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PRODUCTIVITY GROWTH IN INDIA: DETERMINANTS AND POLICY INITIATIVES BASED ON THE EXISTING LITERATURE

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PRODUCTIVITY GROWTH IN INDIA: DETERMINANTS AND POLICY INITIATIVES BASED ON THE EXISTING LITERATURE*

by

Arup Mitra

June 2016

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I. Introduction

Most of the developing countries are confronted with scarcity of natural and financial resources and, therefore, rapid economic growth using up the resource endowment of the economy comes at the expense of the future growth and poses a number of challenges for the economy. Productivity growth (or output growth which is net of input growth) is the key to the long run sustainability of growth as well as development because with rapid productivity growth proportionately less resources will be required to raise the growth by one unit and the scarce resources can be released from the growth process to be utilised for the overall development of the economy. So the interest in the component of growth which is non-input based has grown enormously over the years. Issues related to its estimation are innumerable. However, a detailed review of those issues is outside the scope of this study. On the other hand, this paper aims at (a) examining the patterns of productivity growth across broad sectors of the Indian economy, (b) identifying the determinants of productivity growth and policy variables for experiencing an enhanced productivity growth; and (c) reviewing the ongoing policy initiatives of the government. However, the study does not carry out any independent research; instead it reviews the plethora of existing studies to encompass the issues mentioned above.

In the literature, the importance of total factor productivity (TFP) is highlighted in order to explain growth differences across countries (Howitt, 2000). Improving TFP in manufacturing, in particular, is recognized as an effective way of enhancing the overall performance and catching up with other better performers, i.e., the convergence hypothesis. Manufacturing is capable of experiencing rapid productivity gains largely through technical progress, innovation, externalities, economies of scale, and knowledge spill-over (Kaldor, 1966; Murphy and others, 1989). These productivity gains can be further realized at the macroeconomic level through structural transformation and changes in resource allocation from less to more productive firms and sectors (Bernard and Jensen, 2004).

The rest of the paper is structured as follows. Section 2 presents the broad trends in productivity growth across agriculture, manufacturing and services. The patterns in both TFPG and labour productivity are considered in the analysis. Sections 3 bring out the determinants of productivity growth in the manufacturing sector with policy implications. The policy initiatives for improving manufacturing productivity are discussed in section 4. Section 5 deals with the policy issues and initiatives pertaining to the agriculture sector and finally section 6 comes up with suggestions for improving productivity in the services sector.

II. Broad Trends in Productivity Growth across Sectors

A. Total factor productivity growth

In order to present a broad profile of productivity growth across certain major sectors of the Indian economy this study refers largely to the report titled “Estimates of Productivity Growth for Indian Economy” (India KLEMS project at ICRIER in collaboration with the Reserve Bank of India, Goldar, 2014). Unlike many other studies which are largely confined to some of the specific segments of the economy this study covers the entire economy and that too for a considerably long period of time (1980-81 through 2008-09). The following sectors are considered in the analysis:[1] Agricultural, Mining and Quarrying, Manufacturing industries,

[1] For manufacturing and services a number of subsectors have also been considered.

Electricity, Gas and Water supply, Construction and Services comprising both market and non-market services.

The study by Bosworth and others (2007) and Bosworth and Maertens (2010) show that the growth rate in TFP in the services sector by and large exceeded that in industry and agriculture, particularly between 1980-2004 (Table 1). At the aggregate level TFPG shot up to 2 per cent per annum from 1980 onwards with almost no productivity growth (0.2 per cent per annum) prior to that. Since the aggregate economic growth rate has been mostly services-driven the rapid productivity growth in the services sector also contributed to the overall productivity growth.

Table 1. Growth of output and TFP in broad sectors in 1960-2004 ***(% per annum)***

Total Economy	**Output growth** Bosworth and others (2007)	**TFP growth** Bosworth and others (2007)
1960-1980	3.4	0.2
1980-2004	5.8	2.0
Agriculture		
1960-1980	1.9	-0.1
1980-2004	2.8	1.1
Industry		
1960-1980	4.7	-0.4
1980-2004	6.4	1.0
Services		
1960-1980	4.9	0.4
1980-2004	7.6	2.9

Source: Bosworth and others (2007), see Goldar and Mitra (2010).

From table 2 it is evident that as per all the three estimates shown by Goldar et.al. (2014) productivity growth decelerated marginally in the agriculture sector in the 2000s compared to the period 1980-1999. The manufacturing sector productivity growth on the other hand registered acceleration in 2000s compared to the earlier phase. The services sector maintained a moderate productivity growth of 2.5 and 2.83 per cent over period 1 and 2 respectively (Estimate 1). At the aggregate level the TFPG (2.2 and 3 per cent per annum in period 1 and 2 respectively as per Estimate 1) resembles more or less the productivity growth patterns in the services sector. But the most striking point is that the average productivity growth over 1980/81 through 2008/09 in the manufacturing sector turns out to be lower than that in agriculture or services though for period 2 (2000/01-2008/09) the manufacturing productivity growth is higher than that in agriculture or services as per all the three alternative estimates.

From the long run point of view the sector (manufacturing) which is supposed to take the lead role in terms of productivity growth, as suggested in the literature, in fact, does not turn out to be so. Hence, the beneficial effects of productivity growth which are expected to spill over from this sector to the rest of the economy seem to have remained beyond realisation. Rapid productivity growth in the manufacturing sector is usually taken in the literature to raise profitability and wages in this sector which in turn could generate demand for goods produced in other sectors, enabling them to experience rapid expansion in output, productivity and wages. The technology spill-over effects are also likely to originate from the manufacturing sector and get transmitted to other sectors. However, the sluggish growth in manufacturing productivity seems to have blocked this link. The rapid productivity growth in other sector, if any, may have

derived the impetus from within the sector itself or somewhere else. For example, the changing technology configurations in the services sector may have enabled it to experience a steady, though not perceptibly high, growth in productivity.

