

## CHAPTER 4

### REGIONAL DISPARITIES IN INDUSTRIAL DEVELOPMENT

#### 4.1 Introduction

Industrialization has a major role to play in the economic development of underdeveloped countries. The gap in per capita incomes between the developed and underdeveloped countries is largely reflected in the disparity in the structure of their economies; the former are largely industrial economies, while in the latter production is confined predominantly to agriculture. Undoubtedly, some countries have achieved relatively high per capita incomes by virtue of their fortunate national resource endowments. Petroleum exporting countries like Saudi-Arabia, Kuwait and UAE have achieved higher per capita income by exploiting the strong advantage that they enjoy in international trade. But these countries are a rather special case.

In many cases, the diversion of underdeveloped rural labour to non-agricultural occupations is an urgent requirement for development. But it does not mean that industrial development can be dissociated from progress in the agricultural sector. Improvement of productivity in agriculture creates surplus which can be utilized to support increasing labour force in industries. Besides providing a large part of the sustenance for the growing urban population, the agriculture sector supplies a market for manufactured goods out of higher real incomes and a source of foreign exchange to pay for imported capital goods for industry; it also provides a source of capital for industry through the medium of capital accumulated by traders and leads to the growth of an exchange economy—all these factors promote the growth of manufacturing industry. In fact, unless agriculture is modernized substantially, industrial expansion is likely to proceed at a slow speed due to lack of purchasing power in the hands of the bulk of population. The problem facing the less developed countries is, therefore, not one of choosing between primary and secondary activities but rather one of ensuring the balanced expansion of all appropriate sector of the economy.

The share of industry in national income in 1948-49 was 17 per cent. In 1996-97, it was around 23 per cent—an increase of just 4 per cent in 50 years.

Thus in terms of contribution of national product, the share of manufacturing industry sector continues to be low. In most of the developed nations, this share is between 30 and 50 per cent.

The structural reform programme as initiated by the Government of India particularly since 1991 aims at increasing the long-run growth rate of GDP through deregulation in commodity, money and factor markets. Attaining some poor growth, at about 3.5 per cent per annum, in the thirty years of the post-independence period, the Indian economy attained a growth rate of about 5.6 per cent during 1980-1990 and since mid 1990s, the economy grew by more than 6.3 per cent till 2004-05 and about 8.6 during 2005-06 to 2006-07. This has given rise to a vision of policy makers of attaining even higher growth rates. Some economists argue that one of the major indicators of planning in India is that despite a conscious effort made by the planners to promote labour intensive techniques of production, the growth of employment has continuously lagged behind the growth of labour force. The planners of Tenth Five Year Plan anticipated that in a labour surplus economy like India economic liberalization which includes trade openness, financial openness, outward orientation and minimal intervention in financial, goods, services and factor markets, was like to raise considerably the demand for skilled and unskilled labour. It is in this perspective that we need to assess the potential of Indian economy for attaining high growth of output and employment and ensuring stable price level.

But, when organized employment has almost been stagnant, unorganized sector, contributing almost half of the country's GDP, has performed well in terms of providing employment during the reform era. The NCEUS study estimates the number of such workers to be 23.5 crore constituting 77 per cent of the working population. This has only aggravated poverty due to the casual nature of the jobs and low wages.

The above factors have led to a significant opportunity to increase in industrial investment in West Bengal. Between 1991 and December 2005 the state received a large number of approvals for industrial investment entailing an invested capital of more than Rs. 36,210 crore in organized sector which led to highest net state domestic product. Moreover, the share of West Bengal in total approvals for foreign direct investment in the country between August 1991 and March 2005 was about 18 per cent, with only Maharashtra having a large share.

The actual implementation of projects has also picked up. After the new industrial policy was announced by the state government in 1994, *Shilpa Bandhu*, the 'single window' agency operating in the state, handled so far 1,000 investment proposals of which about 900 for new units and about 60 for expansion of existing units, with total capital outlay of about more than Rs. 50,000 crore.

#### **4.2 Industrial Decline and the Need for Industrialization in West Bengal**

Let us discuss the need for industrial priority in West Bengal, which is a big long-term question and an extremely important issue.

It is sometimes underestimated the extent to which Bengal has de-industrialized. Bengal was one of the major industrial centers in the world, not only in India. In European writings, Bengal has again and again come as being one of the most prosperous areas in the world as an industrial base, the kind of reputation that some parts of Italy gained later. We argue that it is often said that historically, Calcutta was founded 300 years ago by Job Charnok (although this has been questioned by some historians) but it is also true that there was an urban settlement based on trade and industry, apart from agriculture, in this area. This we see not only from Indian records but also from the writings of Ptolemy and Pliny the Elder. Again very near from Calcutta, there were industrial areas of huge prosperity. There is also mention in the writings of Fa Hien who came here in 401 and spent 10 years. He went back by boat. He took the boat from Tamralipta, which is very close to Calcutta. Effectively, it was greater Calcutta. So this has been a trading and industrial area for a very long time. When Charnok came and the Battle of Palasi happened, there was not only English but also the French, the Portuguese, the Spanish, the Flemish and the Danish merchants. They were all interested in the industrial products of this area. Under the British, there was de-industrialization of classical industry but new industries came in the form, for example, of jute. But gradually that went off after independence and there was further de-industrialization. In fact, during the colonial era Bengal became the leading industrialized province in the erstwhile British India. In 1921, Bengal accounted for 35.1 per cent of the total number of industrial workers in India. In 1939, that is, just prior to the Second World War, Bengal accounted to be the major industrialized state in India accounting for 28.7 per cent of the total number of industrial workers in British India (BCCI, 1971).

If we go back in 1946, according to the first census of manufacturing industries in India (which covered all factories employing 20 or more workers using power) West Bengal continued to lead other states in terms of its share in total number of industrial workers in India, though in terms of value added in the manufacturing sector, West Bengal was second to Bombay.

Industrial employment in the engineering and other major industries in 1948 as reproduced in BCCI, (1971:11), West Bengal had a much higher level of employment in the engineering industries than Bombay. In case of chemicals and food, drink, tobacco, Bombay had marginally higher employment than West Bengal; and in chemicals (leaving out dyeing and bleaching) West Bengal had greater employment. In other industries such as paper and leather, West Bengal had higher employment than Bombay. It is only in textiles, in terms of employment, that Bombay had a clear superiority over West Bengal. Besides this, the industrial structure of West Bengal was more diversified than that of Bombay.

We know that planned industrialization began in India from 1951 with the beginning of the First Plan. The annual industrial growth rate (compound) was 5.7 per cent in the First Plan, 7.2 per cent in the Second Plan and 9.0 per cent during the Third Plan (5<sup>th</sup> Five Year / Plan document, Planning Commission, Govt. of India). After 1965, industrial growth slackened and averaged about 3.7 per cent per annum between 1965 and 1975, and it is only in the 1980s that it achieved the rate of the pre-1965 era. During the period 1951-65, West Bengal continued to prosper. In the period between 1951 and 1965, the value of industrial output in West Bengal increased by 287 per cent (BCCI 1971:41). Registered factory employment in West Bengal in the same period increased from 6, 51, 944 to 8, 80, 270 (Economic Review, GoWB, various issues). But West Bengal fell behind Maharashtra in terms of the number of industrial licenses received although they together still accounted for over 40 per cent of licenses issued.

