

INDIA
Structural Changes in the
Manufacturing Sector and Growth Prospect

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INDIA: Structural Changes in the Manufacturing Sector and Growth Prospect

T.P. Bhat*

[Abstract: Structural Changes have occurred in the Indian manufacturing sector in recent years. However, it is not fast enough to change the trajectory of development. Manufacturing is an export driver and creates productive employment and business opportunities, but has not taken place adequately in Indian economy. The contribution of the manufacturing sector is low, around 14 to 16 per cent of GDP and witnessing near stagnation. Technology in manufacturing is stuck at the basic or intermediate level. R&D expenditure is too low to galvanize industries. Growth in manufacturing sector has been declining since the early 2007 due to lack of investment both from the private and public sectors. Lack of demand and slow growth of GDP adversely affected fresh investment in consumer and capital goods industries. High interest rates, too, have contributed to the depressed investment climate. The shrinkage in manufacturing employment is on account of increased capital intensity in all manufacturing firms. The path to revive manufacturing growth requires development of infrastructure, better access to land, and application of new technology, education, skill development and fostering innovation in frontier technologies.]

1. Introduction

The term 'structural change' commonly refers to long-term changes in the composition of an aggregate which may be attributable to changes in the relative significance of sectors of the economy, to changes in the location of economic activity and to other concomitant aspects of industrialization, which are jointly referred to as structural change¹. Over the years, the progress in manufacturing is linked to rising per capita income. A country's optimal industrial structure will differ according to its stage of development and its given characteristics (Lin 2010). Countries at different stages have comparative advantages in different industries. This phenomenon indicates changes in structure of the industry.

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¹ Harguchi, Nobuya and Gorazd Rezonja, "Emerging Patterns of Structural Change in Manufacturing, (Ed.) Adam Szirmai, Wim Naude and Ludovico Alcorta, "Pathway to Industrialization in the Twenty-First Century: New Challenges and Emerging Paradigms, UNU-WIDER Studies in Development Economics, Oxford University Press, U.K. 2013, Pp. 102-128

Ever since the Industrial Revolution in the 18th century, the manufacturing activity has been considered to be the main engine of economic growth. In the development theory the structural changes was associated with shift of resources from primary sector to the manufacturing sector. However, in the recent years, the role of manufacturing sector has been questioned. First, now the advanced economies are mainly service economies. Secondly, the importance of the service sector is recognized, particularly trade, transport and financial services that have contributed to industrialization. Lastly, the recent experiences of India and some of the developing countries raises the question of whether services have become key sector in economic growth in the 21st century.

This paper makes an effort to examine the proposition that manufacturing has acted as the main engine of growth in India in the period 1991-92 to 2010-11. It may be noted that the industrial policy has been drastically altered and modified from inward-looking import substitution to outward looking export policy to a large extent. The changes brought about were not swift and fast, it was slow and calibrated. The "License and Permit Raj" earlier three decades failed to bring about satisfactory rate of growth in the manufacturing or for that matter industrial growth. Further, emphasis on manufacturing did create discrimination against the agricultural sector and which in turn harmed industrial development. In effect, it failed to keep balance of inter-sectoral linkages between manufacturing and service sector. Indian manufacturing was by and large labour-rich and capital poor. But the industry was using little labour and using capital relatively inefficiently. The industry was trapped by perverse policy. Prior to 1980's there was a considerable diversification of Indian manufacturing as consequences of policy distortions. The import substitution strategy and encouragement of public sector investment created the industries which were not acceptable at the comparative income levels.

The mid-60s and mid-70s witnessed stagnation in industrial growth, particularly the manufacturing sector. There has been significant slow-down in the growth of heavy industries and slow and indifferent growth in other industries. The main factors that contributed this industrial stagnation were: 1) slow growth of agricultural incomes and their impact on constraining demand for industrial goods; 2) the slow-down in public investment after mid-60s with its impact on infrastructural investment; 3) poor management of infrastructural sectors, leading to severe infrastructural constraints; and 4) industrial framework, including both domestic industrial policies and trade policies and their effect in creating a high cost industrial structure in the economy².

There has been a slow-down in public investment after the mid-60s. There were several factors responsible for this state of affairs. Mainly two reasons stands out. There were two severe agricultural droughts in succession and large decline in foreign aid. The public savings too declined. More importantly, the conservative attitude of the government deficit

² Ahluwalia, Isher Judge (1985), *Industrial Growth in India: Stagnation in the Mid-Sixties*, Oxford University Press, Delhi, Pp. 166-172.

financing resulted in a marked slow-down in public investment. As public investment slowed down, this led to direct setback in the demand for certain heavy industry goods for example, railway wagon producing industries. More significant than the demand side impact of slow-down in public investment was on its supply side impact. The cuts in the public investment were distributed across sectors and it led to basic supply bottle necks in the economy³.

The under-investment in the infrastructure was coupled with growing inefficiencies in these sectors. Time and cost overruns were the common features. The management of the critical input supply sector power was highly inefficient and defective. There was a marked deterioration in electricity generation and freight traffic moved by the railways. The supply side constraints generated by the infrastructure was compounded by an industrial policy framework which was directed towards regulation rather than development of the manufacturing sector. The import substitution industrial policy led to export pessimism. The process of import substitution was performed inefficiently. There was no phasing out of import substitution for any specific industries, the process of granting import substitution was not systematic. The setting up of indigenous capacity was considered as a sufficient condition for import substitution irrespective of cost and quality considerations. This resulted in high cost industrial structure incapable of surviving without high protection. This totally discouraged foreign as well as domestic competition.

The system did not provide any incentive for improving efficiency, bringing down the costs and improving quality. The government administration was bias towards regulation rather than promotion of private industry which was assigned the task of providing consumer goods. The business environment was non-too friendly but more hostile to private enterprises. Contribution of total factor-productivity was negligible for industry groups. Add to it, the rise in the prices of international oil made deep dent on the budget in 1970s. Under-investment in infrastructure led to shortage of coal, power and rail transport. Under-utilization of installed industrial capacity in a wide range of industries which slow-down the rate of growth in manufacturing. Increased concern on regional dispersion led to uneconomic choice of location and often led to fragmentation of production and uneconomic scale of production at a single location. The licensing procedure made project implementation time consuming and cost overrun. To sum it up, the industrial policy till 1980 failed to meet its set objectives. The structural changes were limited and agriculture remained a dominant sector.