Table 2. Productivity growth at the aggregate level and across sectors (% per annum)

	Estimate 1			Estimate 2			Estimate 3		
Sector	1: 1980/81-1999/00	2: 2000/01-2008/09	1+2: 1980/81-2008/09	1: 1980/81-1999/00	2: 2000/01-2008/09	1+2: 1980/81-2008/09	1: 1980/81-1999/00	2: 2000/01-2008/09	1+2: 1980/81-2008/09
Agriculture etc.	1.99	1.26	1.81	1.89	1.3	1.68	1.78	0.71	1.52
Mining and Quarrying	0.65	-1.03	0.23	0.42	-1.91	-0.17	0.22	-1.59	-0.24
Manufacturing	1.27	3.13	1.74	0.81	2.75	1.30	0.04	2.76	0.73
Utilities	1.51	7.2	2.94	1.22	6.8	2.62	1.14	6.93	2.96
Construction	-3.82	-0.34	-2.95	-4.18	-0.7	-3.31	-4.19	-0.69	-3.31
Services	2.5	2.83	2.59	1.98	2.31	2.07	1.74	2.14	1.84
Total Economy	2.23	2.99	2.42	1.52	2.38	1.74	1.11	2.26	1.4

Source: Goldar (2014), KLEMS Project.
Note: Estimate 1 uses labor person and capital stock; Estimate 2 uses labour input and capital stock and Estimate 3 uses labour input and capital service.

B. Labour productivity

Value added (growth) can be decomposed in terms of employment (growth) and labour productivity (growth). Growth in labour productivity in the face of sluggish employment growth can result from rise in capital intensity. Since employment growth decelerated in agriculture, mining and utilities in the nineties compared to the eighties, the rapid productivity growth in these activities in the second period is quite but natural (table 3). Similar is the case with community, social and personal services. What is interesting to note is that activities like trade, transport and financial services, which experienced a rise in the employment growth rate, also reported a rise in productivity growth in the nineties relative to the eighties. Even in manufacturing, where the employment growth rate declined marginally in the second period compared to the first, productivity growth accelerated from 3.40 to 5.05 per cent per annum. It is only in the construction activity that productivity growth has been negative in both the periods despite positive growth rates both in terms of value added and employment (table 3).

Labour productivity in the third period (1999-2000 through 2004-05) decelerated considerably across several activities. At the aggregate level it almost halved. Only transport, storage and communication registered a significant increase.

Table 3. Labour productivity (Rs) growth rate (% p.a.)

Sector /Industry Division	1983 to 1993-94	1993-94 to 1999-00	1999-00 to 2004-05
Agriculture and Allied Activities	1.31	2.98	-0.07
Mining and Quarrying	1.63	7.98	1.84
Manufacturing	3.40	5.05	3.08
Electricity, Gas etc.	3.25	7.60	3.97
Construction	-0.64	-0.69	0.04
Trade, hotel, etc.	1.67	3.85	1.85
Transport etc.	2.44	3.11	7.26
Financial Services	2.21	2.02	-2.19
Community, Social and Personal Services	1.56	9.17	2.82
Total	2.78	5.44	2.82

Source: Based on CSO's estimate of value added and NSSO's estimate of employment; Mitra (2013).
Note: While calculating the growth rate of productivity for the period 1999-2000 to 2004-05 the productivity figures for both years have been estimated in 1999-2000 prices).

Value added growth can be decomposed in terms of labour productivity growth and employment growth. If labour productivity grows rapidly due to capital accumulation, the contribution to value added generation by new additions to employment can be sluggish. Analysis done elsewhere suggest that this has been a striking feature of the Indian organized (or formal) manufacturing sector (Mitra, 2013b). Mitra (2013b) based on the decomposition of value added growth in terms of employment growth and labour productivity growth noted that only a handful among the sixty two groups within the organized (formal) manufacturing experienced a rapid productivity growth of at least 5 per cent per annum and employment growth of at least 4 per cent per annum simultaneously[2]. Across industries the correlation between productivity growth and employment growth is not negative – rather it is positive though highly negligible, i.e., 0.08. However, value added growth and labour productivity growth are strongly associated, with which capital-labour ratio is again positively correlated.

From table 3 it is again evident that except for some of the tiny industry divisions () like mining and utilities, labour productivity has been on the high side in transport and the other services inclusive of financing, in 2004-05. However, in 2009-10 manufacturing and trade, hotel also recorded a six digit figure (Table 3). The fastest growth rate was witnessed in manufacturing, and all the three components within the services sector also grew rapidly. Construction, on the other, hand recorded a negative growth rate as the employment growth was exceptionally high. Rapid labour productivity growth of nearly 5 per cent in agriculture resulted from sluggish employment growth in this sector. And this cannot be treated as a positive indicator because employment growth elsewhere in the economy did not take place at a rapid pace to shift labour from the agriculture sector. Since agriculture involves redundant labour or superficial employment, a drop in employment did not result in output loss in this sector.

[2] 173 (manufacture of knitted and crocheted fabrics), 182 (dressing and dyeing of fur etc.), 232 (manufacture of refined petroleum products), 281(manufacture of structural metal products, tanks etc.), 300 (manufacture of office, accounting and computing machinery), 312 (manufacture of electricity distribution and control apparatus), 319 (manufacture of other electrical equipment), 332 (manufacture of optical instruments etc.), 372 (recycling of non-metal waste and scrap) and others.

Rise in labour productivity does not necessarily mean rising contribution made by the existing work force in a particular sector. In fact, labour productivity can increase because of rise in organizational efficiency, technological up-gradation or simply rise in capital accumulation. Besides the aggregate (all-sector combined) labour productivity can also rise from sectoral shift away from low productivity sectors to high productivity sectors. In the Indian context capital accumulation, particularly in the manufacturing sector, has been a significant phenomenon, which has indeed resulted in rapid labour productivity growth (Mitra, 2008). Since the value added structure and the employment structure did not witness any sizeable shift between the years 2004-05 and 2009-10 (except in case of agriculture which recorded almost 5 percentage points decline both in terms of value added and employment shares), the labour productivity rise also seems to have resulted from technological up-gradation in the services sector.

Though labour market regulations have not changed significantly, flexibility has been introduced in practical terms by allowing the employers to practice hire and fire rule at their own discretion and also by changing significantly the composition of regular vis-à-vis contractual workers. (D'souza, 2008). Hence, sluggish employment growth in some of the non-farm sectors, manufacturing for example, cannot be held as an outcome of strict labour laws (Mitra and Sharma, 2015) though the foreign firms' investment behaviour may be affected adversely. Rather the type of technology which is imported from the developed countries hold meagre possibilities of labour absorption because such type of technology is innovated to suit the labour market situations of the labour scarce high income countries (Mitra, 2009). The labour demand itself is scanty which results in sluggish employment growth.

The skill bias of the modern technology is seen to reduce the pace of absorption of the unskilled labour, resulting in vast stretches of the low productivity activities in the informal sector which comprises residual absorption of labour.

On the whole, rapid labour productivity growth must not be seen necessarily as a positive indicator of development; rather the limitations associated with such growth need to be kept in view. Some of the major determinants of labour productivity include increasing capital intensity and imported technology suitable to the labour scarce economies.

