
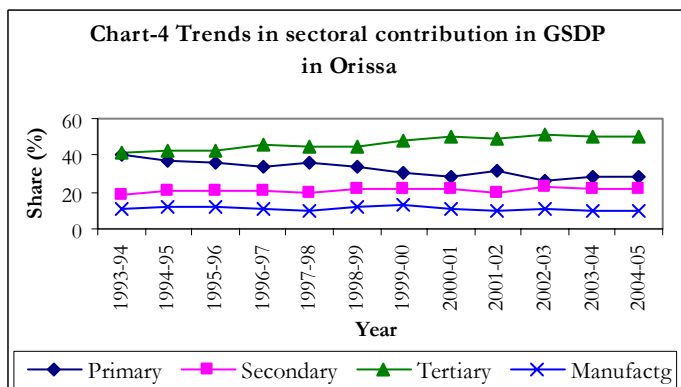
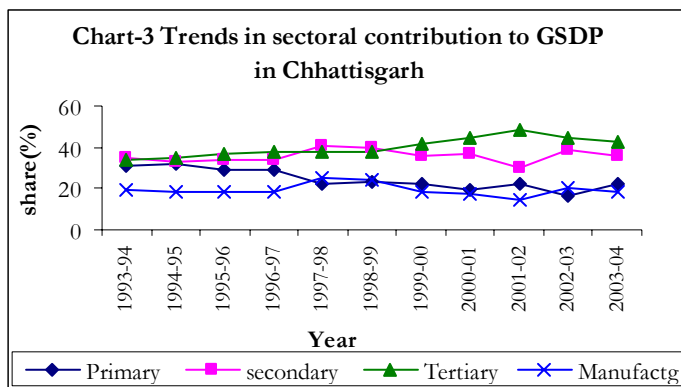
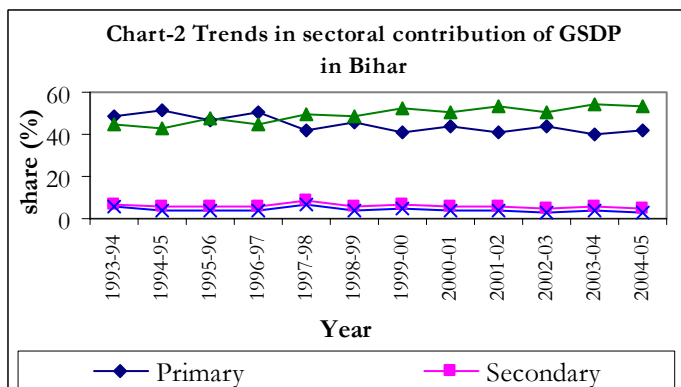


Source: National Accounts Statistics, 2005

The GDP growth of tertiary sector of eastern zone though fluctuating over years performed well and grew upward constantly from 2002; falling in line with the trend at national level. In summary, in eastern states, the manufacturing sector is wildly fluctuating while that of tertiary sector was growing at more or less constant pace. At national level too, the growth of tertiary sector surpassed the growth of manufacturing sector in the past five years, except a meagre deviation in 2001.

3.2 Status and importance of secondary and manufacturing sector in eastern Indian states

Chart 2-6 show that the importance of secondary sector in SGDP is less significant and less than the national figure in states of Bihar, Orissa and West Bengal as these states are predominantly agrarian states. However, in states like Jharkhand and Chhattisgarh, the secondary sector contributes significantly. In Jharkhand, the service sector is the major contributor to SGDP with 42.15% in 2004-05.



Source: National Accounts Statistics, 2005

Though the manufacturing sector has not contributed much directly to the GSDP, roughly half of the contribution to secondary sector is solely from manufacturing sector. It is understandable that these mineral rich states are deriving most of their secondary sector contributions from the activity of mining and quarrying.

| Year | India | Eastern India |
|-------------|-----------------|-----------------|
| 2000-01 | 85,6626.7 | 65,876.13 |
| 2001-02 | 85,6983.2 | 69,798.47 |
| 2002-03 | 97,7260.8 | 71,365.98 |
| 2003-04 | 10,73,258 | 21,25,63.6 |
| 2004-05 | 68,72,48.2 | 55,094.66 |
| CAGR | -4.31048 | -3.51134 |

Source: CMIE

Note: Only listed companies are considered for analysis

The performance of industries operating in the eastern India (including north eastern India, as data for companies in eastern zone alone is not available) is measured against the performance of the companies from all over India. The performance parameter of total sales of the listed companies over years is considered for the analysis. The growth of sales of companies operating in eastern India as well as companies all over India was negative during 2000-05, a cause of concern. However, the magnitude of negative growth of sales of eastern Indian companies is less than that of companies operating at national level. Moreover, a notable trend is that the number of companies operating is on decline over years, generally, both at national-level and at eastern region.

3.3 Panacea to Indian manufacturing sector's persistent problems

A good number of companies in India, especially in east India, are domestic markets focused and not operating at economies of scale. The resulting double losses include: entry and market capturing of efficient foreign firms in the liberalised era, leading to losing grip over domestic market by these domestic companies and missing the opportunity of exploring export market potential. Operating at sub-scale of economies of production will drastically reduce the cost advantage of production and prevent from operating with competitive advantage.

Moreover, most of companies are following more or less similar business models that make them struggle in the competitive business environment and will get worsen in the event of complete liberalisation of the economy in the coming years. Therefore, these companies need to reorient their business strategy to grow globally and withstand the wave of globalisation. The following strategies can be recommended to achieve a measure of success:

3.3.1 Global Value Chain and its relevance to India

Global value chain (GVC) is defined as the internationalisation of the production processes, whereby firms located in different countries participate in the different stages of the production process. The factors such as internationalisation of the production process across the countries, movement towards low efficient and low cost locations, increase in inter-dependency of countries collectively resulted in emergence of Global Value Chain (GVC) that ultimately led to changing scenario of Indian manufacturing industry like:

- Functions which earlier fell under manufacturing domain like R&D, design development, marketing and customer support are being largely outsourced and are considered as service activity, once they are outsourced.
- The outsourcing of parts of manufacturing activity is mainly to make the operations economical while there is a growth in trade.