In fact, West Bengal never recovered from the industrial recession and the related political turmoil of the late 1960s. Data on licenses show that industrial investment in the state was very sluggish in the 1970s and 1980s (Economic Review, GoWB, various issues). This is also indicated by data on the state wise fixed capital per employee in the factory sector. West Bengal had the lowest fixed capital per employee in 1977-78 among the eight states. In 2004-05, West

Bengal in terms of fixed capital per employee was ranked fifth (ASI, Govt. of India, various issues).

So, in addition to a low level of capital formation West Bengal also experienced a sharp decline in employment during this period. It must be emphasized that the case of an initially industrialized region slowly losing its importance is not unheard of. Then one may cite the example that West Bengal was an exactly opposite case of Myrdal's concept of 'cumulative causation' which led to the belief that developed regions would always continue to grow at the expense of the poor regions (North East England and Wallonia in Belgium are also classic examples during seventies in this regard). What is more, the introduction of freight equalization for steel in the mid-1950s had made new locations for engineering industries, at a distance from steel plants, viable. Damette (1980:84) had observed this elsewhere, though in a different context and has stated that the state often reduces the cost of new locations for entrepreneurs. Then the culmination of this policy measure led to the growth of engineering industry outside West Bengal. Moreover, the recession of 1966-67 affected most severely the engineering industry in West Bengal which was still dominated by old units, while other states could absorb the impact of recession without great damage to their industrial structure.

An argument that has considerable adherents is that investments are not affected by labour trouble, the protagonists point to the case of Maharashtra where the number of industrial disputes has been consistently higher than that in West Bengal. Banerjee (1982, 337-340) for instance makes out a case along these lines. But we think that it misses out on the main issue. Actually industrialists are willing and even able to cope with 'normal' labour disputes as long as the state authorities are investor friendly but when organized labour bids for political power it becomes a different issue. Therefore, the crucial factor in West Bengal's decline was thus, the lack of industrial investments to modernized existing industries and no development of new industries. As a result, West Bengal was losing its export competitiveness to other regions because of high cost of production. It further squeezed the field for employment of capital and labour and led to the phenomenon of capital and labour moving out of the state.

We know that the effects of poor infrastructure are much more palpable. A recent study puts West Bengal 14<sup>th</sup> among Indian states in 1997-98 in terms of

an index of infrastructure, as compared with 4<sup>th</sup> position in 1971-72. The index comprises (a) roads, railways, ports (b) irrigation (c) electricity (d) telephone (d) loan-deposit ratios of banks and (f) tax collection of the state government. In terms of each of these individual items, West Bengal has fallen below the national average whereas in 1964-65 it either came first or second. These facts therefore suggest infrastructure to be a key factor explaining the declining of West Bengal's industrial performance relative to the rest of the country. The first drive for industrialization in India took place during 1956-65; four decades later the second one has just begun.

Industrialization is supposed to be the engine as well as a versatile indicator of economic development. It involves major transformation of an economy from one, which is dominated by primary activities to one containing a large industrial sector. This transformation is accompanied by the development of transport and communication, trade and commerce, services and overall urbanization, and necessitates the reorganization of economic, social and cultural life of the people. It is complementary, not contrary to the rural development. It is because industrialization provides market for agricultural products, produces appropriate farm inputs and jobs to unemployed and is capable of triggering off a chain of development in rural areas. But the development of industries, more specifically location of industries is determined by several factors. Among them, raw materials, power and energy, market, capital, transport and labour are key factors. Nevertheless, from the economic point of view, manufacturing industries are located at a place where cost of bringing together of production factors and delivery cost of manufactured goods to consumers are the lowest, thus yielding maximum profit.

In West Bengal the state government always makes endeavour to foster the growth of cottage and small-scale industries because of its employment potentiality and capability to spread through a wide network. The Directorate of cottage and small-scale industries of the state government has the system of registering these small-scale industries and providing necessary support so that these units can flourish in near future (Chatterjee, and Ghosh, 2001, p.24).

"West Bengal once industrially the foremost state in India is striving to regain its former glory" says the Annual Report, 1998-99 of Commerce and Industries Department, Govt. of West Bengal. For achieving the goal the state

government always patronizes the case of setting up industrial units in this state. According to the Incentive Scheme introduced by the state government for industrialization of the economy, the districts are arranged in three groups, viz. A, B, C on the basis of the industrialization achieved.

### **4.3 Indicators of Industrial Development**

In order to show the inter-district disparity in industrial development we have used the following indicators (*see in Appendix to chapter-4*).

- I-1: Number of registered factories per thousand Sq. Kms. of area
- I-2: Number of registered factories per lakh of population
- I-3: Number of workers engaged in registered factories per thousand Sq. Kms. of area
- I-4: Number of workers engaged in registered factories per lakh of population
- I-5: Number of industrial units (small-scale) per thousand Sq. Kms. of area
- I-6: Number of industrial units (small-scale) per lakh of population
- I-7: Percentage of workers in manufacturing to total workers

#### **4.3.1 Rationale for the Choice of Indicators of Industrial Development**

The level of industrial development can be measured by using indicators of different characteristics. But in the present case, the above mentioned seven indicators have been selected for analyzing the level of industrial development at district level in West Bengal. The first and the fifth indicators show the density of factories and the density of small-scale industrial units respectively in a district. Similarly, the second and sixth indicators exhibit the number of factories and number of small-scale industrial units in relation to population. The remaining three indicators, I-3, I-4 and I-7 show how far the industrial sector has succeeded in providing employment.

#### **4.3.2 Share of Manufacturing Sector (in percentage) in DDP by West Bengal Districts**

The share of manufacturing sector in DDP for the period 1980-81 to 2000-01 is presented in Table 4.1. The manufacturing sector takes into account both the registered and unregistered units. In the registered manufacturing sector the SDP at constant prices showed a marginal decline from Rs. 2245.02 crores in 1991-92 to Rs. 2214.39 crores in 1992-93.

According to the Economic Review 1993-94 published by the Govt. of West Bengal "this decline is related to the decline in industrial production in the

state because of the severe recession in the industrial sector in the country as a whole. The SDP in unregistered manufacturing sector however increased from Rs. 1221.08 crores in 1991-92, in percentage term 0.92 percent. The setting up of large number of units mostly in the tiny and cottage industries sector especially under IRDP (Integrated Rural Development Programme) contributed to this increase" (Economic Review, 1993-94 GoWB). From Table 4.1, it can be seen that Howrah retained the first position among 18 districts throughout the reference period. On the other hand, the share of Dakshin Dinajpur district the share of manufacturing sector in DDP remained the lowest. Most of the districts in North Bengal may be identified as industrially backward.