2. Broad Trends in Manufacturing Policy and its Impact

The key features of reforms in the 1980s were : 1) import liberalization, particularly of capital goods and intermediate inputs through the expansion of the range and number of

³ Bhagwati, J. N. and T.N. Srinivasan (1975), *Foreign Trade Regimes and Economic Development: India*, NBER, Columbia University Press, New York and London.

goods on the open general licensing list and through a reduction canalization; 2) The extension of export incentives through the tax system and liberal access to credit and foreign exchange; 3) the significant relaxation of industrial licensing requirements through direct 'delicensing' of some industries and through 'broad banding' which permitted firms in some industries to switch production between similar product lines; 4) decontrol of administered prices of key intermediate inputs. Notably Kohli (2006) and Rodrik and Subramanian (2004) characterise the reforms of the 1980s as having been "pro-business" in orientation. The reforms of the 1990s as considered to be "pro-market" in orientation. It included: 1) The abolition of industrial licensing and limiting the scope of public sector monopolies to a small number of industries; 2) the liberalization of inward foreign direct and portfolio investment; 3) sweeping trade liberalization including the elimination of import licensing and the progressive dismantling of non-tariff barriers; 4) major financial sector liberalization, including the removal of capital controls on capital issues, free entry for domestic and foreign private banks and the opening up of the insurance sector; and 5) liberalization of investment and trade in important services, such as telecommunications. However, there are some areas remained untouched by reforms in the 1990s were the labour market, small-scale reservations and agricultural reforms. Some these sectoral reforms were undertaken in a gradual manner at the latter stage. However, the labour reforms were remained untouched to a large extent.

There has been a positive effects of these reform measures, example, annual average rate of growth of GDP per worker increased from 0.7 per cent in 1970s to 3.9 and 3.3 per cent respectively in 1980s and 1990s, and it was estimated to be around 4.3 per cent in 2000s. While total factor productivity (TFP) growth increased from -0.5 per cent to 2.5 and 1.6 per cent over the same period (Ahluwalia 1991). There has been shift in the growth pattern. This has been carried forward in 2000 to 2011, with some aberrations in 2008 and 2009. The development in the growth pattern has been slow and sluggish. The sectoral share have changed over the reform period and also there are changes in the factor intensities and diversification. The agricultural sector value added to GDP declined from 35 per cent in 1980 to 17 per cent in 2012. Over the 32 years the share of agriculture in has shrunk by 18 percentage points. In the same period the share of industrial sector in GDP increased from 24 per cent to 26 per cent and that of manufacturing declined from 16 per cent to 14 per cent. For that matter, the share of manufacturing never went over 17 per cent of GDP ((1995 and 1996 it was 17 per cent). Industries share in the GDP went up to the maximum of 29 per cent of GDP in the years 2006 and 2007. This clearly indicates there has been stagnation in both industrial as well as manufacturing sector. only sector which grew at a faster rate was the services sector. In 1980 the share of services sector in GDP was 40 per cent and in 2012 it increased to 57 per cent and a net increase of 17 percentage points over the years (see *table 1*). Fall in the share of agriculture sector in GDP has been adequately compensated by the service sector. This pattern of development raise questions on its nature, sustainability and replicability. It is in this context, the kind of stagnation that manufacturing experienced need to be examined.

Table 1. Share of Value Added of Sectors in GDP in Selected Years (in per cent)

<i>Years</i>	<i>Agriculture</i>	<i>Industry</i>	<i>Manufacturing</i>	<i>Services</i>
1980	35	25	16	40
1990	29	26	16	44
1995	26	27	17	46
2000	23	26	15	51
2006	18	29	16	53
2010	18	28	15	54
2012	17	26	14	57

Source: World Bank, World Development Indicators, Various years.

The share of gross capital formation to GDP increased from 18 per cent to 36 per cent in 2012. The steep rise was witnessed from 2004 onwards. In 1980s the average was hovering around 22 per cent and in 1990s around 24 per cent and thereafter from 2001 to 2012 it has risen to 33 per cent of the GDP. Similarly, gross fixed capital formation (private sector) to GDP show accelerated rise from 2004 onwards (see *table 2*). This indicates that the manufacturing is moving towards capital intensity. The gross fixed capital formation remained almost stagnant from 2005 and the same case with gross capital formation. This trend also indicates that the new investment is drying out.

Table 2. Share of Gross Capital Formation and Gross Fixed Capital Formation to GDP (in per cent)

<i>Period</i>	<i>Gross capital formation</i>	<i>Gross fixed capital formation</i>
1980	18	9
1985	23	9
1990	25	14
1995	26	15
2000	24	16
2005	34	23
2010	37	24
2012	36	23

Source: World Development Indicators, various years.

3. Manufacturing Growth and Employment Scenario

The growth rate of the manufacturing sector which accounts in terms of weightage of 75.53 per cent of the industrial sector did not show strong trends in growth over the last decades (from 1981-82 to 2011-12). During the 1980s, by and large, the growth rate hovered around 7 to 8 per cent and the annual average growth rate was 7.63 per cent. This was a period in which industries were allowed to expand the capacity of production and relatively liberal capital goods imports were permitted. The manufacturing growth rate declined in the first decade of the liberalization (1991-92 to 2000-01), it was 6.22 per cent per annum on an average. The growth rate picked up in the middle of the decade but it tapered off towards the end of the decade due to the Asian financial crisis of 1997 and 1998. The decline in the growth rate was also influenced by downswing in the European and North American economies. The decade of 2000s (2001 to 2011-12) opened with world-wide recession with

low rate of growth in manufacturing. The growth recovered in 2003-2004 this continued till 2007-08. During this decade the manufacturing sector grew by 8.27 per cent per annum on an average. (see *table 3*)

Table 3. Growth Rates of Manufacturing and Industrial sector 1981-82 to 2011-12 (in per cent)

<i>Period</i>	<i>Manufacturing</i>	<i>Industrial</i>
1980-81	7.9	9.3
1985-86	9.7	8.7
1981-82 to 1990-91	7.63	7.86
1990-91	9.0	8.3
1995-96	14.1	13.0
1991-92 to 2000-01	6.22	5.97
2001-02	2.9	2.7
2005-06	8.9	11.9
2009-10	11.0	10.5
2011-12	3.0	2.9
2001-02 to 2011-12	8.27	7.21

Source: Reserve Bank of India, Handbook of Statistics, Various years.