All these factors resulted in higher growth in manufacturing trade from developing countries to developed countries. GVCs offer many firms in the region an opportunity to take advantage of the potential benefits that globalisation offers. Indian manufacturing firms are also needed to take advantage of the GVC. In order to join this growth model, India needs to gradually move up in the value chain. India has the following advantages of cost effectiveness production (especially low labour cost), improving basic infrastructure, large pool of English-speaking population and other supporting conditions such as political stability, sound macro-economic management, and enforceable legal and regulatory framework protecting IPR, transparency in policy making, well-functioning institutions and low-cost business environment.

3.3.2 Entry strategies for GVC

1. FDI
2. Joint ventures
3. Foreign and local buyers
4. Licensing

5. Sub-contracting
6. Informal means (Eg training, hiring and returnees)
7. OEM
8. Own Design and Manufacture (ODM)
9. Strategic partnership for technology
10. Overseas acquisition equity

3.3.3 What needs to be done?

Apart from the above specific measures, the following general initiatives need to be taken for boosting Indian industrial sector.

- Developing infrastructure and other services to meet international quality, cost and delivery.
- Creating efficient markets of labour, capital and information
- Competitive strategies for achieving efficiency and dynamism at sectoral level

3.4 Critical success factors of individual industries of manufacturing sector

The following critical success factors for individual industry are identified and the same may be followed by the other companies of the industry to replicate the success.

3.4.1 Textile industry

1. Professionalism
2. Entrepreneurial zeal
3. Quota mastering – post MFA (after 2005), it will be market penetration strategy
4. Effective Logistics Management
5. Market Diversity
6. Focus on specialised areas of operation

3.4.2 Pharma industry

1. Market focus
2. Global perspective and knowledge
3. Moving up in the value chain
4. World-class manufacturing
5. R&D investment
6. Establishing direct relationship with buyers
7. Global networking
8. Scale in bulk drug manufacturing

3.4.3 Agro-chemical industry

1. To have international network for marketing and distribution
2. Moving up in value chain with branded formulations
3. High level of backward integration – to reduce raw material costs
4. Broader product portfolio and registrations abroad – to reduce business risks

3.4.4 Auto & auto components industry

1. Achieving international quality
2. Strong domestic market base
3. Access to best production technology
4. In-house expertise to developing and absorbing the technology
5. R&D
6. Capacity to meet global demand
7. OEM-centric export strategy

3.5 General CSF for manufacturing industries

1. Global market intelligence
2. Strong global networking
3. Direct relationship with buyers
4. Clear product-market strategy for exports
5. Strong R&D skills
6. Technology access
7. Competitive raw material sourcing skills
8. World class manufacturing and quality standards
9. Timely execution of orders
10. Moving up in the global value chain
11. Clear export thrust
12. Entrepreneurial zeal

3.6 Transfer of success

It is known that few companies are successful in implementing efficient business model and grow successful in India. Principles of success need to be transferred to other companies and to make it a wide-spread one. Following are imperatives in this direction

- Undertake awareness programme – through industry associations, export promotion councils and cluster association
- Setting up of National Export Information Repository – to provide information in enhancing the success factors
- Joint programmes – with common objective of implementing the critical success factors at firm levels
- Inter-industry learning – to understand the export dynamics and transferability

3.7 Firm-level strategies

1. Identify main comparators –
 - a. Neighbours with similar advantages
 - b. Immediate competitors in similar activities
 - c. Potential competitors that may emerge as challengers
 - d. Role models, those who are pioneers in technology
2. Benchmark at the level of industry, technology or clusters
3. Benchmark the drivers of industrial performance at firm, industry, technology and clusters level which would help in analysing the strengths and weaknesses of a firm, sector or cluster vis-à-vis others in the same platform.

3.8 Technology, design and quality up-gradation

1. Technology Generation
 - a. Conceptualise state-of-art technology suitable for India
 - b. Evolve indigenous technology with international standards
 - c. Earmarking a percentage of turnover for R&D
 - d. Diversify R&D efforts to focus on services, systems, products and markets
2. Manufacturing world-class products
 - a. Develop products that are suited for Indian conditions; test before entering international markets
 - b. Concentrate on neighbouring markets (developing countries)

3.9 Efficiency enhancement

The following measures can ensure effective supply chain management

1. Supply Chain Management
2. Implementation of EDI
3. Inter-enterprise logistics management
 - a. Electronic commerce
 - b. Bar coding
 - c. Electronic catalogues

Not only imparting efficiency in manufacturing but also improving efficiency in terms of timely delivery, assurance of after sales service and customer satisfaction is strongly suggested. These could be done through Electronic Commerce solutions and tools for planning, forecasting, and product design; by eliminating procurement hold-ups and by improving logistic management. Re-examining and re-engineering the ways and means for efficient flow of information and products along the supply chain should be frequently done.

4. Future Scenario of Manufacturing in India

Having stuck out their necks on the fortunes of different manufacturing segments, everyone is eager to see how the future of the industry will shape up in India. A realistic assessment gives confidence that there is no dramatic decline or death in store for the sector - whether globally or in India. In fact, there are opportunities to tap in certain sectors for both worshippers of productivity and participants in global value chains. But at the same time, a churning is bound to happen on a large scale. There will be success stories alongside closures. Winners and losers would get separated - across sectors and companies within those sectors.

4.1 Indian manufacturing Industry

- India becomes a base for export to third world countries. For example, Hyundai Motors is using India as export base for foreign markets, currently exporting to eight countries and looking forward to expand the same to markets in the European Union and Latin America. The company has also set up an R&D centre at its Chennai plant.
- India has world-class R&D facilities.
- It has come out as a global manufacturing hub with presence of MNCs such as LG, Samsung, Hyundai, Pepsi, GE, General Motors, Ford and Suzuki.
- India has increased implementation of state-of-the-art IT technologies and presently, the IT usage is approximately 15%.
- The sectors showing high potential are automobiles, textiles, steel, aluminium, cement, auto ancillaries, forging and pharmaceuticals.