Table 4. Labour productivity (in Rs) and labour productivity growth (% p.a.)

Sector/industry division	2004-05	2009-10	Growth rate: 2004-05 through 2009-10
Agriculture	18 643	23 715	4.8
Mining	206 375	218 807	1.2
Manufacturing	64 599	107 525	10.2
Utilities	452 254	609 036	6.0
Construction	60 856	55 693	-1.8
Trade and Hotel	74 841	109 581	7.6
Transport etc.	131 650	216 538	9.9
Other Services including Fin.	146 132	216 392	7.8
Total	52 160	78 490	8.2

Source and note: See table 2; Mitra (2013).

III. Determinants of TFPG and Policy Implications: Manufacturing

A host of factors have been identified as the determinants of productivity growth (TFPG). Among them trade openness, agglomeration economies, infrastructure and ICT and innovation are the four major sets. Innovation is also another variable which can enhance productivity. Through innovation higher level of technology is attained which in turn raises the non-input driven component of growth.

The importance of infrastructure is widely recognised in the literature. For example, public infrastructure is considered to be a crucial factor enhancing productivity and technical efficiency through complementary relationship with other factors of production and external economies of scale (e.g. Lucas, 1988; Anwar, 1995;Barro and Sala-i-Martin, 1995). Empirical findings on this issue, however, are mixed: many studies have noted that public infrastructure positively and sizably affects economic performance (Aschauer, 1989; Munnell, 1990a; 1990b). These findings have been challenged on methodological ground (see Evans and Karras, 1994 and Holtz-Eakin, 1994). In the case of India, Mitra and others (2002), Hulten and others (2006) and Sharma and Sehgal (2010) found moderate to large impact of infrastructure on the manufacturing performance. Mitra, Sharma and Veganzones-Varoudakis and others (2011; 2012 and 2014) further investigated the effect of core infrastructure on total factor productivity (TFP) and technical efficiency (TE) in the case of the Indian manufacturing sector. In their study the estimated coefficients of the core infrastructure variable are found to be sizably large in several sectors and for the aggregate manufacturing as well. The estimated effect indicates that infrastructure explains 65% of TFP growth in transport equipments,32% in metal and metal products and 30% in textile. In other industries, it varies from being large to moderate(except in the case of chemical, where it is found to be statistically insignificant). On an average, results suggest that the impact on overall manufacturing is around 0.32, which means that 1% increase in infrastructure leads to a 0.32% TFP growth.

In the empirical model (Mitra, Sharma and Veganzones-Varoudakis, 2011; 2012 and 2014), two measures of infrastructure were used, combining several physical indicators: a total infrastructure index (G) and an information and communication technology index (ICT). The findings highlight the productive role of information and communication technology (ICT), which experienced extensive development around the same period. An increase in total and ICT infrastructure can raise the competitiveness of the manufacturing sector, enhance the capability to resist international competition and reinforce the exporting capacity of industrial goods.

The role of information technology (IT) as a contributor to manufacturing productivity has been examined by another study (Sharma and Singh, 2012). This paper uses five years of panel data for Indian manufacturing plants to examine the relationship of investment in IT to productivity. Plants with higher levels of IT capital stock have higher productivity. The study also explored the impacts of skill composition, the use of imported intermediate inputs, ownership and organizational form on the productivity of IT capital. They noted that access to financial capital, electric power from the grid, and skilled workers all matter for the decision to invest in IT capital.

The role of import and export in enhancing long-term growth has been the subject of extensive debate (see Balassa, 1988; Krugman, 1994). International trade is considered a key source of technology transmission and adoption (see Barro, 1997; Coe and Helpman, 1995; Frankel and Romer, 1999). This channel is particularly important for developing economies where new technology is relatively scarce, resources are limited, and firms are dependent on high quality

imported inputs. In one sense, imports are generally seen to represent increasing competition for domestic firms, inciting them to invest and be more productive. Additionally, imports of intermediate and capital goods are seen to be stimulating productivity through technology transfer from advanced countries and providing better quality inputs (Goldberg and others, 2010; Topalova and Khandelwal, 2011). The learning spill-over between foreign and domestic goods is another channel in this process (see Aitken and others, 1997; Keller, 2004). Empirical validation of these models has, however, produced mixed results. Halpern and others (2009) found that imported inputs have a large productivity effect: an increase in the share of imported intermediate goods from 0 to 100% raised the productivity of Hungarian manufacturing firms by 11% which is confirmed by Goldberg and others (2010) for the Indian manufacturing sector. Using the Prowess database and panel data estimation techniques, the authors estimate an elasticity of 0.45 in relation to the impact of tariff reduction on firms' TFP. Going into more detail, Amiti and Konings (2007) reveal that the productivity gains from cutting tariffs on intermediate goods is twice as big as those from comparable cuts for final goods in Indonesian manufacturing. Topalova and Khandelwal (2011) verify these results for manufacturing in India. They find that both pro-competitive forces, resulting from lower tariffs on final goods and access to better input due to lower input tariffs increase firm-level productivity, the latter having a larger impact. Goldberg and others(2010) shows, in the case of India that the new imported inputs for manufacturing, to a large extent, originated from more advanced countries and exhibited higher unit value relative to existing imports. The enhanced contribution of quality inputs added to productivity growth. However, the study also indicates that a firm's access to new imported inputs increased a firm's ability to manufacture new products. They found that, after the trade reform, a quarter of India's manufacturing output growth was driven by the addition of new products. These new products experienced higher productivity. Hence, enhanced access to better imports, innovativeness and productivity all seem to be in relationship.

The economic linkage between exports and productivity has also long been a highly debated topic in the international economics and trade literature. The issue has, however, received added importance since the pioneering work of Bernard and Jensen (1995; 1999) that brought into focus the exceptional qualities of exporting firms which have been found to be more productive, larger in size, more skill and capital intensive, and high wage payers. Some argue that the higher productivity of exporters reflect the self-selection of more efficient producers into a highly competitive export market (see Bernard and Jensen, 2004). Others emphasise that it is international trade, and exporting in particular, which improves the productivity of firms, finally leading to economic growth (see Balassa, 1988). This is because for exporting firms international competition is a factor that encourages investment in more productive technology and organization and also innovation (see Krugman, 1994; Rodrik, 1988). Empirically trade intensity is found to be positive and significant in metal and metal products, non-metallic mineral products and transport equipment, which are relatively more exposed to foreign competition. The impact is estimated at 5-10% in these industries. The effect on the overall manufacturing is found to be around 2%, which is lower than expected (Mitra, Sharma and Veganzones-Varoudakis, 2011; 2014).