Index numbers of industrial production use based classification from 1991-92 to 2012-13 shows that during this period consumer durables and consumer goods grew relatively at a rapid rate, this is particularly more impressive during 2001-02 to 2012 -13 period. Growth has been relatively modest in case of consumer non-durables and poor in case of basic goods, capital goods and intermediate goods (see *table 4*). The growth has been relatively impressive in capital goods sector during 1996-97 to 2000-01. Otherwise this sector did not show satisfactory growth. Somewhat recovery could be seen in basic goods only during 2001-02 to 2012-13. The growth rates of intermediate goods sector highly fluctuated over the reform period. This is more or less case with the consumer non-durables. In the reform period, consumer durables and consumer goods did attract relatively more investment from the domestic sources as well as foreign sources.

Table 4. Index Numbers of Industrial Production-Use based Classification (compound rates of growth per annum)

<i>Period</i>	<i>Basic Goods</i>	<i>Capital Goods</i>	<i>Intermediate Goods</i>	<i>Consumer Goods</i>	<i>Consumer Durables</i>	<i>Consumer Non-durables</i>
91-92/95-96	7.28	2.01	9.61	6.44	13.83	5.37
96-97/ 00-01	4.49	8.89	8.24	6.15	11.03	4.68
01-02/05-06	5.41	1.73	6.48	10.79	12.92	10.04
06-07/ 12-13	5.60	8.07	4.70	9.02	19.89	4.41
91-92/ 00-01	6.70	5.90	10.99	7.28	16.25	5.65
01-02/ 12-13	7.00	6.57	6.85	13.76	27.24	8.60

Source: Reserve Bank of India, Handbook of Statistics, Various years

It may be appropriate to look at more recent trends in two digit level industrial production to identify the manufacturing activities which have more growth potential. For this purpose, we looked at the growth rates of industries during 2005-06 to 2012-13 period, we

classified them into three categories as high growth, modest growth and low growth industries. The total weights assigned to the manufacturing sector is 755.27 (out of 1000) and the rest for mining and electricity. The weights of the high growth sector is 126.21 or 16.71 per cent of total manufacturing. The high growth sector is defined the growth rate more than 10 per cent. The modest growth sector weight is 291.13 or 38.55 per cent and growth rate above 5 per cent and below 10 per cent and low growth sector weight is 337.87 or 55.26 per cent. The growth rate below 5 per cent. This clearly indicates the low growth sector dominates in the manufacturing segment. The following *table 5* shows broad trends in recent times. Nearly 83.3 per cent of industries grew at low and modest rate. In high growth sectors, the competition is intensive in international market but the opportunity exists because of high degree of complementarity and scope for intra-industry trade. Machinery and equipment and transport equipment are rapidly growing sectors world over. But these sectors need huge investment to make dent in the global market. In modest growth group most of the industries depending upon demand from the domestic market. The scope exists for exports in food products and rubber and plastic products. In low growth sectors, India failed make use of the opportunities in textiles and wearing apparel after the dismantling of Multi-fibre arrangement (MFA) in 2005. India's competitiveness

Table 5. Trends Industrial Products Growth 2005-06 to 2012-13 (compound growth rate per annum)

<i>Industry code and Product sectors</i>	<i>Weight</i>	<i>Growth Rate</i>
High growth sectors (above 10%)		
29 Machinery and equipment n.e.c	37.63	10.30
31 Electric machinery and apparatus	19.80	27.01
32 Radio, T.V. and Communication equipment and apparatus	9.89	89.75
34 Motor vehicles, trailers	40.64	15.29
35 Other transport equipment	18.25	13.05
Modest growth sectors (below 10% and above 5%)		
15 Food products and beverages	72.76	6.22
22 Publishing, printing & reproduction of recorded media	10.78	7.62
25.Rubber and plastic products	20.25	8.09
26 Other non-metallic mineral products	43.14	6.24
27 Basic metals	113.35	8.69
28 Fabricated metal products	30.85	9.31
Low growth sectors (below 5 %)		
16 Tobacco products	15.70	1.02
17 Textiles	61.64	3.89
18 Wearing apparel, dressing and dyeing of fur	27.82	3.23
19 Leather products	5.82	4.98
20 Wood products	10.51	4.81
21 Paper and paper products	9.99	3.81
30 Office, accounting & computing machinery	3.05	-1.48
33 Medical, precision & optical instruments	5.67	2.84
36 Furniture manufacturing n.e.c	29.97	1.65
Manufacturing	755.27	8.27

Source: Economic Survey, Government of India, Various Years. Calculations by the author.

sharply declined on many counts. The scope for enhancing growth in other manufacturing is entirely depending upon the domestic economic growth situation.

Growth in employment rate in the organized manufacturing sector has been dismal during the post-liberalization period with the exception of the period from 2006 to 2011. It was negative during 2001 and 2005 period to the extent of -3.2 per cent per annum. Even in the decade of 1990s it was just positive to the insignificant extent (see *table 6*). The growth rates in the public sector has been continuously declining during the post-liberalization period. Over the period public sector has been shrinking due to lack of government investment and some degree of privatisation. There was hardly any new investment. On the other hand, private sector did not show high response to enhance employment. Relatively better growth in employment came in the private sector from 2007 onwards with exception of the year 2010 when the employment growth was negative. With inflexibility in hiring labour and rigid labour laws the private sector opted for more capital intensive mode of production. Increased competition in the domestic market also induced manufacturing units to go for capital. Further, the import liberalization enabled them to obtain new technology and capital equipment on easy terms.