4.2 Sector-wise outlook

Indeed, India has contravened the general belief that China is good in manufacturing and India in services. The manufacturing segment in India has been stirring up the value chain as well. Whether it is in automobiles or technology, a large number of multinational corporations (MNCs) happened to see India as a feasible manufacturing base. For instance various companies in Automobile Industry, plans to set up plants in India and others those already having base in India, plans to reinvest in their existing units. The world's leading auto part makes, has relocated quite a lot of its product lines to India. Many leading car manufacturers are currently using India as a manufacturing as well as an export base for their products.

The scenario in textile industry is also similar. The textile sector in the manufacturing segment is in a very buoyant mood. Current year, an additional Rs20,000 crore is being invested in the textile industry and in 2006, a further Rs30,000 crore is expected to be invested in textile industry, which means the textile entrepreneur can foresee a very bright future. The ministry of finance has cleaned up the excise regime for natural fibres. Entrepreneurs can go through the zero duty regime, which is the biggest boost to textiles in the past several years. Further the ministry has cut the polyester filament rate from 24 to 16 this year, which accounts for 80% of the man-made fibre and therefore it would further be an impetus for growth.

The textile machinery duty has been cut drastically on large number of textile machineries and other textile related goods as well. By and large, the government thinks that textile industry is poised to do well. After agriculture, textile is the next industry which employs large number of people and hence the government is ready to take necessary steps to make textiles modern, competitive and world-class. With the phasing out of quota regime under MFA (Jan 1, 2005), developing countries like India, with both textile and clothing capacity, might be able to prosper.

As per World Trade Organisation (WTO), from the current year, India would grant product patent recognition to all new chemical entities (NCEs) i.e., bulk drugs hereafter. The Indian Government's decision to allow 100% foreign direct investment into the drugs and pharmaceutical industry is expected to aid the growth of contract research in the country. Indian pharma export was Rs14,000 crore and

accounted for more than a third of the industry's turnover. Apart from manufacture of drugs, the Pharma industry offers huge scope for outsourcing of clinical research. A vast pool of scientific and technical personnel and recognised expertise in medical treatment and health care is India's strength. India has vast opportunities in exports as well as the potential to become a global hub in the area of R&D based clinical research outsourcing, particularly in the area of bio-technology. The Indian pharmaceutical industry is also getting increasingly US FDA-compliant to harness the growth opportunities in areas of contract manufacturing and research. Indian Pharma companies are increasingly focusing on tapping the US generic market, which would be more than US\$8 billion.

Yet another area has been witnessing a lot of developments - electronics manufacturing services (EMS). The EMS market in India is estimated to reach around US\$4.57 billion by 2010. Some of the electronic giants decided to shut down their operations abroad and shift the entire manufacturing base to India due to the cost advantages.

India's competitive edge lies in its ability to turn out low-volume, high-variety parts, in which the engineering content is high, from vertically integrated manufacturing units - despite the fact that the size of India's factories is much smaller than those in China, United States and emerging economies. According to some industry experts and research surveys, manufactured product outsourcing from India could be as big as US\$10 billion by 2007 and US\$50 billion by 2015. In the last few years, manufacturing outsourcing from India has been growing at around US\$1 billion a year. Already, an estimated US\$5 billion worth of engineering goods, auto components, pharmaceutical and textile products have been outsourced from India over the past four years. It is not surprising given the fact that high-skill jobs can be done in India at a fraction of the cost that would be incurred in the developed countries.

5. Road Map-Present to Future

5.1 Indian manufacturing Industry: Current Scenario

| Table- 5.1 Facts: Manufacturing Sector in India | |
|--|-------------------------------|
| GDP (est 2004) | US\$691.88bn |
| GDP growth rate | 8.5% (2005) |
| GDP composition by sector (2004) | Agriculture - 21.2% |
| | Manufacturing -27% |
| | Services - 51.8% |
| Composition of GDP by Value (2004) | Agriculture - 146.679 billion |
| | Manufacturing – US\$186.808bn |
| | Services – US\$358.394bn |
| Average Annual Growth Rate (Manufacturing Sector) | 7.7 % (2004) |

Source: www.worldbank.org,

There are certain extraordinary foreboding moments for India's manufacturing sector at the turn of the millennium. As India's glorious rise on the horizons of global information economy continues to win accolades from all sides, its manufacturing industry - once ranked among the eighth largest in the world - is screeching to a painful slowdown.

But is it really the end of the road for Indian manufacturing sector? Or, is it the beginning of a new era in industrial manufacturing? Or, faced with the challenges of fierce global competition and tectonic shifts in technology, is Indian manufacturing actually probing for a new strategic framework?

For long, tattered by the quirk policies of India's socialistic legacy, and now unthinkingly forsaken by the torchbearers of the new economy, the Indian manufacturing sector is finding itself "flogged to death". At once forced to raise from the slumber of decades of protectionism and license and overnight face the challenges of international competition - both at home and abroad, the manufacturing industry is unmistakably, caught up in the throes of an unprecedented crisis situation.

Its phobic response to imports from China, persistent investment slowdown in the key manufacturing sectors, alarming slump in profitability and closure of several industrial units – seem to signify erosion of business confidence and lack of clear-cut strategic direction.

Inevitably, there is a noticeable sense of absurdity about the present condition in the Indian manufacturing sector and economy in general. While there are ample signs of renaissance in several segments, particularly those in sync with global market dynamics, the macro-level statistics on industrial performance still paints a mood of silence. While IT, automobiles, pharmaceutical and fast moving consumer goods (FMCG) sectors have shown extraordinary growth in the last five years, conventional sectors like small scale manufacturing, engineering goods and chemicals, that had strong presence in Indian economy, have been on decline, bearing the burden of new global competitive pressures. Particularly, the rift between those companies coming forward to accept challenges of restructuring and those unable to wiggle out of the past inertia, point towards a deeper restoring process underway in the manufacturing sector.

Many Indian manufacturing concerns have already been seen shifting their operations from manufacturing and have been further willing to offload their interests in joint ventures to their overseas partners. Several overseas firms have also been antagonistically acquiring or setting up manufacturing businesses in India.

