

## SOME CRITICAL DIMENSIONS OF INDUSTRIAL DEVELOPMENT

### Productivity

8.97 Economic growth crucially depends on gains in productivity. Total factor productivity (TFP), defined as the ratio of a volume measure of output to a volume measure of total input use, measures the efficiency with which labour, capital and other inputs are combined to produce output. There are vast differences in approaches of measurement of manufacturing productivity with regard to the method of estimation, measurement of outputs and inputs, resulted arrived at and interpretation of results. Reflecting these differences, the studies on productivity growth in Indian manufacturing during different time periods have thrown up varied conclusions.

8.98 While many studies have pointed towards acceleration in productivity growth during the 1980s, objections have been raised about the research methodologies that led to this inference. While there is a wealth of literature on productivity growth during the post-reforms period, those studies too have not led to unambiguous conclusions. However, it is widely held that trade liberalization during the 1980s and the 1990s have had a positive impact on productivity growth. It is also observed that in a scenario of steadily increasing labour compensation in manufacturing, the growth of labour productivity is important.

8.99 As an approximation of the efficiency in resource use, productivity is affected by many factors, one of the most important being technological progress. Increased application of information and

communication technology (ICT) in manufacturing, accompanied with commensurate upgradation of labour skills and knowledge, is observed to have multi-dimensional effects on productivity growth. In this context, it is observed that the penetration of ICT in Indian manufacturing and business is very low, compared to advanced countries.

### R&D in Indian industry

8.100 Though spending on R&D in relation to the GDP in the case of India has increased over the years, the difference between the spending in R&D between India and the developed world remains considerably high. India spends approximately 0.88 per cent of its GDP on research and development. This is low compared to countries like China which spend 1.42 per cent of its GDP on R&D and most developed countries spend more than 2 per cent of their GDP (Box 8.3).

8.101 During the period 2005-06, 74.1 per cent of the total R&D expenditure was met from government sources and rest 25.9 per cent came from the private sector. The Central Government was the highest contributor to R&D expenditure with a share of 57.5 per cent, the State Government had a share of 7.7 per cent while the industrial sector contributed 30.4 per cent, and the higher education sector 4.4 per cent. It is pertinent to note that the industrial sector R&D contribution in developed countries is usually more than 50 per cent. There are about 3,690 R&D institutions in the country. Under the Central Government R&D expenditure, 86 per cent was incurred by 12 major scientific agencies. The share of Defence Research and Development Organisation (DRDO) amongst the 12 major scientific agencies was 34.4 per cent.

### Box 8.3 : Report of the National Knowledge Commission on Innovation-extracts

- **Innovation intensity** (measures the percentage of revenue derived from products and services which are less than 3 years old) has increased in both large firms and SMEs, with SMEs registering greater increase. Innovation intensity is greater in firms having majority foreign ownership than with majority Indian ownership. Firms with greater R&D spending are likely to be more innovative.
- **Internal and external barriers to innovation** have been recognised. Most important internal barriers for the large firms include; lack of organisational focus on innovation, lack of competitiveness and inefficient management systems. External barriers comprise skill shortage due to lack of emphases on creativity, design, industrial innovation, etc. in education curricula.
- **Impact of Innovation:** Innovation has been critical to growth since economic liberalisation. Increase in competitiveness and market share have been the most significant effects of innovation.

The commission, inter alia, recommends that;

- **Higher education** system should be reformed in such a way as to develop required intellectual capital and lay the foundation for effective collaboration between industry and educational institutions.
- **Vocational Education and Training (VET)** should be restructured, with a focus on industry participation in fixing the imbalance between supply and demand in VET.
- **Systemic Reforms:** The reforms required for innovation involve the synergistic working of the industry, the government, the educational system, the R&D environment and the consumer. Innovation needs to be as wide spread as possible, across the economy from SMEs to large firms level. Addressing these issues will enable India to be among the global leaders in innovation.