Table 6. Employment Growth Rate in Organized Manufacturing Sector Public and Private Sector: 1991 to 2011 (in per cent per annum)

<i>Period</i>	<i>Public Sector</i>	<i>Private Sector</i>	<i>Both Sector</i>
1991-1995	-1.24	1.10	0.25
1996-2000	-2.70	1.62	0.50
2001-2005	-5.89	-2.46	-3.21
2006-2011	-1.75	3.22	2.18
2006	-3.36	1.34	0.04
2007	-0.46	4.92	3.48
2008	-3.00	4.63	3.03
2009	0.01	4.59	4.06
2010	0.57	-0.27	-0.13
2011	-4.70	4.11	2.61

Source: Economic Survey, Government of India, Various Years. Calculations by the author.

The declining trend in the employment content of growth in the manufacturing could be seen in terms of values of employment elasticity⁴ (ratio of employment growth to growth in value added) in *table 7*. Over the years employment elasticity in manufacturing has steeply declined. The employment elasticity with respect to GDP in manufacturing was 1.01 in 1983/87-88 period and it has fallen to -0.11 in 2004-05/ 2009-10. Some of the work tasks performed by the manufacturing has been outsourced and sub-contracted to the service sector. This kind of changes were also responsible for contraction of employment in manufacturing sector. With the induction of new technology and knowledge component

⁴ Papola, T.S. (2013), Economic Growth and Employment linkages: Indian Experience. ISID Working Paper No. 2013/01, Institute for Studies in Industrial Development, New Delhi.

the use of labour did decline. Moreover, the entrepreneurs prefer use of capital than labour because the management of labour is more difficult. Further, it is not easy to retrench workers. More importantly, the process production itself has changed to make products more competitive.

Table 7. Employment Elasticity with respect to GDP in Manufacturing

<i>Period</i>	<i>Elasticity</i>
1983/87-88	1.01
1987-88/93-94	0.01
1993-94/99-00	0.24
1999-00/04-05	0.78
2004-05/09-10	-0.11
1983/93-94	0.41
1993-94/04-05	0.47
1999-00/09-10	0.25

Source: Papola, T.S. (2013), Economic Growth and Employment Linkages: Indian Experience. ISID Working Paper No. 2013/01, Table 3, Pp 6.

The share of the unorganized manufacturing sector in total manufacturing output has been shrinking. However, its share in employment remained stable until 2005-05. Thereafter, there has been decline to some extent. There has been some reversal in the recent years. The organized manufacturing sector's growth in respect of labour absorption in the period 2004-09 has shown distinct improvement. The aggregate employment numbers from the 66th Round of NSSO survey indicates contrast with the earlier survey. The overall employment in the manufacturing sector (both organized and unorganized sectors) has declined from 53.6 million in 2004-05 (NSSO 61ST Round) 50.5 million in 2009-10 (NSSO 66TH Round). ASI data reveal (2008-09) that employment in organized manufacturing increased from 8.5 million in 2004-05 to 11.3 million in 2008-09. If number of persons engaged in organized manufacturing assumed to remain at the 2008-09 level, the employment in unorganized manufacturing would see sharp decline from 45.1 million in 2004-05 to 39.2 million in 2009-10.

The study of Rajesh Raj (2006) Makes observation that the growth of value added has declined from 9.4 per cent in the pre-reform period to 4.4 per cent in the reform period, implying that the unorganized manufacturing sector failed to sustain the growth momentum during the post-reform period. This has been due to slow growth of employment and investment in the post-reform period. This was on account of employment decline in the reform period. According to the above study the food and related industry group emerged as a major contributor to employment (from 23.6 per cent in 1978-79 to 27.6 per cent in 2000-01 period) and also value added (from 17.6 per cent to 20.1 per cent in the same period). At the same time, textiles and allied industries saw erosion in their shares in employment (from 35.8 per cent to 29.1 per cent between 1978-79 and 2000-01) and value added (from 33.1 per cent to 28.7 per cent in the same period). However, this sector continue to be the largest source of employment generation and value addition. Manufacturing of machinery goods and minerals registered high rates of value

added growth both in pre and post reforms period. Their share in employment and investment increased. In contrast, basic metal and cotton industries had low rates of value addition growth and similar was the case with employment.

The textile garment industry grew rapidly during the reform period which was on account of increased investment in the sector and also the reflection of boom in demand. This sector grew rapidly in the unorganized sector in the reform period. In contrast, the performance of wood products, cotton products and beverages were disappointing. Their growth rates fell in the reform period. The analysis of productivity in the unorganized manufacturing sector reveals that the productivity has improved during the reform period, however, there has been a wide variation across the industries. The low growth performance industries such as wood products, cotton products and beverages did experience low rise productivity. The total factor productivity show decline of -1.19 in the textile industry despite of its impressive performance in terms of gross value added, employment and investment. This indicates that the textile industry has a potential to enhance output much beyond the present level. The decomposition of productivity growth suggests that technological up gradation needs to be prioritized to improve the growth of output of the unorganized sector.

4. Some Aspects of Structural Changes

The fixed capital in manufacturing increased by 19.4 per cent over the period 1991-92 to 2006-07⁵. The increase in the fixed capital was faster in the initial years of reform and it tapered off in the subsequent period particularly in the period 2001-02 to 2006-07. This was largely due to the down turn both the Indian economy and the global economy. The process of economic reform also slow down in the later period. An increase in fixed capital differed vastly from industry to industry. For example, apparel (64.4%) and coke and petroleum products (54.7%) have high rate of growth in fixed capital. Similarly in publishing and printing (32.0%) and motor vehicles (31.8%) but to lesser extent. The rise in the fixed capital was low in important industries such as basic metals (12.4%) and machinery and equipment (12.9%). For details see *table 8*.

The gross value added (GVA) in the manufacturing sector increased by 17 per cent during 1991-92 to 2006-07. In the second phase (1996-97 to 2000-01) the GVA growth declined to 1.9 per cent and in the subsequent period (2001-02 to 2006-07) the growth rate was restored to 16.8 per cent per annum. It may be interesting to observe industry-wise growth in GVA. The growth rate of GVA has been impressive in case of coke and petroleum products (74.9 %), basic metals (30.2%), and motor vehicles and trailers (24.7%). Whereas it has been low in case of wood and wood products (3.6%), radio, T.V. and communication equipment

⁵ Bhat, T.P. (2013), Growth and structural Changes in Indian Industry, ISID Working paper No. 2013/02, February, Institute for Industrial Studies, New Delhi, Pp30-31.