Among some of the major private sector groups, a few companies in manufacturing sector have radically abridged their investments in manufacturing business, taken aback by their dismal performances in the businesses; and further again some major companies have exited.

As the equity restructuring has been going on in the concerns in manufacturing sector, it may be justifiable to ask whether the future of manufacturing in India would continue to remain in Indian hands, if at all. Whether manufacturing continues to be Indian or not - the role of a competitive manufacturing sector per se in the development of the economy is certainly going to be far more important than what has been conceded so far.

5.2 Elements for accelerating growth in the manufacturing sector

To achieve a double digit growth in GDP per annum, it is essential that manufacturing grows at about or over 18% annually, even when agriculture growth picks up close to 4.32% and Services at 7.75% annually.

Following steps must be taken for achieving the growth in Indian manufacturing industry.

Alleviating Demand Constraints

- Generate higher demand by reducing prices
- Increase purchasing power of the consumer
- Gradually reduce direct and indirect tax incidence

Resolving Supply Constraints

- Reduce needless costs borne by industry
- Improve competitiveness of Indian industry
- **Enhance flow of funds to the manufacturing sector**
 - Band on prime lending rates to be not more than 4% for large enterprises and SMEs (small and medium scale enterprises)
 - Reduce spread on borrowing and lending rates of banks
 - Revive the development of financial institutions
 - Foreign Exchange Reserves with RBI (bearing a long maturity term) should be made easily available to Indian industry, keeping money supply in check
- **Restore infrastructure bottlenecks**
 - Provide un-interrupted power supply at reasonable rates
 - Allow duty-free import of fuel for captive power generation
 - Enhance efficiency and reduce costs at Indian ports
 - Further improve surface transport facilities
 - Provide incentives to infrastructure providers
 - Provision of uninterrupted power at affordable rates. Worldwide, industry obtains power at much cheaper rates
- **Simplify labour laws**
 - Flexible procedures for hiring contract labour for export related activities.
 - Implement flexible labour laws that allows replacement of non-performing workers with willing workers to attract fresh investments in labour intensive manufacturing
 - Simplify laws relating to retrenching labour at the time of closure of an enterprise.
- **Simplify laws to facilitate exit and restructuring**
 - Simplify exit/ restructuring laws

- Early warning system: Banks' emphasis should be on prevention and/ or detection through better appraisal and monitoring rather than cure after sickness/ default.
- Taxation laws and procedures come in the way of restructuring/ exit.
- **Export incentives/duty defrayment to include reimbursement of all indirect taxes, local levies and surcharges**
- **Reduce transaction costs**
 - Reduce multiplicity of economic laws at the centre
 - Promote streamlined, transparent and user friendly administrative laws, rules and regulations, and circulars and orders
 - Mindset of field level functionaries perpetuating inspector *raj* needs to be amended

6. How to enhance Manufacturing Competitiveness

Manufacturing competitiveness can be achieved through adoption of some of the following philosophies:

6.1 Lean Manufacturing

Meaning

Lean manufacturing, in other words means, producing more with less. It is an idea, based on the Toyota Production System (TPS) and other Japanese management practices which struggle to reduce the time line between the customer order and the delivery of the final product, by constant elimination of waste. All types of companies such as manufacturing, software development, financial services, process or distribution, can benefit by adopting this lean manufacturing philosophy.

Developing a lean manufacturing system is not a day's or month's process; instead it is a journey which can take a minimum of ten years for successful implementation and to make the philosophy ingrained in the company culture. Such a long process is required as it involves a fundamental change in the way the company approaches its manufacturing processes. The change to lean is not just an application of a few techniques; it's a whole new way of looking at the world. A large amount of changes are required to eliminate wastes which don't make any sense under the old paradigms.

As and when any key decision maker observes something that appears to be "instinctively wrong", the process may be stopped until the paradigm can be changed. It is the responsibility of the manufacturer in the entire supply chain to teach and collaborate with those down the supply chain for successful development of an extended lean enterprise and derive maximum benefit from the process.

Lean manufacturing has three important elements:

Flow is the perception that production material should flow throughout the production process, possibly, as a one piece flow, through various operations in design, order taking and production, without interruptions or scrap.

Pull refers to customers pulling demand from the suppliers or every process pulling from the previous process. For instance, instead of producing goods based on the company's estimation about the sales for that particular product, the plant would manufacture at a price at which the customer can actually buy the product.

Striving for Excellence refers to the continuous improvement in attitude or in other words it is a loom that a company by no means becomes perfect or fully "Lean". Continuously re-examining the processes and looking for ways to take wastes out. This is how companies have achieved significant improvements in the financial performance.

Benefits from implementing Lean Manufacturing

Its implementation is an evolutionary process and the benefits of lean manufacturing come out as the cycle of analysis, development and refinement of processes repeated again and again.

Quality enhancement and inventory reduction are basic areas of visible improvement, in terms of performance measures. And once the cash, in the way of excessive inventory, is drained out of the business, it can be returned to the shareholders or reinvested back in the business.

Not only does reduced capital spending for every dollar of sales help drive margin improvement over time, but reduced manufacturing costs should come as a benefit to successful implementation of Lean Manufacturing.

- Labour needed for given level of output down 50-75%.

- Throughput time in plant (and WIP) down 90%
- Throughput time in product development down 50–75%
- Defects in process and reaching customer down 90%
- Ship-on-time without expediting rises from 50-75 to 90+%
- Injuries to workers fall by 90%
- Plant space needed for a given level of output falls 50%
- Capital needed for given level of output falls 50%

6.2 Six Sigma

| Sigma | Defects per million opportunities |
|--------------|--|
| 3 σ | 66,810 |
| 4 σ | 6,210 |
| 5 σ | 233 |
| 6 σ | 3.4 |

Six Sigma is a business initiative to reduce costs through some of the problem solving methodologies. The Sigma Level relates to the performance level in Defects Per Million Opportunities or DPMO. Six Sigma simply means a quality that makes every effort for near perfection. It is a process from manufacturing to transactional and from product to service. It is a closely controlled data driven approach and methodology for eliminating defects in six standard deviations between the mean and the nearest specification limit. The statistical representation of Six Sigma describes quantitatively how a process is performing. To achieve this, a process would not produce more than 3.4 defects per million opportunities. A Six Sigma defect is defined as anything outside of customer specifications. A Six Sigma opportunity is then the total quantity of chances for a defect. Process sigma can easily be calculated using a Six Sigma calculator. It embraces the improvement of existing products and processes, as well as the design of new products and processes. Six Sigma can also be seen as a measure, a target and a philosophy.