**Table 4.1: Share of Manufacturing Sector (in percentage) in DDP**

Districts	1980-81	1990-91	2000-01
Burdwan	25.861	20.439	17.538
Birbhum	17.490	7.765	5.082
Bankura	10.036	9.349	7.642
Midnapore	16.616	14.510	12.122
Howrah	47.587	44.232	27.489
Hooghly	32.167	28.073	20.472
24 Parganas (N)	45.589	27.430	26.215
24 Parganas (S)	18.605	11.194	21.485
Nadia	13.052	9.560	16.573
Murshidabad	7.712	17.038	15.635
Malda	16.449	10.577	8.596
Uttar Dinajpur	7.018	3.912	5.125
Dakshin Dinajpur	4.877	2.719	5.932
Jalpaiguri	16.745	9.475	10.198
Darjeeling	42.347	8.083	6.772
Cooch Behar	8.838	5.583	5.688
Purulia	16.787	10.966	11.894
Kolkata	14.047	16.981	7.288
West Bengal	24.679	17.702	14.999

Source: Statistical Abstract, the Bureau of Applied Economics and Statistics, GoWB (various years)

#### **4.4 District-wise Industrial Sector Development: Indicator-wise Assessment**

##### *Inter-District Disparities in Terms of the Indicator of Industrial Development*

The distribution of districts according to their respective levels of development with respect to different indicators of industrial development is shown in Table 4.2, Table 4.3 and Table 4.4 for the years 1980-81, 1990-91 and 2000-01 respectively:

**Table 4.2: Distribution of Districts by Relative Levels of Industrial Development in 1980-81**

Sl. No.	Indicators	State Average	Developed Districts	Developing Districts
1	No. of registered factories per 1000 sq. kms. of area	280.62	Kolkata, Howrah, 24 Parganas (N)	24 Parganas (S), Hooghly, Darjeeling, Burdwan, Jalpaiguri, Nadia, Birbhum, Bankura, Purulia, Midnapore, Uttar Dinajpur, Cooch Behar, Dakshin Dinajpur, Murshidabad, Malda
2	No. of registered factories per lakh of population	10.16	Howrah, 24 Parganas (N), 24 Parganas (S), Kolkata, Darjeeling, Jalpaiguri	Burdwan, Hooghly, Birbhum, Nadia, Bankura, Purulia, Midnapore, Uttar Dinajpur, Dakshin Dinajpur, Cooch Behar, Malda, Murshidabad
3	No. of workers engaged in registered factories per 1000 sq kms. of area	18940.76	Howrah, Kolkata, 24 Parganas (N), Hooghly	24 Parganas (S), Burdwan, Jalpaiguri, Darjeeling, Nadia, Midnapore, Birbhum, Purulia, Uttar Dinajpur, Dakshin Dinajpur, Murshidabad, Bankura, Cooch Behar, Malda
4	No. of workers engaged in registered factories per lakh of Population	1236.99	Howrah, 24 Parganas (N), 24 Parganas (S), Hooghly, Burdwan	Darjeeling, Jalpaiguri, Kolkata, Nadia, Midnapore, Purulia, Birbhum, Bankura, Dakshin Dinajpur, Uttar Dinajpur, Cooch Behar, Murshidabad, Malda
5	No. of industrial units (small scale) per 1000 sq. kms of area	337.44	Kolkata, Howrah, Nadia	24 Parganas (N), Burdwan, Hooghly, Malda, Cooch Behar, Birbhum, Jalpaiguri, Midnapore, Darjeeling, Murshidabad, Bankura, Dakshin Dinajpur, Uttar Dinajpur, Purulia, 24 Parganas (S)
6	No. of industrial units (small scale) per lakh of	24.01	Nadia, Howrah, Burdwan, Jalpaiguri, Malda, Cooch Behar,	24 Parganas (N), Hooghly, Bankura, Midnapore, Kolkata, Purulia,

	population	Darjeeling, Birbhum	Dakshin Dinajpur, Uttar Dinajpur, Murshidabad, 24 Parganas (S)
7	Percentage of workers in manufacturing to total workers	5.55 24 Parganas (N), 24 Parganas (S), Howrah, Burdwan, Hooghly	Jalpaiguri, Midnapore, Kolkata, Darjeeling, Nadia, Purulia, Birbhum, Bankura, Murshidabad, Uttar Dinajpur, Cooch Behar, Dakshin Dinajpur, Malda

It may be noticed from Tables 4.2, 4.3 and 4.4 that the number of registered factories per thousand of Sq. Kms. of area and percentage of workers in manufacturing to total workers between 1980-81 and 2000-01 have increased manifold in absolute terms. However, the number of small-scale industrial units in relation to population has shown a declining trend during the same period. Number of workers engaged in registered factories per thousand Sq. Kms. of area and in relation to population has shown declining trend during the period 1980-81 and 2000-01.

**Table 4.3: Distribution of Districts by Relative Levels of Industrial Development in 1990-91**

Sl. No.	Indicators	State Average	Developed Districts	Developing Districts
1	No. of registered factories per 1000 sq. kms. of area	419.09	Kolkata, Howrah, 24 Parganas (N)	24 Parganas (S), Hooghly, Burdwan, Darjeeling, Jalpaiguri, Nadia, Birbhum, Bankura, Midnapore, Uttar Dinajpur, Purulia, Cooch Behar, Malda, Dakshin Dinajpur, Murshidabad
2	No. of registered factories per lakh of population	11.97	Howrah, 24 Parganas (N), 24 Parganas (S), Kolkata, Darjeeling, Jalpaiguri	Hooghly, Burdwan, Birbhum, Nadia, Bankura, Purulia, Midnapore, Uttar Dinajpur, Cooch Behar, Dakshin Dinajpur, Malda, Murshidabad
3	No. of workers engaged in registered factories per 1000 sq kms. of area	18411.62	Howrah, Kolkata, 24 Parganas (N), Hooghly	24 Parganas (S), Darjeeling, Jalpaiguri, Nadia, Burdwan, Midnapore, Birbhum, Purulia, Murshidabad, Uttar Dinajpur, Dakshin Dinajpur, Bankura, Cooch Behar, Malda
4	No. of workers engaged in	894.07	Howrah, 24 Parganas (N), 24 Parganas (S), Hooghly	Darjeeling, Jalpaiguri, Kolkata, Nadia, Midnapore, Burdwan,

	registered factories per lakh of population		Purulia, Birbhum, Dakshin Dinajpur, Bankura, Murshidabad, Uttar Dinajpur, Cooch Behar, Malda
5	No. of industrial units (small scale) per 1000 sq. kms of area	617.06	Kolkata, Howrah, 24 Parganas (N), Nadia Hooghly, Darjeeling, Burdwan, Malda, Cooch Behar, Midnapore, Murshidabad, Birbhum, Dakshin Dinajpur, Jalpaiguri, Bankura, Uttar Dinajpur, 24 Parganas (S), Purulia
6	No. of industrial units (small scale) per lakh of population	42.56	Darjeeling, Nadia, 24 Parganas (N), Howrah, Malda, Cooch Behar, Burdwan, Midnapore Hooghly, Bankura, Jalpaiguri, Murshidabad, Birbhum, Dakshin Dinajpur, 24 Parganas (S), Uttar Dinajpur, Purulia, Kolkata
7	Percentage of workers in manufacturing to total workers	5.55	24 Parganas (N), 24 Parganas (S), Howrah, Hooghly Midnapore, Jalpaiguri, Kolkata, Burdwan, Nadia, Darjeeling, Birbhum, Purulia, Murshidabad, Bankura, Uttar Dinajpur, Dakshin Dinajpur, Cooch Behar, Malda

According to the Table 4.3 Kolkata, Howrah and 24 Parganas (N) were above the state average in respect of number of registered factories relative to geographical area in the year 2001. In the matter of concentration of registered factories relative to population, Howrah, 24 Parganas (N), 24 Parganas (S), Hooghly and Burdwan districts were also in the developed category of districts. Majority of districts were categorized as less developed districts in respect of most of the indicators of industrial development.