The advocates of endogenous growth theory believe that R&D plays a critical role in improving productivity through innovation (Grossman and Helpman, 1991; Rivera-Batiz&Romer, 1991) and technology transfer (Barro, 1997). Other models explain that R&D expenditures contribute to productivity through their industry-wide spill-over effect (see Grossman and Helpman, 1990b; Romer, 1986). In this framework, firms spend on innovation to obtain new technology that augments their productivity growth. This has significant additional implications for the overall economy, as the private know-how of individual firms easily spills over horizontally to

other firms of the same industry and, later, vertically to firms of other industries. This acts as an external effect, enhancing the productivity of all firms. Results of the empirical literature give, however, contrary results regarding the impact of R&D on firm's productive performance. Raut (1995), Basant and Fikkert (1996), and Sharma (2012), in particular, do not find strong evidence in favour of this as they estimate relatively small effects of R&D spending on firms' TFP. Mitra, Sharma and Veganzones-Varoudakis (2012; 2014) re-estimated the role of R&D intensity (R&D), calculated as the ratio of in-house R&D expenditure to total sales. Findings suggest that the R&D variable explains only 1.4% of TFP growth, which is not very surprising as Indian manufacturing is known for its low R&D intensity. Nonetheless, in research-intensive industries, that is, chemical and machinery, the effect is found to be 6% and 5%, respectively.

As regards the size, Mitra, Sharma and Veganzones-Varoudakis (2012; 2014) observed that the impact is noticeable in food and beverage and non-metallic mineral products, which are sectors characterized by small firms with low productivity. This result means that a policy of pro-concentration would generate productivity gains in these sectors and thus add to competitiveness. In other words policies which encourage firms to grow in size, possibly through mergers and acquisitions, and promote concentration can actually contribute to productivity growth though the popular approach has been to discourage concentration. Rapid productivity growth can occur only when a firm has acquired a minimum threshold limit in terms of size.

On spatial concentration it has also been observed that states which are more urbanised or cities which are large in size offer higher returns to investment in terms of higher total factor productivity growth. The agglomeration economies which are in place contribute to TFPG (Mitra, 1999; 2000). Though there are two types of agglomeration economies – namely localisation economies and urbanisation economies –it is difficult to decipher the impact of these two factors separately. Often they tend to get inter-twined and the effect is observed jointly.

High labour costs reducing employment has been debated extensively in the literature. In an important study, Hasan, Mitra and Ural (2006) observed that labour demand elasticity increases with reductions in protection. Providing evidence from a panel of 48 developing countries, his findings suggested that trade liberalisation is more likely to have a beneficial impact when labour markets are flexible and vice versa. More regulated and rigid labour markets are associated with higher real wages, which, however, come at the expense of employment.

Regulated labour market and the lack of flexibility cause productivity loss due to labour unrest etc. Empirically, however, not strong evidence is available to support this view. In practice firms are usually able to overcome the labour regulations. However, the counter view is that the foreign firms which do not know the tricks of avoiding labour laws tend to get discouraged from making any significant investment in sectors which usually add to TFPG (Mitra and Sharma, 2015).

IV. Policy Initiatives: Manufacturing

In addition to a discussion of what policies have been taken, it would be interesting to have details on those policies that should be implemented. Hence, we try to make a comparison between the two sets.

The policy suggestions of various studies reviewed in the foregoing section include trade reforms, pro-concentration initiatives, labour market reforms, skill up-gradation programmes, infrastructure related programmes which not only refer to physical but also financial and social infrastructure, efforts to improve accessibility of the enterprises to ICT and proactive measures to encourage FDI and innovation. FDI is expected to bring in foreign technology which will not only contribute to productivity growth directly but also through spill-over effects. Similarly innovations are expected to develop technology which will contribute to productivity and employment both. Also there are sufficient indications for improvements to be followed in terms of allocative efficiency, that is, resources to be diverted towards sectors of higher productivity away from sectors of lower productivity. In trying to understand why India's manufacturing sector has not been more dynamic, Dougherty, Herd and Chalaux (2009) argue that anti-competitive regulations have deterred firms' expansion and the entry of new firms.

In the reform era (since 1991) in India, the manufacturing sector has witnessed major policy changes. Industrial de-licensing and removal of restrictions on foreign investment have modified the profile of this sector considerably (Aghion and others, 2008). Trade policies have stimulated exports and imports, especially of intermediate and capital goods, since tariff rates have been reduced drastically and the quantitative restrictions on imports were by and large abolished (see Topalova and Khandelwal, 2011).

Studies have highlighted the complementarities between trade liberalization and other market reforms, in particular, deregulation and further lowering of FDI regulations (Hasan, Mitra and Ural, 2006). The issue of the impact of imports on productivity is highly critical, as the trade regime in the pre-reform era was highly restrictive. In 1991, in the aftermath of a balance-of-payments crisis, India embarked on a dramatic import liberalization of the economy as part of an IMF adjustment program. An important part of this reform was to abandon the extremely restrictive import policies. The average tariffs were reduced from about 86% in 1989–90 to about 30% in 1999– 2000. For manufacturing, there was a decline from about 120% in 1989–90 to about 33% in 1997–98. The non-tariff barriers (NTBs) in manufacturing also fell from 87% in 1988–89 to 28% in 1999–2000. Within manufacturing, the NTB for machinery and intermediate goods dropped considerably, to only 10 and 12%, respectively, in 1995. Currently, almost all commodities are free from quantitative restrictions on imports (see International Trade, 2010). Consequently, imports (both capital and intermediate) surged dramatically in recent years.

The trade policies, in the 1990s and the 2000s, have dramatically changed the dynamics of India's exports. Policies such as the removal of export restrictions, the simplification of the trade regime, the elimination of the trade monopolies of the state trading agencies, the full convertibility of the domestic currency for foreign exchange transactions, and the policy of export promotion have boosted industrial export growth (Hasan and others, 2003).

In order to encourage firms to innovate and conduct R&D activities, the government has developed a system of fiscal incentives and financial benefits (Sharma, 2012; UNIDO, 2005). These reforms aimed at making Indian industry (manufacturing) more efficient, technologically up-to-date, and competitive. However, despite these policy changes, the total factor productivity (TFP) growth in manufacturing declined from above 5% in the 1980s to less than 2% in the 1990s (see Goldar and Kumari, 2003; Trivedi and others, 2000). Some other estimates also indicate only marginal improvement in TFP in the 2000s (Kathuria and others, 2010; Sharma & Sehgal, 2010). Goldar's estimate (2014) for the manufacturing sector which shows a marked improvement in the 2000s compared to the average figure combined for the eighties and the nineties also lie in the neighbourhood of a modest 3% per annum. However, some authors have

argued that non-traditional ICT-intensive services, which are characterized by a growing tradability, increasing technological sophistication, and low transport costs, are on the forefront of a third industrial revolution which have started showing up in terms of a revival in productivity growth in the 2000s (see Ghani, 2010).