The basic objective of the Six Sigma process is the execution of a measurement-based strategy that spotlights on process improvement and discrepancy reduction through the application of Six Sigma improvement projects. This is achieved through the use of two Six Sigma sub-methodologies: DMAIC and DMADV. The Six Sigma DMAIC processes (define, measure, analyse, improve, control) is a development system for existing processes falling below specification and looking for incremental improvement. The Six Sigma DMADV process (define, measure, analyse, design, verify) is a development method used to develop new processes at Six Sigma quality levels. It can also be made in use if a current process requires more than just incremental improvement. Both the above sub-methodologies of Six Sigma processes are executed by Six Sigma Green Belts and Six Sigma Black Belts, and are overseen by Six Sigma Master Black Belts.

As per the Six Sigma Academy, Black Belts could save the manufacturing companies approximately US\$230,000 per project and can complete 4 to 6 projects per annum. Few of the most successful companies after implementing Six Sigma, has estimated benefits on the order of US\$10 billion during the first five years of implementation. GE first implemented Six Sigma in 1995 after which Motorola and Allied Signal adopted the Six Sigma trail. Since then, thousands of companies throughout the world have discovered the far reaching benefits of Six Sigma. There is also a philosophical element to Six Sigma. The belief is that the highest quality 'producer' is the lowest cost 'producer'.

Benefits of Six Sigma

- Six Sigma saves time and money and enhances customer satisfaction
- Improving the quality and delivery performance not ten fold but a hundred fold
- The Six Sigma target of 3.4 Defects Per Million Opportunities is equivalent to a performance of 99.99966%
- Bottom line cost savings (5%-20% of turnover per annum)

- Saves up to 1.2% - 4.5% of a company's revenue
- Improved quality of product or service as perceived by the customer (internal and external customers)
- Reduction in process cycle times
- Development of staff skills
- Common language throughout the organisation
- World class standard

6.3 Technology and Manufacturing

Enhance productivity, flexibility and customer responsiveness

From quote to cash, an integrated ERP system helps the company to get the product out the door faster. The ERP software tools are to maximize the efficiency of business processes across the entire enterprise. Forecast demand to suppliers via MRP, increase on-time delivery, automate the shop floor and decrease lead times, increase order capacity and make commitments which can be fulfilled.

Enable new business and growth strategies

Undertaking new business strategies requires an infrastructure that can handle the demands of an industry that is increasingly dependent on technology. Updating and integrating the business processes with an ERP system enables the company to take on more business and grow in new directions and connect multiple plants. Take advantage of the Internet and wireless technology to connect to customers and partners and also to introduce new product lines as well as mobilise its sales force.

Eliminate costs and inefficiencies

Using an enterprise system to standardise business processes which could dramatically improve the company's bottom line. Utilising MRP results in more inventory turns and management of company's vendor relationships reduces costs for purchased items. More efficient scheduling on the shop floor reduces downtime and overtime. Improved customer service leads to repeat business.

Expand knowledge of key business data

This software integrates all business management functions, eliminating contradictory information from disparate systems. Reports, graphs and charts on key business data can be automatically generated to provide a higher level of business performance visibility, with the drill-down capability into details behind the data that the organisation has always dreamed of.

Extend business using the Internet

Taking the business onto the Internet can give the company a competitive edge. Web-enabled technology allows the company to access information, sell product, run business processes and communicate with its customers and partners at any time and from anywhere in the world.

Enhances customer relationship

- Opportunities and Leads
- Integrated Contact Management
- Quoting and Sales Orders
- Comprehensive Sales Reporting

Forecasting

Information technology software enables the company to build sales forecasts and combine them with existing sales orders to generate forecast demand for product within the Master Production Schedule. Build multiple forecasts and perform what-if scenarios to simulate the impact on one's operation before committing to a build plan.

6.4 Cost reduction

Cost reduction is one of the primary objectives of any company. Companies are continuously looking for ways to reduce its costs while sustaining quality, efficiency and compliance. At a time when downsizing, mergers, acquisitions and increased customer demands are the norm, it's no wonder companies are seeking ways to decrease the amount of money that leaves their bank accounts. Some areas of business lend the companies well to fixed cost reduction, while others do not.

Directly Impacting the Bottom Line

Fixed costs are those intrinsic to the operation of a facility and it can be carefully assessed, decreased or eliminated. One of the most scientific means of cost reduction is to lower fixed costs. For example, executing a new, innovative waste water treatment system within the company will not only keep the company in compliance, but will also cut its annual treatment costs. Hence the outcome results in less money out of the company's pocket and a positive effect on its bottom line.

Backdoor Approach

Cost avoidance is an ability to lessen certain costs through proactive management, methods and programmes. Savings from cost avoidance is difficult to define and don't show up directly on the balance sheet of any company. Instead, cost avoidance computations compare current expenditures to a baseline, with the difference tallied as savings. Baselines could be drawn out from internal sources (such as averages of previous year costs) or external sources (such as average costs in a given industry). Here are some of the ways by which costs could be avoided.

- Outsourcing — Outsourcing works to maximise resources and do more with less.
- Partnering — Developing an alliance partnership which enables the company to do things smarter and save money on projects over time.
- Process Improvements— Many companies learn the hard way that fully assessing a problem before implementing a solution saves money.
- Needs Analysis — Toyota Motor Manufacturing and North America, Inc. experiences the importance of finding the right tool for their environmental management system job.

Section 1.01 the best way to avoid costs is to develop a culture where every employee takes responsibility and thinks strategically about cost avoidance.