**Table 4.4: Distribution of Districts by Relative Levels of Industrial Development in 2000- 01**

Sl. No.	Indicators	State Average	Developed Districts	Developing Districts
1	No. of registered factories per 1000 sq. kms. of area	476.61	Kolkata, Howrah, 24 Parganas (N)	24 Parganas (S), Hooghly, Burdwan, Darjeeling, Jalpaiguri, Nadia, Birbhum, Bankura, Midnapore, Uttar Dinajpur, Purulia, Malda, Dakshin Dinajpur, Cooch Behar, Murshidabad
2	No. of registered factories per lakh of population	12.83	Howrah, 24 Parganas (N), 24 Parganas (S), Kolkata, Darjeeling, Jalpaiguri	Burdwan, Hooghly, Birbhum, Bankura, Nadia, Purulia, Midnapore, Uttar Dinajpur, Dakshin Dinajpur, Cooch Behar, Malda, Murshidabad

3	No. of workers engaged in registered factories per 1000 sq kms. of area	19265.89	Howrah, Kolkata, 24 Parganas (N), Hooghly	24 Parganas (S), Burdwan, Jalpaiguri, Darjeeling, Nadia, Midnapore, Birbhum, Bankura, Uttar Dinajpur, Dakshin Dinajpur, Purulia, Murshidabad, Malda, Cooch Behar
4	No. of workers engaged in registered factories per lakh of population	857.22	Howrah, 24 Parganas (N), 24 Parganas (S), Hooghly, Burdwan	Darjeeling, Jalpaiguri, Kolkata, Midnapore, Nadia, Bankura, Purulia, Birbhum, Dakshin Dinajpur, Uttar Dinajpur, Murshidabad, Malda, Cooch Behar
5	No. of industrial units (small scale) per 1000 sq. kms of area	176.62	Kolkata, Howrah, Nadia, 24 Parganas (N), Malda	Hooghly, Burdwan, Darjeeling, Midnapore, Murshidabad, Dakshin Dinajpur, Uttar Dinajpur, Jalpaiguri, Bankura, Cooch Behar, Birbhum, Purulia, 24 Parganas (S)
6	No. of industrial units (small scale) per lakh of population	11.11	Nadia, Malda, Darjeeling, Howrah, Bankura, 24 Parganas (N)	Midnapore, Jalpaiguri, Dakshin Dinajpur, Burdwan, Hooghly, Purulia, Uttar Dinajpur, Cooch Behar, Murshidabad, Birbhum, Kolkata, 24 Parganas (S)
7	Percentage of workers in manufacturing To total workers	5.55	24 Parganas (N), Howrah, 24 Parganas (S), Hooghly, Burdwan	Midnapore, Jalpaiguri, Kolkata Nadia, Darjeeling, Bankura, Birbhum, Purulia, Murshidabad, Uttar Dinajpur, Dakshin Dinajpur, Malda, Cooch Behar

Inter-district disparities in the state, as per data in the Table 4.5, have got exacerbated for the reason that density of industries was growing in some special sites on the periphery of the state. High inter-district disparities were found in the case of number of registered factories as well as number of workers engaged in such factories both in terms of area and population. On the other hand, relatively low inter-district disparities emerged in terms of the indicator such as number of industrial units (small-scale) in relation to population.

**Table 4.5: Indicator-wise Co-efficient of Variation (percentage)**

Sl. No.	Indicator	1980-81	1990-91	2000-01
1	Number of registered factories per 1000 sq. kms of area	267.03	268.37	253.63
2	Number of registered factories per 100000 (lakh) of population	125.54	124.25	123.95
3	Number of workers engaged in registered factories per 1000 sq. kms of area	171.01	181.12	172.90
4	Number of workers engaged in registered factories per 100000 (lakh) of population	134.70	141.44	123.70
5	Number of industrial units ( small Scale) per 1000 sq. kms. of area	198.56	153.16	145.78
6	Number of industrial units ( small Scale) per 100000 ( lakh) of population	54.98	53.04	61.91
7	Percentage of workers in manufacturing to total workers	152.47	163.53	142.90

Source: Authors Calculation

#### **4.5 District-wise Composite Indices of Industrial Sector Development:**

##### *District-wise Analysis of the Level of Industrial Development*

The district-wise levels of industrial development have been analyzed with the help of composite indices of industrial development. These indices have been calculated by taking first Principal Component (PC) matrix. It has been obtained from the inter-correlation matrix of such variables for the year 1980-81, 1990-91 and 2000-01, as shown in Tables 4.6, 4.7 and 4.8 respectively.

We have used the same seven indicators of industrial development as noted earlier in this chapter. It may be observed from Table 4.6 that number of registered factories relating to geographical area is positively and significantly correlated with number of workers engaged in registered factories per thousand Sq. Kms. of area and number of industrial units (small-scale) per thousand Sq. Kms. of area, other three variables namely, I-2, I-4 and I-7 are positively correlated but statistically insignificant even at 10% level with the first indicator. Only I-6 variable that is number of industrial units (small-scale) relative to population is negatively correlated and statistically insignificant even at 10% level with the first indicator.

**Table 4.6: Inter-Correlation Matrix of Industrial Development (1980-81)**

Variable	I - 1	I - 2	I - 3	I - 4	I - 5	I - 6	I - 7
I - 1	1.000						
I - 2	0.419	1.000					
I - 3	0.756	0.826	1.000				
I - 4	0.149	0.866	0.716	1.000			
I - 5	0.984	0.324	0.699	0.069	1.000		
I - 6	-0.054	0.123	0.094	0.099	0.065	1.000	
I - 7	0.101	0.758	0.607	0.944	0.019	-0.011	1.000

Note: Critical value of r at 10 percent level = 0.497

Critical value of r at 5 percent level = 0.576

Critical value of r at 1 percent level = 0.714

Similarly, it may also be observed from Table 4.7 that a positive and significant correlation exists among the number of workers engaged in registered factories per thousand Sq. Kms. of area and number of industrial units (small-scale) per thousand Sq. Kms. of area.

**Table 4.7: Inter-Correlation Matrix of Industrial Development (1990-91)**

Variable	I - 1	I - 2	I - 3	I - 4	I - 5	I - 6	I - 7
I - 1	1.000						
I - 2	0.394	1.000					
I - 3	0.804	0.780	1.000				
I - 4	0.163	0.907	0.671	1.000			
I - 5	0.980	0.428	0.844	0.225	1.000		
I - 6	-0.175	0.255	0.050	0.246	-0.026	1.000	
I - 7	0.129	0.812	0.587	0.939	0.193	0.177	1.000

Note: Critical value of r at 10 percent level = 0.497

Critical value of r at 5 percent level = 0.576

Critical value of r at 1 percent level = 0.714

Further, Table 4.8 depicts a positive and significant correlation among registered factories in relative to geographical area and number of industrial units (small-scale) in relation to area. But three indicators are positively and insignificantly correlated with the first indicator.