(4.8%), and office, accounting and computing machinery (5.7%). The GVA growth rate was in the range of 10 to 20 per cent in other industries. For details see *table 9*.

Table 8. Rise in the Growth Rate of Fixed Capital Per Annum 1991-92 to 2006-07 (in per cent)

<i>Industries</i>	<i>Rise in fixed capital</i>	<i>Industries</i>	<i>Rise in fixed capital</i>
15. Food and beverages	22.0	16. Tobacco products	22.7
17. Textiles	26.8	18. Apparel and dyeing fur	64.4
19. Leather products and tanning	11.8	20. Wood and wood products	24.4
21. Paper and paper products	16.0	22. Publishing and printing	32.0
23. Coke and petroleum products	54.7	24. Chemicals and chemical products	17.7
25. Rubber and plastic products	21.7	26. Non-metallic mineral products	15.9
27. Basic metals	12.4	28. Fabricated metals	28.6
29. Machinery and equipment	12.9	30. Office, accounting and computing machinery	23.5
31. Electric machinery and apparatus	13.0	32. Radio, T.V. and communication equipment	16.2
33. Medical, optical instrument	7.5	34. Motor vehicles	31.8
35. Transport equipment	12.1	36. Furniture	13.4

Source: Handbook of Statistics on Indian Economy, Reserve Bank of India. Author's calculation.

Table 9. Growth of GVA Per Annum: 1991-92 to 2006-07 (in per cent)

<i>Industries</i>	<i>Growth rate of GVA</i>	<i>Industries</i>	<i>Growth rate of GVA</i>
15. Food and beverages	13.8	16. Tobacco products	10.5
17. Textiles	7.7	18. Apparel and dyeing fur	19.0
19. Leather products and tanning	7.0	20. Wood and wood products	3.6
21. Paper and paper products	6.7	22. Publishing and printing	11.5
23. Coke and petroleum products	74.9	24. Chemicals and chemical products	14.5
25. Rubber and plastic products	9.5	26. Non-metallic mineral products	11.8
27. Basic metals	30.2	28. Fabricated metals	18.6
29. Machinery and equipment	11.5	30. Office, accounting and computing machinery	5.7
31. Electric machinery and apparatus	14.6	32. Radio, T.V. and communication equipment	4.8
33. Medical, optical instrument	15.9	34. Motor vehicles	24.7
35. Transport equipment	14.0	36. Furniture	44.3

Source: Based on NSSO data. Author's calculation.

The share of all labour-intensive industries in total manufacturing GVA has declined more or less continuously over 1991-92 to 2006-07 period.⁶ Steep decline is evident in case of textiles, paper and paper products. Among the capital-intensive industries share of GVA increased sharply with respect to coke and petroleum products, motor vehicles and trailers and basic metals. This scene clearly indicates the industrialization is moving towards capital intensity. Yet another example is the share of labour-intensive industries has declined in total manufacturing GVA over the period from 1991-92 to 1995-96 period to 2001-02 to 2006-07 from 29.3 per cent to 23.8 per cent. And in the same period, capital-intensive industries GVA has increased from 70.7 per cent to 78.6 per cent. This also supports view that the manufacturing activity is moving towards capital intensity. Falling GVA growth in labour-intensive industries is a cause concern to a labour surplus country like India. It has a long-term employment implications.

Increase in the fixed capital growth rate has been higher than GVA growth rate in most of the industries during the reform period. However, the exceptions are coke and petroleum products, basic metals, electric machinery and apparatus, medical, optical instrument and watches and transport equipment. All these product groups are capital-intensive industries. This may be due to technological changes in these industries which enhanced the productivity per worker. The rise in the growth of fixed capital is higher than the rise in work force in all industries except furniture. And finally, the rise in the GVA is higher in all industries over the work force rise except in the case of apparel and dyeing fur. This indicates the capital intensity in the industry is growing at a faster rate. The output is becoming increasingly capital-intensive including that of labour-intensive industries. The labour productivity is also on the rise with increased amount of capital per worker.

Gross value added per unit of capital declined in most of the industries during the period 1991-92 to 2006-07, except in case of coke and petroleum products, basic metals, electric machinery and apparatus, medical, optical instrument and transport equipment. The GVA per unit of fixed capital declined sharply in the case of wood and wood products (-68%), apparel and fur (-64.3%), office, accounting and computing machinery (-59.9%), textiles (-57.8%), publishing and printing (-53.8%) and radio, T.V. and communication equipment (50.9%). All labour-intensive industries experienced steep fall in GVA per unit of fixed capital for details see *table 10*. It provides yearly variations in each industry about GVA per unit of fixed capital. For the total manufacturing as a whole decline in GVA per unit of fixed capital was -9.24 per cent per annum during 1991-92 to 2006-07 period.

The GVA per worker increased in all industries except in the case of apparel and dyeing of fur during the period. Among the labour-intensive industries, GVA per worker is highest in publishing and printing, tobacco products and food products and beverages; the lowest is in leather and leather products. Among the capital-intensive industries, the GVA per worker is high in the case of coke and petroleum products, transport equipment and basic

⁶ See foot note 4 Pp. 32-33.

metals. However, it is low in the case of rubber and plastic products, office, accounting and computing machinery, radio, T.V. and communication equipment. For total manufacturing as a whole, GVA per worker increased by 136.20 per cent from 1991-92 to 2006-07 (see *table 10*, col.2). Similarly, fixed capital per worker increased in all industries, the highest being publishing and printing, coke and petroleum products, tobacco products, wood products and textiles. The capital per worker increased rapidly in case of labour-intensive industries. The fact again emphasised is the labour-intensive industries are substituting capital for labour.