Conventional cost avoidance activities

- Implementing compliance assurance programmes to prevent regulatory fines
- Expediting permit reviews to avoid lost market opportunity costs
- Training employees on effective operational practices to minimise downtime
- Encouraging health and safety awareness to avoid injuries and worker compensation issues
- Outsourcing to expand staff capabilities and maximise resources

Just-In-Time (JIT) Manufacturing

JIT is a philosophy of continuous improvement in which non-value-adding activities (or wastes) are identified and eliminated for the purposes of:

- Reducing Cost
- Improving Quality
- Improving Performance
- Improving Delivery

- Adding Flexibility
- Increase innovativeness

JIT is not about automation. JIT eliminates waste by providing the environment to perfect and simplify the processes. JIT is a collection of techniques used to improve operations. It can also be a new production system that is used to produce goods or services.

When the JIT principles are implemented successfully, significant competitive advantages are realised. JIT principles can be applied to all parts of an organisation: Order taking, purchasing, operations, distribution, sales, accounting, design, etc.

7. Conclusion - Manufacturing vis-à-vis Services

Any economy moving from primary sector-base to a more industrialised and service sector-base is a clear indication of economic development. However, it is also expressed that the growth in any economy without an even spread across the manufacturing and service sectors will be an inequitable and lop-sided development. Historically, the developed economies passed through a phase of industrial revolution leading to a rising share of manufacturing industry in their GDP, which is later on followed by the growth of the services in the post-industrialisation phase.

In India, however, what is being witnessed is a rapid expansion of services well before the completion of the growth phase of the industry. Most economists and experts would agree that the rapid growth of the services sector much before the manufacturing industry attaining maturity, is not a healthy sign. One view is that the rapid growth of the services sector in recent years is not a natural growth but a forced one. With growth rates in both agriculture and industrial sectors falling short of the requirements to absorb the growing labour force, those without work are forced to indulge in some sort of service activity that may provide a subsistence income. The prevalence of widespread poverty testifies this hypothesis.

The trend in service sector growth has consistently surpassed growth in other sectors of the Indian economy in the past decade. In 2003-04, the service sector contributed about 56.66% to Indian GDP. India accounts for 1.4% of world services trade compared to 0.9% of world merchandise trade in 2003-04. The phenomenal growth rates in India's IT sector and its leading position as an offshore destination are proof of the country's potential in services. The IT and BPO sectors today employ about a million persons and their contribution to employment will rise as more work is off-shored to India. Other services such as telecommunications and transport have also experienced a growth spurt since their deregulation. The service sector has also played an instrumental role in attracting FDI. Hence, there has definitely been a services revolution in India and the sector has played an important role in integrating India with the world economy.

However, such oft-cited facts and figures have created a perception that services alone can propel India to a growth trajectory of 8% and more. Some argue that India's success depends on services and that India has leapfrogged from the primary to the tertiary sector, in what represents a paradigm shift from other economies.

The following arguments are put forth to support the statement that service sector can alone propel India's economy and there must be balanced (not necessarily equal) growth between sectors of Indian economy. It is opined that India has to move to higher growth path in a manner that is equitable, employment creating and sustainable; there must be broad-based growth across sectors and within the service sector.

- With the sectoral GDP contribution of roughly 21%, 27% and 52% across the primary, secondary and tertiary sectors, respectively, and average annual growth rates of around 3.5%, 6%, and 8%, respectively; a simple weighted average calculation indicates a feasible growth rate of around 6.5%. To achieve a growth rate of 8% or more would require services to grow at around 12% per year, assuming no change in the performance of other sectors. The latter seems unlikely to be realised on a sustained basis, especially since the fastest growing services like IT are susceptible to changes in the global business cycle and competitive challenges abroad.

While further deregulation may spur growth in services like transport and energy, the latter are unlikely to raise overall service sector growth rate to 12% on a sustained basis. Also, high growth rates on a growing base for the service sector would be difficult to maintain statistically. Even the 6.5% growth rate computed above is questionable given agriculture's dependence on the monsoons, making its impact on the overall growth rate unpredictable from one year to another. These simple growth calculations indicate the difficulty of achieving a higher growth trajectory based on services alone and the need for broad-based growth. It is worth noting that economies that have exhibited average growth rates of 7% or more over the 1965-99 period, have all had

industrial growth rates of 8-13% along with service sector growth rates of around 7-10%. Hence, historically, no country has been a high growth performer through services alone. As against this, the country's manufacturing sector started stabilising now but despite its low contribution to national GDP; it would be able to give constant and stable growth over years to Indian economy.

- The argument that if any country have the kind of demographic and skill-based advantage that India possesses in services is also misleading. In that case, India can follow a different model of growth, going from agriculture to services, bypassing industry. The flaw in this argument is that growth driven by services, especially by a few service segments, cannot cater to the problem of growing unemployment in India. During the 1990s, while GDP growth accelerated, there was no commensurate growth in employment. Services alone cannot provide the kinds of jobs required by the economy. Fast growing services like IT and BPO can generate jobs only for those with some basic level of literacy. They cannot directly draw away surplus labour from agriculture and create employment for the masses.

Even if BPO services were to continue growing at the rates exhibited in recent years, they would account for only 0.1% of the workforce in the future. For example Indian IT firms have focused on developing and delivering IT services to advanced economies. Even if India becomes the world's software factory and the most optimistic projections of IT-related jobs (including jobs in call centers and design centers) were upheld, this industry will employ at the most a few million people. In a nation with over a billion people, this constitutes a dent in the employment statistics.

- The question is whether such changes are sustainable and effective when other areas of the economy continue to lag? For example, 79% of India's population lives in villages with limited basic infrastructure. Over 60% of the population is considered literate, however measured on a very basic criterion of ability to read and write simple words in any language, acquired with or without formal schooling, which is almost irrelevant in the context of a knowledge economy. This says that for India to develop into a service sector/knowledge based industry sector, substantial changes on its educational front must be brought in.