Source : 'Innovation in India' (2007), a report by National Knowledge Commission (NKC)

**Table 8.24 : Projects appraised for environmental clearance during April-February 2009**

Nature of Project	Cleared		Pending		Rejected/ Returned	Transferred to SEIAAs
	EC	TOR	EC	TOR		
Industry	604	460	68	218	74	65
Thermal power	53	92	26	218	17	22
River valley and hydroelectric	11	44	12	24	Nil	7
Mining (coal and non-coal)	241	413	102	142	137	86
Infrastructure and miscellaneous	133	513	30	24	3	7
Construction & industrial estates	367	22	60	-	340	390
<b>Total</b>	<b>2953</b>		<b>748</b>		<b>571</b>	<b>577</b>

Source: Ministry of Environment and Forests

EC – Environmental clearance; TOR - Terms of Reference

8.102 During 2005-06, the industrial sector R&D units spent 0.55 per cent of their sales turnover on R&D. In terms of sector-wise position, the drugs and pharmaceuticals sector occupied highest position with a share of 37.4 per cent followed by transportation and defence with 14.7 per cent and 6.9 per cent respectively.

8.103 The study of human resource sector suggests that nearly 3.91 lakh personals were employed in the R&D establishments in the country including in-house R&D units of industries, as on April 1, 2005. Majority (63 per cent) of the total R&D personnel was employed in institutional sector and higher educational sector. Industrial sector which comprises both public and private industries deployed 37 per cent of the total R&D personnel. Out of this, public sector including joint sector industries, employed only 6 per cent on R&D activities. The number of applications filled for patents increased from 8,503 on 2000-01 to 28,940 in 2006-07. The number of patents granted stands at 7,539, out of which only 25.3 per cent were Indians.

### Industrial pollution and the environment

8.104 Polluting industries have been a significant source of air and water pollution. Out of 2,982 industries identified under the 17 categories of polluting industries, 2,121 units have so far set up pollution control devices to comply with the standards, 478 units have been closed and action has been taken against 383 defaulting units. Necessary measures - both preventive and promotional - have been taken for control of industrial pollution. These, inter alia, include; notification and enforcement of emission and effluent standards, setting up of clean technology mechanisms and effluent treatment plants, establishing waste

**Table 8.25 : Strikes and lockouts (Man-days lost, in million)**

Year	Strikes		Lockouts	
	Number	Man-days lost	Number	Man-days lost
2004	236	4.83	241	19.04
2005	227	10.81	229	18.86
2006	243	5.32	187	15.01
2007	210	15.06	179	12.11
2008(P) (Jan-Dec)	201	2.44	30	0.96

Source: Labour Bureau, Shimla

P: Provisional

minimization circles in clusters of small scale industries, regulating siting of industries, implementing the Charter of Corporate Responsibility for Environmental Protection (CREP) in highly polluting industries, Eco-mark scheme to encourage environment-friendly products, progressive emission norms and cleaner fuels for controlling vehicular pollution, economic instruments to internalize costs of pollution and fiscal incentives for pollution control equipments. Prior environmental clearance based on impact assessment is made mandatory for designated sectors/projects. Status of projects appraised in 2008-09 is given in Table 8.24.

8.105 Monitoring of designated cities/towns for air pollution reveals that while the levels of sulphur dioxide were within the standard limits, no definite trend has been observed in ambient nitrogen oxide. High level of RSPM was the more prevalent form of

air pollution in almost all the metro cities. Organic and bacterial contamination, the main water pollutant, has shown gradual improvement. Fly ash, phosphogypsum and iron & steel slags are the main solid wastes generated in India. Of the specific interest to the industrial sector was the issue of the final Notification on Hazardous Waste (Management, Handling and Trans-boundary Movement) Rules of 2008, repealing earlier rules, for ensuring effective hazardous waste management. While, revised environmental standards were notified for petroleum oil refinery and for sulphuric acid plants, first-time standards were notified for incinerators for pesticides and common hazardous wastes, coffee industry and sponge iron plants.

### Labour relations

8.106 The continued decline in the number of strikes and lockouts indicates an improvement in industrial relations in the country (Table 8.25).

8.107 During 2008, as per the information available, Tamil Nadu experienced the maximum instances of strikes and lockouts followed by Kerala, Andhra Pradesh and Karnataka. Industrial unrest was concentrated mainly in financial intermediation (excluding insurance and pension), textiles, air transport, mining of coal and food products.