**Table 4.8: Inter-Correlation Matrix of Industrial Development (2000-01)**

Variable	I - 1	I - 2	I - 3	I - 4	I - 5	I - 6	I - 7
I - 1	1.000						
I - 2	0.428	1.000					
I - 3	0.821	0.794	1.000				
I - 4	0.202	0.920	0.683	1.000			
I - 5	0.947	0.306	0.744	0.105	1.000		
I - 6	-0.214	-0.113	-0.148	-0.090	0.072	1.000	
I - 7	0.149	0.814	0.577	0.919	0.070	-0.127	1.000

Note: Critical value of r at 10 percent level = 0.497

Critical value of r at 5 percent level = 0.576

Critical value of r at 1 percent level = 0.714

**Table 4.9: Principal Component Matrix of Industrial Development (1980-81)**

Variable	$P_1$	$P_2$	$P_3$	$h^2$
1	0.6703	0.7348	-0.0802	0.9957
2	0.9084	-0.2514	0.0313	0.8893
3	0.9663	0.1643	0.0114	0.9608
4	0.8266	-0.5493	-0.0147	0.9853
5	0.6032	0.7875	0.0476	0.9862
6	0.0985	-0.0583	0.9924	0.9980
7	0.7533	-0.5816	-0.1328	0.9234
Eigenvalue	3.8324	1.8936	1.0125	
Percentage Variance	54.7492	27.0520	14.4650	
Cumulative Variance (%)	54.7492	81.8013	96.2662	

The data in the above tables, depicting inter-correlation matrices, bring out by and large, a positive correlation among all the seven indicators of industrial development in the reference years. The inter-correlation matrices for the years 1980-81, 1990-91 and 2000-01 have been further transformed into Principal Component matrices and presented in Tables 4.9, 4.10 and 4.11 respectively.

In respect of 1980-81, on the basis of Principal Component matrix, three Principal Component (PCs) have been retained which taken together explained 96.27 per cent of the total variance. It may be observed from Table 4.9 that out of seven indicators, six indicators are positively correlated with the first Principal Component. The first principal component explains 54.75 per cent of the total variance. Further, all the Communalities ( $h^2$ ) are very high ranging from +0.8893 to +0.9980, which indicates that each variable taken for analysis is significantly correlated with all the variables.

**Table 4.10: Principal Component Matrix of Industrial Development (1990-91)**

Variable	$P_1$	$P_2$	$h^2$
1	0.6760	-0.7260	0.9841
2	0.9068	0.3060	0.9160
3	0.9534	-0.2403	0.9667
4	0.8280	0.5220	0.9580
5	0.7242	-0.6513	0.9486
6	0.1598	0.4863	0.2620
7	0.7712	0.5240	0.8694
Eigenvalue	4.0186	1.8862	
Percentage Variance	57.4083	26.9458	
Cumulative Variance (%)	57.4083	84.3540	

The selected indicators were, by and large, correlated with each other in the reference years, i.e. 1980-81, 1990-91 and 2000-01 and in most of the cases

the correlation was significant as well. The first Principal Component explained 54.75 per cent of the total variance in 1980-81, 57.41 per cent in 1990-91 and 55.98 per cent in 2000-01.

**Table 4.11: Principal Component Matrix of Industrial Development (2000-01)**

Variable	$P_1$	$P_2$	$P_3$	$h^2$
1	0.7104	0.6908	-0.1149	0.9950
2	0.9089	-0.3135	0.0605	0.9280
3	0.9565	0.2225	0.0145	0.9646
4	0.8272	-0.5386	0.0807	0.9809
5	0.6133	0.7636	0.1576	0.9840
6	-0.1793	0.0381	0.9829	0.9997
7	0.7622	-0.5700	0.0336	0.9070
Eigenvalue	3.9190	1.8245	1.0157	
Percentage Variance	55.9862	26.0638	14.5096	
Cumulative Variance (%)	55.9862	82.0501	96.5597	

The composite indices of industrial development for three selected points of time for each district were constructed. These indices for the year 1980-81 were constructed by using the following equation:

$$\begin{aligned} ID_1 = & (0.6703) Z_1 + (0.9084) Z_2 + (0.9663) Z_3 + (0.8266) Z_4 + (0.6032) Z_5 \\ & + (0.0985) Z_6 + (0.7533) Z_7 \dots \end{aligned} \quad (I)$$

Where,  $ID_1$  stands for composite index of industrial development for a district,  $Z_1, Z_2, Z_3, \dots, Z_7$  are standardized values of variables and figure in parentheses are factor loadings or weights of the variables concerned.

Similarly, the composite index of industrial development for each district has been constructed for the year 1990-91 by using the equation given below:

$$\begin{aligned} ID_2 = & (0.6760) Z_1 + (0.9068) Z_2 + (0.9534) Z_3 + (0.8280) Z_4 + (0.7242) Z_5 \\ & + (0.1598) Z_6 + (0.7712) Z_7 \dots \end{aligned} \quad (II)$$

Where,  $ID_2$  stands for composite index of industrial development for a district.  $Z_1, Z_2, Z_3, \dots, Z_7$  are standardized values of variables and figure in parentheses are factor loadings or weights of the variable concerned.

In the same manner the composite index of industrial development for each district for the year 2000-01 has been constructed in terms of the following equation:

$$\begin{aligned} ID_3 = & (0.7104) Z_1 + (0.9089) Z_2 + (0.9565) Z_3 + (0.8272) Z_4 + (0.6133) Z_5 \\ & + (-0.1793) Z_6 + (0.7622) Z_7 \dots \end{aligned} \quad (III)$$

Where,  $ID_3$  stands for composite index of industrial development for a district,  $Z_1$ ,  $Z_2$ ,  $Z_3 \dots Z_7$  are standardized values of variables and figure in parentheses are factor loadings or weights.

All the eighteen districts of the state have been ranked according to their levels of industrial development as per the indices of infrastructure development during the three selected years of our study (Table 4.12 and Fig 4.1).

It is apparent from the Table 4.12 that, according to the level of industrial development in 1980-81, district Howrah was at the top, followed by Kolkata, 24 Parganas (N), Hooghly and Burdwan. Conversely, district Murshidabad was at the bottom, preceded immediately by Dakshin Dinajpur. Correspondingly, in 1990-91, district Howrah was again at the top followed by Kolkata, 24 Parganas (N), 24 Parganas (S) and Hooghly. On the contrary, Dakshin Dinajpur was at the bottom, preceded immediately by Dakshin Dinajpur, Uttar Dinajpur, Murshidabad, Purulia, Bankura, Cooch Behar, Malda and Birbhum. After a decade, the comparative levels of industrial development as reflected in the ranking of the districts did not show any significant change, only at the bottom position there occurred a slight reshuffle, i.e. Malda, Cooch Behar, Dakshin Dinajpur, Murshidabad, Uttar Dinajpur, Purulia, Bankura and Birbhum in the reference year 2000-01.

It may be observed from Table 4.12 that the value of coefficient of variation increased from 141.61 per cent in 1980-81 to 147.75 per cent in 1990-91 and further slightly decreased is 145.76 per cent in the year 2000-01. This increase indicates that the disparities in the level of industrial development have increased during the period between 1980-81 and 1990-91, but in 2000-01 slightly decreased, which is a good sign for pace of industrial development in West Bengal.