Moreover, those who accepted the "new growth theory," (including noted Stanford University economist Paul Romer), convincingly argued that human capital, which is a function of education levels and workforce skills, is a crucial input for economic growth. Human capital generates the ideas and knowledge that, in turn, decide how efficiently and effectively the traditional inputs of capital (such as plant and equipment) and labour are translated into output. The message is that an enormous pool of labour, in itself, is of limited value. Real progress into a knowledge economy will not come without a substantial development of India's human potential.

▶ **Manufacturing/ industrial sector Vs Specific Service sectors (IT & ITeS)**

- It is fashionable to say that India's population constitutes its greatest asset. This viewpoint is misleading. People are assets only when they participate meaningfully in the cycle of value creation and consumption by exercising buying power or creating products and services of value, or by creating and harnessing knowledge. A large fraction of India's population does not meet, or even come close to, this asset standard. To transform such a situation, a renewed focus is required on the two pillars that have supported the growth of every successful economy - a strong infrastructure core and widespread access to education.
- The value of IT depends greatly on the existing level of economic development. IT can make existing assets and processes more effective and efficient, but cannot compensate for the lack of a basic infrastructure. What is appropriate for a developed economy is not necessarily appropriate for India, where basic elements of infrastructure including quality education, healthcare, electricity and drinking water remain in short supply.
- The impact of IT is best understood when the differences between industrial and knowledge-intensive ventures are recognised. Industrial growth derives from investments in large-scale

infrastructure (such as railways, roadways, power grids and dams). Such infrastructure supports the growth of physical-asset intensive industries (such as the steel and transportation industries) that create and move physical entities (such as goods, water and people). These ventures employ numerous workers with limited education and skills, and can uplift large sections of society. In contrast, ventures in the knowledge economy usually involve the production of knowledge-intensive goods (like software), and the large-scale capture, movement and utilisation of information using sophisticated network infrastructure (such as computers, cable, fibre and routers). Beyond the physical labour required for initial construction, building and maintaining such infrastructure requires specialised knowledge.

- Despite the hype of the "new economy", the fact is that economic development is cumulative. The industrial economy made agriculture more productive. The productivity of agricultural labour skyrocketed with the use of industrial and biological innovations including tractors, irrigation systems, fertilisers, pesticides and genetically engineered seeds. Historically, industrial innovation in developed economies has created great wealth and improved living standards across societal divides. This progress has set them up in an ideal position to create and exploit knowledge as they transform into knowledge-based economies. Crucially, the greatest source of productivity and growth attributed to the knowledge economy derives not from the knowledge economy itself, but from its effects on the industrial economy. For example, IT can enable supply chains and factories to work more efficiently, thus play an augmentative role.
- In contrast to manufacturing, the direct benefits to IT (such as employment in IT jobs) are likely to flow to the few who already have the benefits of education. The trickle-down effects of IT (such as cleaning and maintenance staff for IT firms) are likely to be modest or non-existent outside the large cities. The benefits of IT implementation across other industrial sectors (such as employing IT to make transportation and supply chains more efficient) will likely be substantial.
- The equitable social distribution focus not only on the creation of wealth, but also on its distribution across social divides. The IT industry holds limited potential for wealth to trickle down to the poorer sections of society. Unlike a steel plant, IT engenders few opportunities for the uneducated. Any transfer of wealth from the IT sector (for example, by taxing the IT sector to fund social spending) would be achieved through the heavy hand of government. This represents, at best, a dubious economic proposition. In fact, the rapid growth of IT will likely lead to a digital divide in the short term, where the rich and educated are empowered and enriched by IT and the poor are oblivious to its impact.

However, IT can play a facilitative/augmentative role to the industry. In order to improve the jute industry the IT can be best used in following ways: using the power of technology (including IT) to derive new and innovative uses for jute; to expand the domestic and export market base for jute products; to position jute as a natural, inexpensive and biodegradable substitute for plastics; and to improve the efficiency of local jute markets so that jute growers can get better prices which now benefit millions of Indian households.

Therefore, the creative application of IT in a range of manufacturing and agricultural industries can yield much greater returns at a societal level, compared with software production and export. Moreover, not all technology is information technology - traditional R&D related to design and manufacturing remains extremely important. Such R&D can be enhanced by IT (for example, via virtual collaboration and computer aided design), but not substituted by it.

India should aggressively pursue manufacturing and agriculture-based industries to build a robust industrial economy that can be made more efficient with IT and other service sectors. The Indian vision of a knowledge-based economy will be realised only when it is based on the foundation of a robust industrial economy. To be truly beneficial, the rain of IT must fall at the right place, in the right quantity, at the right time and for the right purpose.

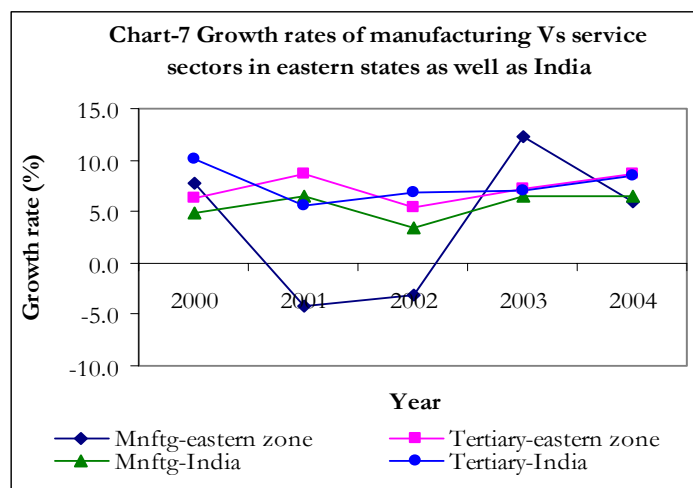
Hence, there has to be more emphasis on boosting industrial growth, especially in manufacturing, which still employs 30% of the non-agricultural workforce in India and has important backward and forward linkages with the rest of the economy. A strong domestic manufacturing sector would provide a large demand base for India's service sector, making it less vulnerable to overseas conditions and enabling a virtuous cycle of growth. The Tenth Plan growth target of 10% for the industrial sector is worth noting in this context.