On the labour market front Goldar (2004) argued that the unions in India have become weaker in the reform period, which caused a slow-down in the growth rate of real product wage rate in the organized manufacturing in the nineties. Though the labour market regulations have not undergone significant changes, in practical terms the state governments have adopted a pro-employer approach. Given the fact that stricter rules may discourage industrialisation pace, which in turn may affect the revenue earnings of the state, most of the state governments have allowed the employers to adopt several means of flexibility, leading to rapid increases in contractual employment (Tendulkar, 2000; 2004; Desouza, 2008). Hence, for all practical purposes the labour marker regulations cannot be held against sluggish productivity growth in the manufacturing sector. However, strict labour market rules may be discouraging many foreign firms to invest in India. Hypothetically speaking their inclusion may have contributed to productivity growth. Therefore a strong case can be made for labour market reforms.

National Manufacturing Policy: The National Manufacturing Policy (NMP), 2011 promises to create a 100 million more jobs and contribute 25 per cent to country's GDP in a decade. In the face of dampening demand and rising cost of capital the experts in the policy circle believed that it can change the fate of manufacturing in India and turnaround the overall economy. The policy addresses in great detail the environment and regulatory issues, labour laws and taxation, but it is the proposed creation of National Manufacturing Investment Zones (NIMZs) or clustering of manufacturing units that is treated as a unique way of integrating the industrial infrastructure and achieve economies of scale. NIMZs will be developed as integrated industrial townships with world class infrastructure and land use on the basis of zoning, clean and energy efficient technology with a size of at least 5,000 hectare. The NIMZs will be on the non-agricultural land with adequate water supply and the ownership will be with the state government. It aims at introducing flexibility in the labour market by offering greater freedom to the employers while hiring and firing. It also enables the sunset industrial units to follow a simplified exit mechanism. At the same time it insists on workers' rights which run the risk of being compromised in the name of flexibility. "Make in India" under the present government is now a flagship initiative. An important feature of the manufacturing policy is its financial and development incentives to the small and medium enterprises. On the whole, the policy, promises to increase the share of manufacturing sector to the country's gross domestic product to 25 per cent from existing 16 by 2020. Formation of smart cities is an attempt to reduce the cost of investment and reap the benefits of concentration. The National Manufacturing Policy and the creation of National Investment and Manufacturing Zones seem to be subscribing to the view that concentration can lead to enhanced productivity.

In order to raise the share of the manufacturing sector the government has identified 25 focus sectors for development. 100 percent FDI is allowed in all sectors except Space (74 percent), Defense (49 percent) and News Media (26 percent). A key emphasis of the Make in India campaign is to improve "the ease of doing business in these sectors – faster clearances, transparency for permits and financing, as well as efficient e-governance mechanisms. Since the launch of Make in India in September 2014, FDI into the country has witnessed a 48 percent jump in the seven-month period between October 2014 and April 2015, and a 31 percent increase, valued at US $9.50 billion, between April and June 2015. It is still early days, and critical infrastructural developments are needed to convert investment into manufacturing gains.

Nevertheless, Make in India affirms that India is open for business"[3].

Skill formation: While a gradualist approach may be adopted to deal with labour regulation related issues, more important for increased industrialization of work force is the employability of the available labour force. The skill match index (estimated by Mitra, 2013b based on the NSS data following the methodology of Estevao and Jsounta (2011)) measures the gap between the quality of labour available and the type of labour required.[4]

$$\text{Skill Mismatch Index} = \text{sigma } (j=1\ldots n)\ (S_{jt}-M_{jt})^2$$

Where, j is skill level, n is the number of skill categories, Sij proportion of population with skill level j at time t and Mij is proportion of employees with skill level j at time t.
The index representing the difference between the skill level of the population and the workers is estimated at 73.11, which is quite high (Mitra, 2013b). In other words, the difference between the skill levels of the potential labour supply and those already working is sizeable. Of course we need to understand that those who are employed are not necessarily absorbed in demand-induced activities. There are several activities which are repository of surplus labour, not requiring much skill to be pursued. Hence, those who are working are not necessarily better off compared to the non-workers in terms of skill levels. Even then the mismatch is significant.

The skill mismatch index calculated for different time points from the distribution of workers in each of the activities across various skill levels is again highly significant. The skill gap in the manufacturing sector is seen to be increasing indicating that over time jobs in this activity are becoming more skill-based compared to those in other activities such as construction and transport (Mitra, 2013b). Therefore, improvement in employability is an important consideration from policy point of view. For this, skill formation is an essential prerequisite which can be attained by accessing quality education and participating in institutions which impart training in skill formation. Such technical institutions, particularly which provide diplomas, are however few in number and thus government initiative is indeed crucial. From the point of view of the quality of vocational education again greater efforts are called for. Besides, on the job training is another important way of eliminating skill mismatches.

The present government's 'Skill India' programme is supposed to be a multi-skill programme. The objective is to create opportunities for the youth and to develop more of those sectors which have already been put under skill development in the past and also to identify new sectors for skill development. The Skill India campaign was launched in July 2015 to prepare graduates and workers alike for the skills needed by industry. It aims at imparting training to 400 million by

[3] India's Economic Initiatives: A Magnet for Investments - See more at www.india-briefing.com/news/indias-economic-initiatives-magnet-investments-11247.html/#sthash.XWIa3aDn.dpuf, Posted on September 29, 2015 by India Briefing, www.india-briefing.com/news/indias-economic-initiatives-magnet-investments-11247.html/

[4] Comyn (2012) reports on recent research into enterprise skill profiles and workplace training practices in the Bangladesh manufacturing industry. Based on data from 37 enterprises across eight manufacturing groups, collected during a study for the International Labour Organisation, he analysed enterprise and sectoral skill intensity and identified key skill issues. This helps prioritise sectors for project-based investments in workplace training and industry skill development. Particularly at a time of significant expansion negligence of research and training can affect performance adversely. The research also illustrates the difficulties of using generalized approaches to classifying and comparing skills at the enterprise and sectoral levels. Without a skill which has greater applicability across a number of sectors, the bargaining power of the workers and consequently the occupational mobility tend to change sluggishly.