Further, the districts have been classified into two categories on the basis of their levels of industrial development. As pointed out at *methodology part*, the levels of development in which districts have been classified are developed and developing. Developed districts are those, which have the composite index value of industrial development above the state average whereas developing districts have a value below the state average.

The classification of districts according to composite index of industrial development for the years 1980-81, 1990-91 and 2000-01 is given in Table 4.13.

The most interesting and remarkable feature of industrial development in West Bengal over the twenty year period of study is that the pattern of industrialization has remained the same. That is, the districts which are historically developed industrially, their position remained the same. Thus there has been no dispersal of industries to the districts which are industrially backward. This may be a matter of concern to the policy makers in West Bengal.

Inter-temporal analysis of Table 4.13 reveals that in 1980-81, 1990-91 and 2000-01 fairly five districts, namely Howrah, Kolkata, 24 Parganas (N), 24 Parganas (S) and Hooghly were in the category of developed districts.

It is apparent from the above analysis that industrial development has operated according to the hypothesis of cumulative causation with the result that the advanced districts have developed further in relation to backward ones and the backward districts have developed less in relation to advanced ones. According to the value of composite indices of industrial development, Table 4.13 shows that Howrah district has been progressing rapidly in the process of industrialization throughout the reference period i.e. from 1980-81 to 2000-01 and also maintaining its ranking at the top among the districts.

Table 4.12: District-wise Indices of Industrial Development

Districts	1980-81		1990-91		2000-01	
	Index	Rank	Index	Rank	Index	Rank
Burdwan	0.2880	6	0.0881	9	0.2248	6
Birbhum	0.0447	10	0.0282	11	0.0360	11
Bankura	0.0210	13	0.0168	14	0.0273	12
Midnapore	0.0383	11	0.0567	10	0.0564	10
Howrah	1.0000	1	1.0000	1	1.0000	1
Hooghly	0.3413	5	0.3487	5	0.3444	5
24 Parganas (N)	0.7888	3	0.8034	3	0.7353	3
24 Parganas (S)	0.4396	4	0.4685	4	0.4660	4
Nadia	0.1017	9	0.1054	8	0.0623	9
Murshidabad	0.0000	18	0.0083	16	0.0117	15
Malda	0.0175	15	0.0233	12	0.0000	18
Uttar Dinajpur	0.0057	16	0.0001	17	0.0160	14
Dakshin Dinajpur	0.0030	17	0.0000	18	0.0089	16
Jalpaiguri	0.1409	8	0.1180	7	0.1317	7
Darjeeling	0.1578	7	0.1965	6	0.1255	8
Cooch Behar	0.0181	14	0.0215	13	0.0043	17
Purulia	0.0269	12	0.0097	15	0.0198	13
Kolkata	0.7944	2	0.8190	2	0.7935	2
Mean	0.2349		0.2285		0.2258	
S.D.	0.3326		0.3375		0.3291	
C.V.	141.61		147.75		145.76	

Rank Correlation of Coefficient,  $R_{12} = + 0.96$ ,  $R_{13} = + 0.96$ ,  $R_{23} = + 0.91$