But raising industrial growth will require institutional, infrastructural, and legislative reforms in the economy on a large scale, something the enclave-type service sector growth in India has not required so far. In some ways, the good performance of India's service sector against the backdrop of a slow growing industrial sector should be seen as a failure of development and of second generation reforms rather than a new model of development.

► Manufacturing Vs service sector

The trends in growth rates of service sector and manufacturing sectors at national-level against the same at eastern Indian states collectively is depicted in the (see Chart-7 for the Trends in growth rates of manufacturing Vs service sectors in eastern states as well as India). It shows that the manufacturing sector of eastern India suffered a negative growth in 2001 and 2002, which however managed to grow at 12.3% in 2003, which was even higher than the growth of service sector in eastern India as well as India as a whole. However, it plunged again in 2004 and grew at same rate of Indian manufacturing sector. The negative growth of manufacturing sector of eastern states of Bihar, Orissa and Chhattisgarh in 2001 and the same by Bihar and Orissa in 2002 could be attributed to negative growth of manufacturing sector of eastern India.

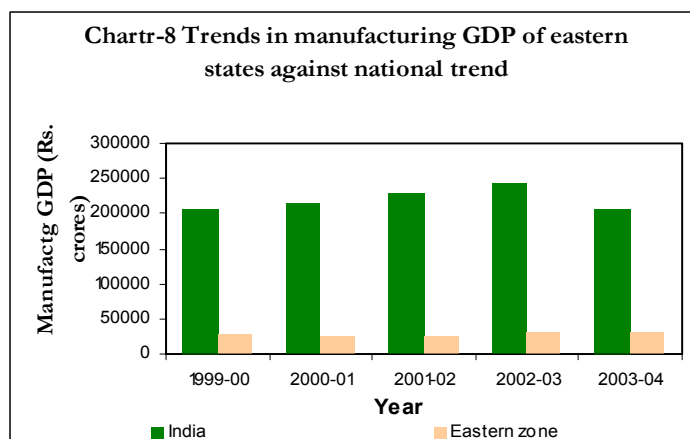
The GDP growth of tertiary sector of eastern zone, though fluctuating over years, has been performing well and growing upward constantly from 2002; it fell in line with the trend at national level. All in all, in eastern states, the manufacturing sector is wildly fluctuating while that of tertiary sector was growing at more or less constant pace. At national level too, the growth of tertiary sector surpassed the growth of manufacturing sector in the past five years except a meagre deviation in 2001.



Source: National Accounts Statistics 2005

The manufacturing GDP at both national level and eastern states over years are calculated and see chart-8. It could be inferred from the figure that the contribution of the eastern zone manufacturing sector to Indian manufacturing sector was meagre and almost constant over past five years. The contribution is fluctuating between 11 and 15% in these years.

GDP is expected to grow at 6.9%, up from 6.5% in 2004-05. However, the main contributor will be agriculture as it is projected to grow at a high rate of 4.4%, which is not unusual in a year that follows a



Source: National Accounts Statistics 2005

bad agricultural year. In 2004-05, industry is predicted to grow at a lower rate of 6.7%, and services sector growth is estimated at 7.7%. A slowdown in industrial growth in 2004-05 can be attributed to cost-smoothing behaviour of firms to tide over an anticipated cost escalation as revealed in the latest business confidence survey carried out by the National Council for Applied Economic Research, New Delhi. This is further strengthened by the fact that firms are very upbeat about capacity utilisation but not very optimistic about demand conditions, suggesting the desire to hold larger inventories.

The survey indeed shows that the proportion of firms willing to accumulate such inventory levels, especially in consumer goods, has gone up significantly. This explains the beginning of a downturn in the industrial business cycle in 2004-05. In 2005-06, GDP growth is predicted to decline to 6.1%, mainly on account of a further decline in the growth of industry and services to 5.2% and 7.3%, respectively. The revival of industry and services growth in 2006-07 will drive up overall expansion to 7.0%.

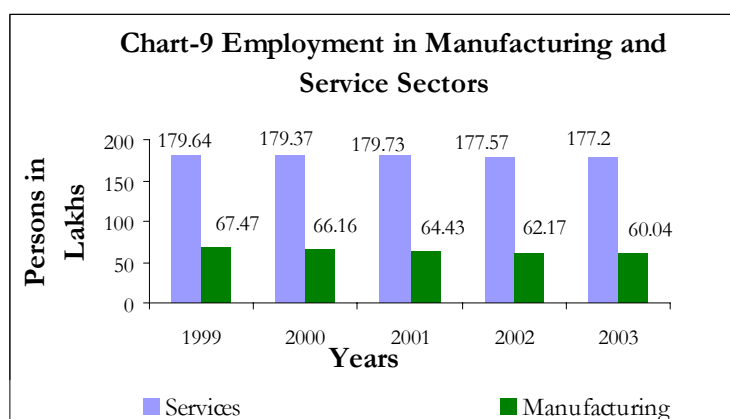
Table-7.1 Current status and future projections for Indian IT and ITeS sectors

| Parameters | 2004-05 | 2008 (projection) |
|--------------------------------------|---------------|-------------------|
| Share to national GDP | 4.1% | 7% |
| IT exports (as a % of total exports) | 25% | 35% |
| IT exports in value | 869.8 billion | |
| Employment (in million) | | |
| Software & Services | 1.1 | 2.2 |
| Hardware Sector | 0.7 | 4.8 |

Source: www.itfriend.nit.gov.in

Moreover, many of these gains have come in so-called new economy sectors like software. India's share of software services is about 17%, and in recent years Indian growth in this sector has been double the world export growth. McKinsey has estimated that Indian firms now control over half of the global IT and back office outsourcing market. In other words, India Inc is now competing in areas once thought to be the preserve of the developed world.

Of course, this is not to say that the emergence of India as a new economic giant does not face difficulties and challenges. Economic reform since the watershed year of 1991 has been partial, gradual and at times faltering. Much remains to be done, including dealing with fiscal fragility and overcoming significant infrastructure bottlenecks and political stability.



Source: Economic Survey 2004-05