Table 10. GVA Per Unit of Fixed Capital, GVA Per Worker and Fixed Capital Per Worker 1991-92 to 2006-07 (in per cent)

<i>Industry</i>	<i>GVA per unit of fixed capita</i>	<i>GVA per worker</i>	<i>Fixed capital per worker</i>
15. Food products and beverages	- 29.11	145.99	246.93
16. Tobacco products	- 42.23	177.56	380.00
17. Textiles	- 57.75	78.48	322.29
18. Apparel and dyeing fur	- 64.34	12.73	145.11
19. Leather products and tanning	- 26.45	32.36	80. 21
20. Wood and wood products	- 68.02	52.22	374.69
21. Paper and paper products	- 41.60	56.01	167.50
22. Publishing and printing	- 53.75	228.80	610.88
23. Coke and petroleum products	33.21	702.61	503.18
24. Chemical and chemical products	- 13.48	140.15	177.48
25. Rubber and plastic products	- 43.79	25.23	122.36
26. Non-metallic minerals	- 18.54	94.66	139.04
27. Basic metals	95.28	342.41	126.62
28. Fabricated metal products	- 28.69	99.92	180.40
29. Machinery and equipment	- 7.35	136.38	154.88
30. Office, accounting & computing machinery	-59.85	63.51	307.47
31. Electric machinery and apparatus	8.25	148.49	129.39
32. Radio, T.V & communication equipment	-50.90	77.10	260.65
33. Medical, optical instrument &watches etc.	60.47	130.10	43.39
34. Motor vehicles and trailers	- 18.70	129.69	181.02
35. Transport equipment	43.12	355.62	298.86
36. Furniture	- 39.89	117.85	262.11
Total manufacturing	- 9.24	136.20	193.64

Source: Based on NSSO data. Author's calculations Value in constant terms.

5. Main Constraints

There are several factors for stable share of manufacturing in GDP and employment. Among them four factors appears critical. They are: 1) high resource intensity of manufacturing; 2) higher compliance burden under the regulations; 3) difficulties in land acquisition for setting up industries; and 4) dysfunctional exist policy framework that take considerable time in reallocation of resources locked up in sick and non-viable units. The

organized manufacturing sector in India is material resource intensive. The share of inputs in total value of output of the manufacturing sector has shown an increase from 76.3 per cent in 1981-82 to 81.3 per cent in 2008-09. The ratio of value added to output has declined from 22.7 per cent in 1981-82 to 18.7 per cent in 2008-09. This indicates that innovation and technology intensity (including capital intensity) has not made any significant improvement in efficiency of resource use. It shows that there is a scope for industry to scale up itself in the value chain through better technology, skill up gradation of workforce and improved integration through forward and backward linkages. Three factors namely, inadequate efforts to develop indigenous technology and /or acquisition of technology, limited adoption of the acquired technology through research and adequate emphasis on human resources development may have contributed to keeping the material resources intensity in Indian manufacturing stable. New Manufacturing Policy (NMP) recognizes these constraints. It proposes a technology development and acquisition fund, incentivize green manufacturing technology and focus on skill development. It would like to associate industry in this venture. It has been estimated that one percentage point reduction in the input intensity of manufacturing would have increased the gross value added in organized manufacturing close to 5 per cent in 2008-09⁷.

The organized manufacturing faces problems with regard to the compliance burden which acts as a deterrent to enterprises. On this count, India has been ranked low in doing business by the World Bank in 2012. The organized manufacturing data reveals that the ratio of employees (total persons engaged including managerial staff) to workers (engaged in production) has remained nearly stable at 1.29 to 1.35 during 1981-2009, but the ratio of emoluments (total compensation to employees) to wages (compensation to workers) has become adverse for the workers. This reflects that the per capita real wages have remained nearly stagnant, income of the supporting staff has increased significantly⁸. This trend has led to increased casualization of shop floor workers. This casualization in the worker could be either because of the possible cost savings or to reduce compliance cost or both. One of the most important statutory approvals for setting up and running the industry relates to environmental clearance which is withheld for considerable time. This is the main disincentive for setting up new units. The NMP suggests a number of ways to reduce compliance burden. But many measures are yet to fructify.

The experiences of successful industrial development suggests that there are significant benefits to be had from clustering and agglomeration of manufacturing units. It helps in creating effective supply chains, provides easier access to markets and supports economies in production logistics. It requires availability of serviced land for use of industry. In India

⁷ Singhi, M.C. and Rajeev Malhotra (2012), *Accelerating Manufacturing Growth- Promise of New Manufacturing Policy and Beyond* (Ed) A Policies for India's Development : Critical Decade, Oxford University press, 2012, Pp. 209-233.

⁸ Trivedi, Pushpa, etl. (2011), *Productivity, Efficiency and Competitiveness of Indian Manufacturing Sector*, Development Research Group Study No. 37, Reserve Bank of India, June.

land acquisition has become an important constraints for industries. The NMP envisages development of National Investment and Manufacturing Zones (NIMZs) to promote investments in manufacturing sector and to make NIMZs hubs for both domestic and global markets. However, this scheme yet to take off the ground. The recent bill proposed makes land acquisition all the more difficult.

The Indian industry suffers on account of a difficult exit route. It is both time consuming and costly. Delay in exit results in locking up resources in units which are no longer economically viable. Considerable amount of resources have remained unutilized over the years. One of the important considerations in NMP is to conceive a job loss policy with adequate compensation so that the issues relating to labour dues do not delay closure or right-sizing of units, thereby preventing the reallocation of resources. The job loss policy will enable units to pay adequate compensation to workers in the eventuality of business losses or closure through insurance. It would eliminate the charges on assets to meet the compensation requirements.

6. The Action Required

The policy corrections are required to enhance manufacturing output. The New Manufacturing policy (NMP) has proposed to increase the share of in GDP to 25 per cent and increase the absorption of labour from around current 50 million to more than 150 million by 2022. Besides, it seeks the creation of required skill set among the rural migrants and urban poor to make growth inclusive; increased domestic value addition; and technological depth in manufacturing; enhance global competitiveness of Indian manufacturing; and ensure sustainability of growth particularly with regard to energy efficiency, optimal utilization of natural resources and restoration of degraded eco-system⁹. Meeting the objective of 25 per cent share for the manufacturing sector, the implications ought to be looked into.

In the period 2005-06 to 2010-11, the manufacturing sector grew by 9.35 per cent and GDP 8.62 per cent per annum. This implies that the sector would need to grow at an average of 14 per cent per annum in the 11 years (2011-12 to 2021-22), while retaining the policy target growth of 4 per annum in primary sector and GDP growth at 9 per cent per annum for the period. This would mean a growth of 8.6 per cent per annum in services. And the share of services would remain constant¹⁰ (see *table 11*).