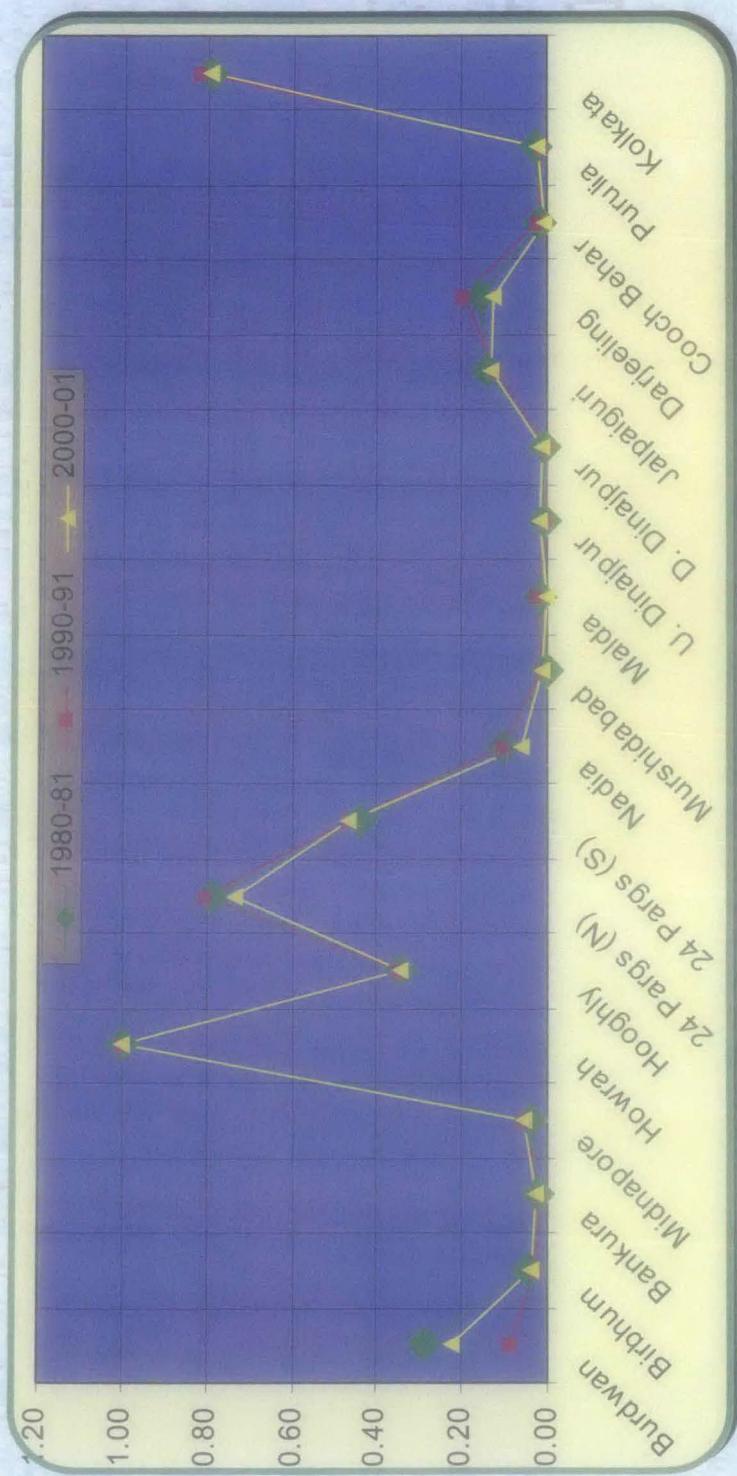


Figure 4.1: Patterns of Industrial Development in West Bengal

**Table 4.13: Classification of Districts According to Level of Industrial Development**

1980-81		1990-91		2000-01	
Districts	Index	Districts	Index	Districts	Index
<i>Developed Districts</i>					
Howrah	1.0000	Howrah	1.0000	Howrah	1.0000
Kolkata	0.7944	Kolkata	0.8190	Kolkata	0.7935
24 Parganas (N)	0.7888	24 Parganas (N)	0.8034	24 Parganas (N)	0.7353
24 Parganas (S)	0.4396	24 Parganas (S)	0.4685	24 Parganas (S)	0.4660
Hooghly	0.3413	Hooghly	0.3487	Hooghly	0.3444
Burdwan	0.2880				
<i>Mean</i>	<i>0.60866</i>		<i>0.6879</i>		<i>0.6678</i>
C.V.	48.23		37.18		39.23
<i>Developing Districts</i>					
Darjeeling	0.1578	Darjeeling	0.1965	Burdwan	0.2248
Jalpaiguri	0.1409	Jalpaiguri	0.1180	Jalpaiguri	0.1317
Nadia	0.1017	Nadia	0.1054	Darjeeling	0.1255
Birbhum	0.0447	Burdwan	0.0881	Nadia	0.0623
Midnapore	0.0383	Midnapore	0.0567	Midnapore	0.0564
Purulia	0.0269	Birbhum	0.0282	Birbhum	0.0360
Bankura	0.0210	Malda	0.0233	Bankura	0.0273
Cooch Behar	0.0181	Cooch Behar	0.0215	Purulia	0.0198
Malda	0.0175	Bankura	0.0168	Uttar Dinajpur	0.0160
Uttar Dinajpur	0.0057	Purulia	0.0097	Murshidabad	0.0117
Dakshin Dinajpur	0.0030	Murshidabad	0.0083	Dakshin Dinajpur	0.0089
Murshidabad	0.0000	Uttar Dinajpur	0.0001	Cooch Behar	0.0043
		Dakshin Dinajpur	0.0000	Malda	0.0000
<i>Mean</i>	<i>0.0480</i>		<i>0.0517</i>		<i>0.0557</i>
C.V.	143.12		143.46		146.66

It may be observed from the Table 4.13 that during the year 1980-81, Darjeeling, Jalpaiguri and Nadia was in the list of relatively backward or developing category districts. During 1990-91, Darjeeling, Jalpaiguri, Nadia, Burdwan and Midnapore, similarly in the reference year 2000-01, the number of backward districts rose from three to five. Therefore, this type of tendency, wherein number of districts under backward category has been increasing eventually may not be considered desirable for overall economic prosperity of the state.

#### 4.6 Districts-wise Dimensions of Industrial Development

The catalysis of any industrialization process, particularly in areas where there are severe topographical, geographical and socio-economic constraints, is largely dependent on infrastructural development. Progressive planned outlay for creation of economic infrastructural amenities, coupled with well defined industrial

policy with scientific management, has noticeably improved the pace of industrial development in the state of West Bengal during the period post-1970 period.

In the present chapter dimensions (see *note end of the chapter-4*) of industrial development have been analyzed with the help of the previously noted indicators for the three points of time i.e. 1980-81, 1990-91 and 2000-01.

#### **4.6.1 (A) Dimensions of Industrial Development, 1980-81:**

The various dimensions of industrial development have been examined with the help of Rotated Factor Matrix. The Principal Component Matrix of Industrial Development is converted into Factor Matrix after Varimax Rotation, which is presented in Table 4.14.

**Table 4.14: Rotated Factor Matrix (Varimax Method) 1980-81**

Variable	Factor-1	Factor-2	Factor-3	<i>h</i> <sup>2</sup>
1	0.1177	0.9888	-0.0645	0.9957
2	0.8786	0.3283	0.0980	0.8893
3	0.6837	0.6992	0.0666	0.9608
4	0.9901	0.0393	0.0579	0.9853
5	0.0233	0.9912	0.0567	0.9862
6	0.0413	0.0032	0.9981	0.9980
7	0.9584	-0.0289	-0.0633	0.9234
<i>Eigenvalue</i>	3.15	2.56	1.03	
<i>Percentage of Variance</i>	45.06	36.56	14.64	
<i>Cumulative Variance (%)</i>	45.06	81.62	96.27	

Note: Critical value at 5 per cent level = 0.576  
Critical value at 1 per cent level = 0.714

It may be observed from Table 4.14 that the factor loadings of seven variables are having positive correlation with the first factor. Four indicators, namely number of registered factories per lakh of population, number of workers engaged in registered factories per thousand Sq. Kms. of area, number of workers engaged in registered factories per lakh of population, percentage of workers in manufacturing to total workers, has positive and significant correlation with first factor. But the indicators number of small-scale units relative to population is insignificant with this factor. Thus, the first factor measures *modern industrial development*.

First dimension of industrial development for the year 1980-81 has been worked out as follows:

$$ID_4 = (0.8786) Z_2 + (0.6837) Z_3 + (0.9901) Z_4 + (0.9584) Z_7 \dots \dots \dots \text{ (IV)}$$

Where  $ID_4$  is the first dimension of industrial development,  $Z_2$ ,  $Z_3$ ,  $Z_4$  and  $Z_7$  are values of variables in standardized form and the figures in parentheses are factor scores with respect to the first factor.

Similarly, the second dimension of industrial development is formed as a cluster of three indicators, namely number of registered factories per thousand Sq. Kms. of area, number of workers engaged in registered factories per thousand Sq. Kms. of area and number of industrial units (small-scale) per thousand Sq. Kms. of area. The above mentioned three indicators are significantly and positively correlated with the second factor. Thus, the second factor measures *overall industrial development*.

Second dimension of industrial development for the year 1980-81 has been calculated with the help of following equation:

Where  $ID_5$  is the second dimension of industrial development,  $Z_1$ ,  $Z_3$  and  $Z_5$  are values of variables in standardized form and the figures in parentheses are factor scores with respect to the second factor.

Table 4.15 (Figures 4.2 and 4.3) reveals that six districts, namely Howrah, 24 Parganas (N), 24 Parganas (S), Hooghly, Kolkata and Burdwan have attained higher value of composite indices relative to the state average in respect of *modernized (first dimension) Industrial development*. Therefore, these districts are classified as developed districts in terms of the modernized industrial development index and remaining twelve districts lagged behind in this dimension of industrial development.

In the matter of overall industrial development (second dimension), it is evident from Table 4.15 that three districts, namely Kolkata, Howrah and 24 Parganas (N) came to be categorized as developed districts, while remaining fifteen districts lagged behind in this respect. Further, it may be observed from the values of coefficient of variation (Table 4.15) that extent of inter-district disparities was comparatively higher for (second dimension) overall industrial development during the year 1980-81.