2022 through National Skill Development Corporation. "The Ministry of Skill Development and Entrepreneurship was set up in November 2014 to drive the 'Skill India' agenda in a 'Mission Mode' in order to converge existing skill training initiatives and combine scale and quality of skilling efforts, with speed. The Ministry, therefore, proposes to launch the National Mission for Skill Development which will provide the overall institutional framework to rapidly implement and scale up skill development efforts across India. The vision, objectives and design of the Mission, draw on the lessons learnt from the implementation of skill development efforts over the past decade." [5]

Bandyopadhyay[6] (undated) reviewed in detail the industrial policies in India. The Industrial policy 1991 of the government of India introduced a number of policies for reducing cost, technological and managerial modernisation of industries for improving productivity and quality of the products and the international competitiveness. Micro, small and medium enterprises received focus, village industries were targeted, infrastructure was to be developed for rural industrialisation to take place and the flagship scheme of the ministry of MSME introduced the cluster development programme for the MSMEs. Till 2007 400 MSME clusters were developed and other ministries also promoted 800 more clusters. Credit linked capital subsidy scheme for technology up-gradation was also introduced.

National Manufacturing Competitive Council under which national manufacturing competitive programme was introduced was set up mainly to support the SMEs. Application of lean manufacturing, design clinic, promotion of ICT in manufacturing sector, setting up of mini tool rooms, technology and quality management support to SMEs are the main components of the programme.

Food processing, Textiles and Garments, Engineering, Consumer goods, Pharmaceuticals, Capital goods, Leather and IT hardware are among the priority items specifically mentioned in the Common Minimum Programme. A list of policies initiated by the government of India to create an impact on the manufacturing sector is appended at the end of the text.

The Planning Commission study (2012) discusses the challenges faced by small and medium manufacturing firms and builds the case for how adopting a Cluster approach would enhance productivity of these enterprises. According to the study the basic requirement for the government to make incisive, relevant and impactful interventions at the Cluster level is to have information on the units within Clusters. The requirement of the units in terms of energy, infrastructure, finance and marketing facility can be assessed and accordingly provisions can be made to improve the economic viability of the clusters. For different products such clusters can be indentified in order to extend support since the cluster-based approach is expected to be highly efficient and cost effective. A study by UNIDO mapped over six thousand Clusters in traditional handloom, handicrafts and modern SME industry segments (as cited by this study, Planning Commission, 2012). The Development Commissioner (Handicrafts), Government of India, launched the Baba Sahab Ambedkar Hastshilp Vikas Yojana Scheme (AHVY) which aims at promoting Indian handicrafts by developing artisans' clusters into professionally managed and self-reliant community enterprises.

[5] The National Mission for Skill Development1 A Framework for Implementation. Available from http://pibphoto.nic.in/documents/rlink/2015/jul/p201571502.pdf.

[6] Bandoypadhyay, M. (undated) Policies and Programmes for Industrial Development and Technological Innovation in India, ADB –RETA Final Report. Available from www.namstct.org/ADB_RETA_Report/ Mr_M_Bandyopadhyay.pdf.

The MckKinsey report[7] (2001) revealed that there are three main barriers to faster growth and productivity across sectors: the multiplicity of regulations governing product markets and restricting competition and best practices, distortions in the land market, and widespread government ownership of businesses which promote inefficiency and wastage. In terms of output to input ratio productivity is measured which brings out the gross inefficiency of the government run units, particularly in the manufacturing sector. In order to overcome these barriers the government has to adopt a deeper, faster process of reform which can remove the bureaucratic delays, fasten the decision making processes and strengthen the support system, improving the efficiency of the units.

V. Policy Issues and Initiatives: Agriculture

Pertaining to the agriculture sector again accessibility to irrigation, fertilizers, high quality inputs, and credit are seen to raise productivity. The OECD policy brief (2014) points out the following:

> Through the world's largest food security programme, India provides subsidised grain to 800 million people. Questions remain over the cost-effectiveness of these programmes and their potential impacts on international markets.
>
> A sizable share of public resources is devoted to helping India's farmers, in particular through input subsidies.
>
> Expenditure on subsidies to producers and consumers may crowd out investment in other determinants of food security, such as health, education and rural infrastructure.

In relation to what policy makers should be doing to raise productivity the following suggestions are made (OECD, 2014):

> Begin to shift public expenditures away from price support and input subsidies and toward investments that support the productivity and long-term competitiveness of the agriculture sector and, over time, contribute to make staple food more affordable.
>
> Invest in agriculture innovation systems, including technology transfer and farm extension services, and in strategic rural infrastructure, including water use, in order to boost agricultural productivity and resource sustainability.
>
> Invest in education, health, sanitation, and other public services that would contribute to improved food and nutrition security.

Mahendra Dev (2012) identified seven factors which need focused reforms in the short and medium terms to improve agricultural productivity. These are: (a) price policy; (b) subsidies and investments; (c) land issues; (d) irrigation and water management (e) research and extension; (f) credit; (g) domestic market reforms and diversification.

[7]file:///C:/Users/Lenovo/Downloads/MGI_The_growth_imperative_for_India%20(2).pdf.

We discuss these points in relation to three important questions: what it means, what has been done and what needs to be done?

A. Price policy

At present food security system and price policy basically consists of three instruments: procurement prices/minimum support prices, buffer stocks and public distribution system (PDS). This process is basically followed for some of the staple food like rice and wheat. The procurement prices refer to the prices at which the government buys from the farmers. During the harvest season or in a year of good harvest when the market prices tend to slide down farmers' profitability need not get affected as they are encouraged to sell to the government at a price which is higher than the open market price. Similarly for building buffer stocks in order to eliminate the gaps between demand and supply round the year the government may buy directly from the farmers by providing them price incentive. Through the PDS the government tries to sell the products to the consumers at a price lower than the open market price which in the months other than the harvest has a tendency to rise sharply. It would be desirable to extend the support system to many other food crops including pulses, vegetables and some of the cash crops and non-food crops as well. This would enhance the profitability of the farms, particularly the small ones, and encourage investment which ultimately can contribute to productivity growth and make these farms self-sufficient. At that juncture the state support can be withdrawn and even the tax base can be expanded. However, without policy initiatives to raise the productivity growth agriculture may not be in a position to meet the required demand for food particularly, in the coming years. Without productivity growth the bulk of the work force in the agriculture sector would continue to receive meager earnings and remain in abject poverty. Given the fact that land has to be increasingly delegated for non-agricultural uses, land productivity has to increase continually.