This analysis shows that the rise in the share of manufacturing sector would be entirely on account of the decline in the share of the primary sector in GDP. The average growth of 14 per cent per annum appears highly improbable in the context of manufacturing sector

⁹ National Manufacturing Policy, Annex to Press Note No. 2 (2011 Series), Department of Industrial Policy and Promotion, Government of India.

¹⁰ See foot Note No. 6

growth in the last two years. Currently, new investment is not coming in green field ventures. Less said the better about the foreign direct investment. However, it may be useful to outline measures needed to achieve some better results in this direction.

Table 11. Implications of NMP (in per cent)

<i>Sectors</i>	<i>Average Growth in 2005-06 to 2010-11</i>	<i>Average Shares in 2005-06 to 2010-11</i>	<i>Average Growth 2011-12 to 2021-22</i>	<i>Average Share 2021-22</i>
Primary	3.76	18.62	4.0	9.91
Manufacturing	9.35	15.82	14.0	25.0
Services	9.92	65.55	8.6	65.09
GDP at factor cost	8.62	100.00	9.00	100.00

Source: Singhi, M.C. and Rajeev Malhotra. (2012), Accelerating Manufacturing Growth. (Ed.) A Policies for India's Development: Critical Decade, Oxford University Press, Pp 227.

First, the issue of availability of land for industrial and infrastructure use is caught in a controversy. The present Bill on Land Acquisition and Rehabilitation Bill which will come into effect in January 2014 has not met the industry's approval, particularly issues relating to compensation. This need to be attended to by the government. Further, reallocation of agricultural land to manufacturing is linked with the issue of agricultural productivity and food security. The situation could be a win-win for both manufacturing and agriculture, if agricultural productivity increases to a level both less land and labour is required in that sector for food security. The surplus land and labour can become available for manufacturing. The manufacturing sector to better equipped to absorb the labour displaced from agriculture.

Second, the growth of the services sector depends on the growth of manufacturing. At the same time, growth of the services sector with quality benchmarking could contribute to the productivity improvements in manufacturing. Banking, insurance, trade, transport, communication and skill development are some of the sectors where the growth will be driven by a competitive and vibrant manufacturing sector and in turn would contribute to growth of manufacturing sector. The forward linkage with the services sector is strong but with the agricultural sector it is low. There is a need to strengthen the linkage of agriculture with the manufacturing sector.

Third, within manufacturing there is a need to shift structurally in favour of high value addition industries. Specific policy thrust is required for the development of sub-sectors like high precision machinery, pharmaceuticals, biotechnology, ship building, defence production and aerospace industry which provide scope for diversification. Growing domestic demand in many of these sectors has to be leveraged for locating production facilities in the country by bringing in suitable foreign collaborators. This can provide depth to Indian manufacturing while increasing value addition from this sector. These sub-sectors are research and technology intensive with significant backward linkages. System integration is the key area where India has ample scope to expand, leveraging its technical education and existing production base. While India was the 9th largest producers of manufactured product with a share of 1.8 per cent of global manufacturing value added , it

was not a dominant producer in any of the broad manufacturing category. India will need to nurture a large science and techno-based innovation eco-system that channelizes the capability of young population to understand new technology and absorb and simulate it to meet local needs.

Fourth, investment requirements in India will continue to exceed the availability of resources from the domestic savings. The investment saving gap during 2005-12 was 1.7 per cent of GDP. This gap may be covered through foreign direct investments (FDI). There is a need to create economic environment for the larger inflow of FDI. There is need for further liberalization in FDI policy.

Fifth, the new manufacturing sector will need to be environment friendly. Environment issues encompass exploration, excavation, use of resources and pricing. The resource needs of the manufacturing sector would require a certain balancing, consistent with sustainable protection of environment. A more transparent policy framework for pricing and allocation of natural resources would be a starting point in this regard. There is also a case for creating capacity in harnessing solar energy on a scale and technology that provides with a serious alternative to addressing India's energy security.

7. New Challenges and Emerging Paradigms

The task of raising manufacturing to 25 per cent of GDP encounters several new challenges in the current and the next decade. Some of them are internal and some of them external. The major challenges are:

- How to achieve industrialization in an highly unequal and globalized world economy, dominated by large multi-national companies and characterised by fragmented global value chains (GVC's);
- The shrinking of policy space for latecomers like India to Industrialize in the present global order led by the institutions such as the WTO and regional economic trade blocs;
- The rise of Asian economy like China and its implications to Indian industrialization in a highly competitive domestic and international market;
- How to deal with jobless growth in manufacturing in the pace of increasing capital and knowledge intensity in the process of production;
- Creating adequate systems for financial intermediation that ensure the long-term funds for industrial investment; and
- How industrial policies should respond to the threats of global warming and climate change.

Finding comparative advantage in a "slice" of production chain may perhaps easier than finding a comparative advantage in the entire production chain. In this context, global value chain has made industrialization much easier and quicker. In totality, the global value chains have opened a new industrialization path. The concept one nation supply chain has disappeared to a large extent with the advent of transnational corporations and organization of new type of service companies. The global trade started to shift from "trade

in goods" to "trade in tasks". The world trade in parts and components increased from \$502 billion in 1992 to \$2039 billion in 2010. The entrepreneurial drive and ability to adjust to the emerging situation will matter. Indian entrepreneurial class need to accept these ethos to carry forward the process of rapid industrialization.

The growth of employment in manufacturing has been slowing down under the influence of increasing capital-intensity and labour-saving technological change. The industrial development is no longer able to absorb large increases in labour supply. From the policy perspective, this will require a rethinking of the relationship between the industrial sector, the services sector and agriculture sector. However, it is not feasible to sacrifice the development of manufacturing sector because there is a high correlation between the levels of manufacturing and economic development. There is indeed a "structural change bonus" from industrialization because productivity in manufacturing tends to be higher than in agriculture. Opportunities for productivity growth will be more limited in services sector. There are more opportunities for capital accumulation in manufacturing. In manufacturing there are more opportunities for realising scale-economies. Manufacturing is the locus of technological change and it is a critical source of important spill over effects. More importantly, as income increases, the relative demand for agricultural products will decline and the relative demand for manufacturing goods will increase creating dynamic opportunities for manufacturing.

Achieving low-carbon industrialization is yet another challenge. It has number of interrelated implications for industrial policy and industrialization in general. In the first instance, it requires global policy cooperation. The second is that it will require innovation and transfer of environmentally more sustainable technologies on an unprecedented scale. The latter may result in substantial entrepreneurial opportunities in low-carbon industrialization for developing country like India. China's growing investment in low-carbon technologies as a way to reduce both energy costs, pollution and provide new source of growth and employment at the same time.

8. Conclusions

The manufacturing is an export driver and it creates employment and business opportunities. Its continued growth is an absolute necessary for forward movement in economic development. The experiences many countries is testimony to this fact. The Japanese manufacturing sector grew by leaps and bounds in 1970s and 1980s. South Korea and China repeated the same story in 1980s and 1990s respectively. The contents of the stories may be different to some extent but emphasis on the manufacturing sector is common. The growth was based on development of infrastructural facilities, abundant encouragement to enterprises and creation new entrepreneurship, availability finance, and more importantly incentive to R&D particularly innovation in manufacturing. The government support to industry was an critical input. This model cannot be replicated in the contemporary period but with marginal adjustment it is possible adopt this model.

The contribution of manufacturing to GDP in India has been 14 per cent in 2012 and it has never crossed 17 per cent ever since the reform period. Nearly 80 per cent of manufacturing employment and 17 per cent of manufacturing output in India is in the informal sector¹¹. This highly imbalanced structure does not allow sustained high growth in the manufacturing sector. India's share in world manufacturing is 1.8 per cent whereas China's manufacturing contributes 34 per cent of the GDP and 13.7 per cent of global manufacturing (up from 2.9 per cent in 1991). Only 9 per cent of our working population is in industry. Technology in manufacturing is stuck at basic or intermediate level. The R&D expenditure is about 0.9 per cent of GDP (of which $\frac{3}{4}$ th is public and $\frac{1}{4}$ th is private sector). With the growth rate of 5.5 per cent for the last decades – the manufacturing output grew nearly by one percentage point faster than the GDP growth rate. Over the years, the manufacturing output got diversified into basic, intermediate and consumer durable industries, declining the share of consumer non-durables. The share of capital goods rose until mid-1980s, declining thereafter under the impact of economic reform¹². The manufacturing sector growth has been declining since the early 2007. The deceleration has been sharp since the second half of 2008.

India's exports have been rising. However, the exports of high technology products have been minimal¹³. India is ranked quite low in the production of Advanced Technology Products (ATPs). The competitiveness of the industry depends on several factors. The skill of the workforce at all levels is most important determinant. The effective use of technologies requires skills and up gradation from low level technologies to complex technologies requires greater and diverse skills. The availability of such skills are by and large absent in many manufacturing sectors. The programme to prepare the workforce with necessary skills has lagged behind. This has resulted in loss of employment. More importantly, education sector at all levels needs major reform to produce skilled persons. The present system is not imparting appropriate skills to a large number of persons entering the labour market.

The development of small and medium industries are critically important. They contribute 40 per cent of the manufacturing and about 35 per cent of the exports. The SME sector is employment intensive and generate employment for 7 persons on an investment of ₹5 lakhs as against one person in the organized sector for same amount of investment. Dispersal of SME units all over the country provides substantial employment in the rural

¹¹ National Commission for Enterprises in the Unorganized sector (NCEUS), Government of India (2007, Conditions of Work and Promotion of Livelihood, in the Unorganized sector, Report, Government of India, New Delhi.

¹² Nagaraj, R (2012) Trends and Patterns of Industrial Growth: A Review of Evidence and Explanations, ICSSR Study.

¹³ Report of the Prime Minister's Group (2008), Measures for Ensuring Sustained Growth of the Manufacturing Sector, New Delhi, accessed from the website of the National Competitiveness Council, <http://www.nmcc.nic.in>

areas. Therefore ensuring that the SME sector grows at a healthy rate is crucial for the overall growth of manufacturing sector. For this to happen the SME sector has to be competitive. To become competitive a number of measures are needed. Mergers and acquisitions to obtain economies of scale may be required. The SME's may have to accept becoming ancillaries to major company have a distinct advantage since they are part of a value chain. Often major company demands products from the ancillary unit which are competitive to ensure that the final product of the major company remains competitive. There is a need to nurture and develop SME's to accelerate manufacturing growth.

Manufacturing is not only the backbone of the economy but also the muscle behind national security. Keeping this in view, five manufacturing sectors have been identified as strategic for strengthening the national capabilities from the long-term point of view. These are: aerospace; shipping; capital goods; IT hardware and electronics and solar energy. All these sectors require high technology components and sub-assemblies. These industries would also bestow spill over benefits to the rest of the civilian industry. This is the feature of fast developing industrialized nations.

The recent stagnation in the manufacturing sector is due to lack of investment from the private sector as well as public sector. The new investment projects have been drying up across sectors, partly as consequences of rising stalled projects which reduces the ability of firms to start new ones. New projects of both private sector and governments have been falling. Several factors have caused the stalling of investments and drying up new investments. A CMIE study¹⁴ shows that in 2011-12, 20 projects accounted for 70 per cent of total cost of shelved projects. The analysis of the projects indicates difficulties in land acquisition, coal linkages and mining bans as major causes. Other stalled project suggests that policy issues such as in telecom spectrum allocations have also played a role. Lack of demand condition and slow growth of GDP adversely affected fresh investment in consumer durables and non-durables. Similar is the case with food and agro-based products. Lack of growth and slow-down in investment are feeding into each other, with causation flowing both ways. High interest rates have contributed the depressed investment climate. Most worrisome part the sharp slowing of corporate investment which is the source future manufacturing expansion.

At the current reckoning it is indeed extremely difficult or impossible to realize 25 per cent of GDP from the manufacturing sector by 2021-22 or even at the end of 2024-25. At best, with great effort we may realize 20 per cent target from manufacturing. At any point of time the manufacturing sector never grew by 14 per cent per annum. Even this requires high focus on creation of infrastructure, better access to land, development of communication technology, education, skill development and fostering innovation in frontier technologies.

¹⁴ CMIE (2012), Sharp Increase in Projects Shelved, May

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