The provision of remunerative prices for farmers is essential to maintain food security and increase the incomes of farmers, particularly in the face of an increase in the rural wages and consequent rise in the cost of cultivation. The on-going programme related to the employment guarantee act seems to have raised the rural wages. Besides, the input prices have also increased over the years. All this has resulted in a marked increase in the cost of cultivation, reducing the profitability of the farmers in various crops. Reduced profit margin and the inability to pay back the borrowed amount and crop failures have led to several crises like farmers' suicide. In such a situation the provision of remunerative prices would encourage farmers to continue with cultivation, particularly when it comes to food crops which do not help them earn any significant profit. Further the author (Mahendra Dev, 2012) argues that both price and non-price factors are important in raising agricultural productivity. There is a host of non-price factors such as availability of high yielding variety seeds, fertilizers, pesticides, water and electricity including modern technology which contribute to productivity growth. Measures need to be initiated to stir these non-price factors.

B. Subsidies and investments

Public investment declined from 3.4% of agricultural GDP in the early 1980s to 1.9% in 2001-03 and within the same timeframe subsidies increased from 2.9% to 7.4% of agricultural GDP (GOI, 2007), suggesting trade-offs between the two. Both public and private investment need to rise for improving agricultural productivity: gross capital formation (GCF) in agriculture has increased from 12% of agricultural GDP in 2004-05 to 14.2% of GDP in 2007-08 with a rise in public sector investment. However investment to the order of 16% of agricultural GDP is

required in order to get 4% growth in agriculture. The *Bharat Nirman* programme in 2005 by the Government of India is an appropriate initiative though as Mahendra Dev (2012) argues the pace of this programme has to improve considerably.

In 2009-10 the gross capital formation as a percentage of agricultural GDP went up to around 20 %. The share of public sector GCF in the total GCF increased from 17 per cent in 2000 to 28 per cent in 2009. New initiatives have been taken towards promotion of private sector participation: the Indian government has allowed 100 per cent foreign direct investment (FDI) in the agriculture sector related to fertilisers, agricultural machinery, horticulture, development of seeds, animal husbandry, pisci-culture and the cultivation of fruits and vegetables (India Brand Equity Foundation, 2013)[8]. Private sector investment is expected to benefit Indian farmers with small land holdings and small scale investment. The new investments can encourage agricultural R&D, technologies for energy saving, and protect the environment, which in turn may contribute to improvement in yield. As 100 per cent FDI was permitted, the agricultural services sector witnessed foreign investments of US$ 1.5 billion over 2000–2012.

C. Land issues

On land issues and insecurity of land tenure the government of India wants that small farmers should be assisted to buy land through the provision of institutional credit, on a long term basis, at a low rate of interest and by reducing stamp duty. At the same time, their operational holdings can increase by liberalizing the land lease market. The two major elements of such a reform include 'security of tenure for tenants during the period of contract; and the right of the land owner to resume land after the period of contract is over' (GOI, 2007). However the prevalence of informal contractual arrangement hinders investment in land, as neither the owner nor the tenant has the willingness to invest, which affects productivity adversely. New problems have emerged as the demand for land for non-agricultural purposes have gone up. Those who wish to leave agriculture are selling off their land to builders and others but not to the small and marginal farmers. The increasing use of cultivable and fertile land for non-agricultural purposes is likely to aggravate the food shortage problem.

D. Water

For improving the accessibility to water in the rainfed areas new watershed guidelines based on Parthasarathy Committee's recommendations were accepted by the Central Cabinet in March 2009 though as Mahendra Dev (2012) writes, the implementation has to increase considerably. Assets created under National Rural Employment Guarantee Schemes can be utilised in improving land and water management.

E. Research

The yield gaps between the figures recorded at research stations and the field ranges from 5 to 300 percent. The new agricultural technologies need to be improved. The ATMA (Agricultural Technology Management Agency) scheme was launched in 2005 to support state governments' efforts to improve the extension system so that the returns to investment on research and extension will be much higher on agricultural growth as compared to other investments (Mahendra Dev, 2012). National Food Security Mission (NFSM) was launched

[8] The Indian Agriculture Sector: Investments, Growth and Prospects. Available from www.ibef.org/download/ Agriculture-Sector-04jan.pdf.

in 2007 to increase 20 million tonnes of food grains in the next five years. Though it showed positive results by increasing yields in different regions there is a need to strengthen it to improve productivity.

F. Credit

Only 27 per cent of the farmers had access to institutional credit as noted by the Expert Group on Financial Inclusion in 2008 and unfortunately not much improvement has taken place in the share of the small and marginal farmers (Mahendra Dev, 2012). The small and marginal farmers' access to credit has to improve for productivity to rise.

G. Diversification and marketing

The National Horticulture Mission (NHM) was launched in the country during the 10th Plan in order to facilitate diversification in favour of high value products. But Mahendra Dev (2012) argues that the impact has to be strengthened to improve productivity in horticulture sector.

The Agricultural Policy Vision 2020 suggests a variety of programmes which are listed below:

> Public investment in irrigation, infrastructure development (road, electricity), research and extension and efficient use of water and plant nutrients are the dominant sources of TFP growth. The sharp deceleration in total investment and more so in public sector investment in agriculture is the main cause for the deceleration. This has resulted in the slow-down in the growth of irrigated area and a sharp deceleration in the rate of growth of fertiliser consumption. The most serious effect of deceleration in total investment has been on agricultural research and extension. This trend must be reversed as the projected increase in food and non-food production must accrue essentially through increasing yield per hectare. Recognising that there are serious yield gaps and there are already proven paths for increasing productivity, it is very important for India to maintain a steady growth rate in total factor productivity. As the TFP increases, the cost of production decreases and the prices also decrease and stabilise. Both producer and consumer share the benefits. The fall in food prices will benefit the urban and rural poor more than the upper income groups, because the former spend a much larger proportion of their income on cereals than the latter. All the efforts need to be concentrated on accelerating growth in TFP, whilst conserving natural resources and promoting ecological integrity of agricultural system. More than half of the required growth in yield to meet the target of demand must be met from research efforts by developing location specific and low input use technologies with the emphasis on the regions where the current yields are below the required national average yield.

VI. Policy Issues: Services

For the services sector policies which promote skill formation, accessibility to ICT and lead to the growth of high value services are expected to enhance productivity growth. Several new services have come up as the consumption basket even of a typical middle class household has undergone significant changes in favour of these services in the last ten years or so (Mitra, 2013a). Some of these new services are characterized by high productivity or at least have the potentiality to improve productivity. Some of the new unconventional services which have

taken over the lead are professional services, information technology and information technology enabled services, organised retail, healthcare, tourism, retail management, etc. For example several health services for which a large demand base exists can raise productivity with up-gradation in technological support. Agricultural services, financial services and different types of services used as inputs by the manufacturing sector have the potentiality to improve productivity. However, productivity in the services sector is strongly associated with skill, implying that the unskilled are mostly engaged in the low productivity segment in the services sector.

Barriers faced by service sector which fail to realise its full potential include absence of appropriate policy, multiple governing bodies, without coordination among them, lack of regulation in some sectors and over regulation in the others. Regulatory uncertainties and FDI restrictions have adversely affected investments in different segments within the services sector. Besides, cost of service deliveries is high as infrastructure facilities are poor. Private investments in key infrastructure services such as transport, energy and telecommunications are important. Given the age structure shift and the potentiality for demographic dividend to be reaped it is important for India to generate quality employment and move up the value chain. Quality employment in turn can contribute to productivity growth significantly. The linkage between employability, quality employment and productivity need to be understood in order to break this low equilibrium trap of poor human capital with almost no employability skills, low productivity employment and poverty.

The ICT seems to have brought in a major revolution contributing to TFPG. Das et al (2013) suggest that labor productivity in Indian service sector has been growing substantially over decades, and much of this productivity gain is accruing through acceleration in market services labor productivity**.** This productivity gain in the ICT intense services is because of the increasing role of ICT. Besides, improvement in social infrastructure (quality of education, health etc.) has also resulted in higher levels of performance. Within the services sector activities which engage skilled human labour and ICT are seen to have realised higher labour productivity as well as TFPG (Mitra, 2013). On the other hand, several informal sector activities in the services sector engaging mostly unskilled labour without the support of technology are characterised by low productivity, generating meagre earnings.

As Mukherjee (2013) points out, there is no government policy on how services sector can lead to inclusive growth. The focus is on the rapid expansion in the services sector which can contribute to the overall growth. For this productivity in the services has to improve which is directly related to skill, technology up-gradation and ICT application. Government efforts in this direction are substantial but these initiatives do not create opportunities for the unskilled labour to be engaged in the growth process except in a few instances where secondary effects in terms of employment creation are strong. Improvement in the quality of education and vocational courses in institutions which are created to cater to the low income households is essential.

The key barriers faced by different types of services need to be identified and then specific reforms need to be undertaken. For instance, in road transport, reforms should focus on establishing a supply chain by removing barriers to the interstate movements of goods which can be done with the help of technology (i.e., computerizing check posts)and implementation of single goods and service taxes (Mukherjee, 2013).

The following are the suggestions made by Mukherjee (2013) to provide a boost to the services

growth, productivity and technological advancements in this sector:

1. Removal of FDI restrictions.
2. Service sector employment and education: There is a skill shortage in ICT and organized retail services.
3. Taxes and subsidies: India has a high corporate tax rate of 30%–40% compared to around 17% in Singapore and up to 25% in the PRC.
4. Access and availability of infrastructure: In India government investment in infrastructure is low and has not been able to meet the demand.
5. Research and development and ICT: Both have the potentiality to play key roles in inclusive growth by ensuring access to cheaper technology and by disseminating knowledge.
6. Trade: India's trade in services largely comprises computer and software services, and exports are concentrated in a few markets. More diversification is required.

The Smart Cities initiative of the present government aims at creating cities with basic infrastructure built on a sustainable model. With assured water and electricity supply, sanitation and solid waste management, urban mobility and efficient public transport, IT connectivity, e-governance and citizen participation and the safety and security of citizens investment is expected to go up resulting in productivity induced higher rates of economic growth. One hundred cities and towns have been selected by the Ministry of Urban Development with at least one city from each state. The Smart Cities Council India has been formed which is a part of the US-based Smart Cities Council, operating in 140 countries.

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Table. Schemes related to departments/ministries impacting manufacturing sector

S .No.	Ministry / Department	Schemes
1.	Department of Industrial Policy & Promotion	Indian Leather development program me Industrial infrastructure Up gradation scheme Fright subsidy scheme North East Industrial and Investment promotion policy (NEIIPP), 2007 Industrial park scheme, 2002 Investment Promotion Scheme Transport Subsidy Scheme
2.	Ministry of Food Processing Industries	Mega Food Parks Scheme (MFPS) Scheme for Setting up/Up-gradation of Quality Control/ Food Testing Laboratory / R&D and promotional Activity National Mission on food processing
3.	Ministry of Textile	Comprehensive Power loom Cluster Development Schemes (CPCDS) Comprehensive Handloom Cluster Development Scheme (CHCDS) Mega Handloom Cluster Comprehensive Handicrafts Cluster Development Scheme (CHCDS) Technology Up- gradation Fund Scheme (TUFS) The Scheme for Integrated Textile Parks (SITP)
4.	Ministry of Small Scale & Medium Enterprises (MSME)	Scheme of fund for Regeneration of Traditional Industries (SFURTI) International cooperation Scheme Rajiv Gandhi UdyamiMitraYojana (RGUMY) Scheme for Assistance to Training Institutions Marketing Assistance Scheme through National Small industries Corporation(NSIC) Prime Minister Employment Generation Programme (PMEGP) National Manufacturing Competitiveness Programme (NMCP) Micro & Small Enterprises Cluster Development Programme (MSE-CDP) Credit Guarantee Scheme Purchase and Price Preference policy
5.	Department of Heavy Industries	Research & Development in Automotive Industry Implementation of National Automotive and R&D Infrastructure Project (NATRIP) Various Schemes for capacity Augmentation of plants & Machinery
6.	Department of Chemical &Petrochemicals	Scheme for Setting Up of Plastic parks Technology Innovation in various fields of Petrochemicals &Downstream Plastic Processing Industry for 2014-15.
7.	Department of Electronics and	• Scheme of Manpower Development for Software Export Industry

	Information Technology	• R&D Funding Scheme • Multiplier Grants Scheme • Support International Patent Protection in Electronics & IT (SIP-EIT) Scheme • Special Economic Zones (SEZ) Scheme Electronics Hardware Technology Park (EHTP) Scheme Export Oriented Unit (EOU) Scheme Export Promotion Capital Goods (EPCG) Duty Exemption and Remission Schemes Software Technology park (STPs) Modified special incentive package scheme (M-SIPS) Scheme for financial assistance for skill development in Electronics system Design and Manufacturing (ESDM) sector
8.	Department of Pharmaceuticals	Scheme for Cluster Development programme for Pharma sector (CDP-PS)
9.	Ministry of Steel	Promotion of Research & Development in Iron and Steel sector

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