**Table 4.15: Dimensions of Industrial Development in 1980-81**

Sl. No.	Districts	First Dimension Index	Rank	Second Dimension Index	Rank
1	Burdwan	0.3346	6	0.0639	6
2	Birbhum	0.0396	11	0.0130	12
3	Bankura	0.0215	13	0.0027	15
4	Midnapore	0.0450	10	0.0077	13
5	Howrah	1.0000	1	0.4456	2
6	Hooghly	0.3994	4	0.1017	4
7	24 Parganas (N)	0.9066	2	0.2186	3
8	24 Parganas (S)	0.5578	3	0.0466	7
9	Nadia	0.0505	9	0.0670	5
10	Murshidabad	0.0028	17	0.0028	14
11	Malda	0.0000	18	0.0162	10
12	Uttar Dinajpur	0.0112	14	0.0000	17
13	Dakshin Dinajpur	0.0068	15	0.0002	18
14	Jalpaiguri	0.1541	8	0.0200	8
15	Darjeeling	0.1773	7	0.0170	9
16	Cooch Behar	0.0045	16	0.0137	11
17	Purulia	0.0357	12	0.0004	16
18	Kolkata	0.3446	5	1.0000	1
Mean		0.2273		0.1132	
C.V.		144.02		223.29	

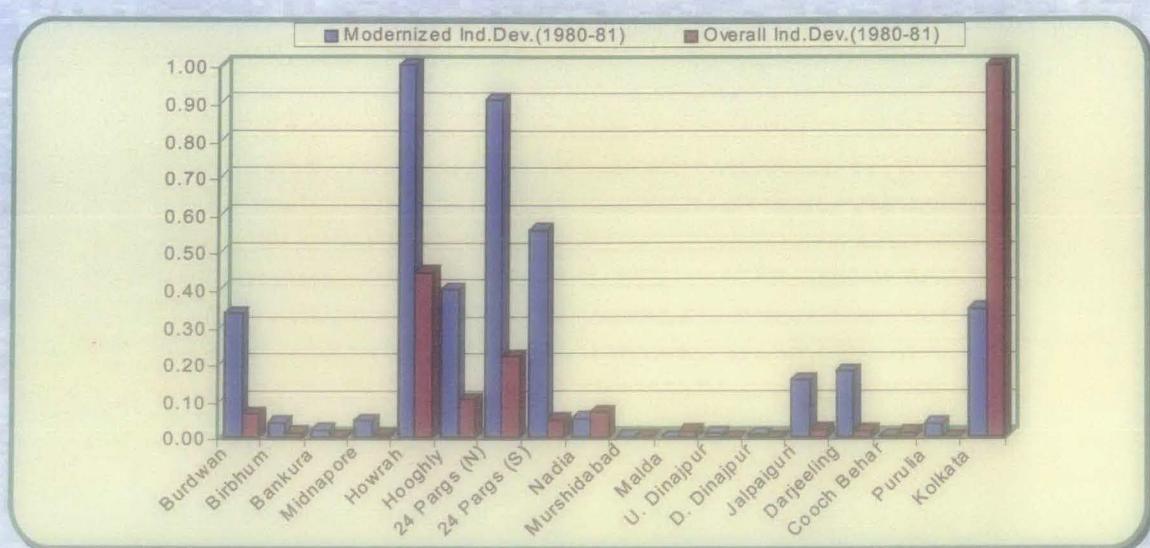


Figure 4.2: Dimensions of Industrial Development in 1980-81

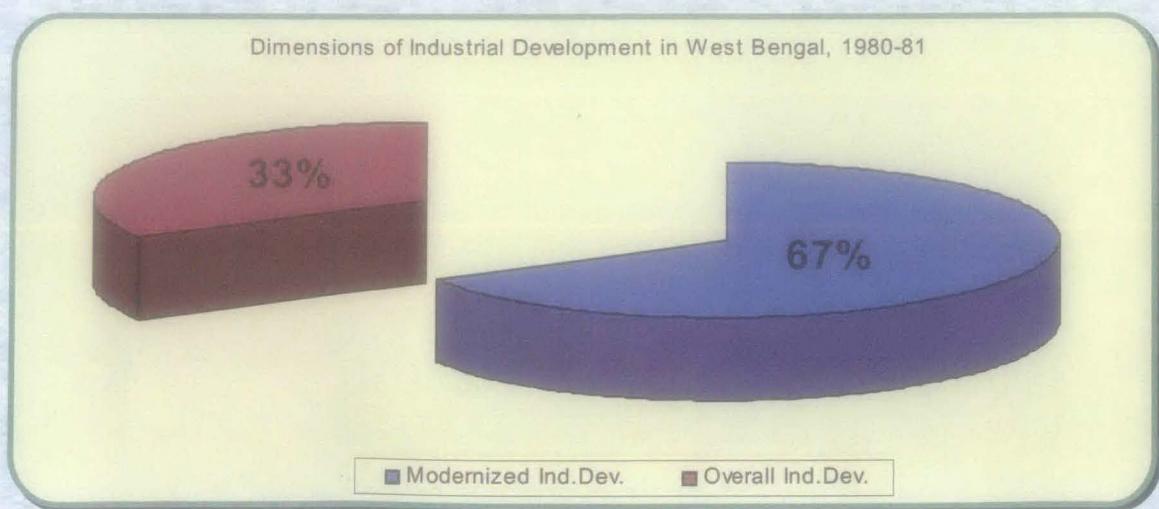


Figure 4.3

#### 4.6.2 (B) Dimensions of Industrial Development, 1990-91:

For the year 1990-91 two Principal Component Matrix of industrial development has been transformed into the Rotated Factor Matrix with the help of Varimax Method, which is presented in Table 4.16.

Table 4.16 reveals that four indicators, namely number of registered factories per lakh of population, number of workers engaged in registered factories per thousand Sq. Kms. of area, number of workers engaged in registered factories per lakh of population, percentage of workers in manufacturing to total workers have positive and significant correlation with the first factor of industrial development. This factor explains 43.04 per cent of the total variance. Thus, as noted above the first dimension measures *modern industrial development* for the year 1990-91.

Table 4.16: Rotated Factor Matrix (Varimax Method) 1990-91			
Variable	Factor-1	Factor-2	$h^2$
1	-0.0073	0.9920	0.9841
2	0.8693	0.4004	0.9160
3	0.5279	0.8294	0.9667
4	0.9603	0.1892	0.9580
5	0.0791	0.9707	0.9486
6	0.4501	-0.2437	0.2620
7	0.9205	0.1488	0.8694
Eigenvalue	3.01	2.89	
Percentage of Variance	43.04	41.31	
Cumulative Variance (%)	43.04	84.35	

Note: Critical value at 5 per cent level = 0.576  
 Critical value at 1 per cent level = 0.714

First dimension of industrial development has been calculated with the help of following equation:

$$ID_6 = (0.8693) Z_2 + (0.5279) Z_3 + (0.9603) Z_4 + (0.9205) Z_7 \dots \dots \dots \text{(VI)}$$

Where  $ID_6$  is the first dimension of industrial development,  $Z_2$ ,  $Z_3$ ,  $Z_4$  and  $Z_7$  are values of variables in standardized form and the figures in parentheses are factor scores with respect to the first factor.

The second dimension of industrial development is nothing but cluster of indicators, which are significantly correlated with second factor. The second factor has positive and significant association with three indicators, namely number of registered factories per thousand Sq. Kms. of area, number of workers engaged in registered factories per thousand Sq. Kms. of area and number of

industrial units (small-scale) per thousand Sq. Kms. of area. Accordingly, the second dimension measures *overall industrial development* for the year 1990-91.

Overall industrial development (second dimension) for the year 1990-91, has been worked out by using the following equation:

$$ID_7 = (0.9920) Z_1 + (0.8294) Z_3 + (0.9707) Z_5 \dots \dots \dots \text{(VII)}$$

Where  $ID_7$  is second dimension of industrial development for the year 1990-91,  $Z_1$ ,  $Z_3$  and  $Z_5$  are values of the standardized respective variables. The figures in parentheses are factor scores with respect to the second factor.

The composite factor scores of different dimensions of industrial development for the year 1990-91 have been presented in Table 4.17.

It may be noted from Table 4.17 (Figures 4.4 and 4.5) that five districts—Howrah, 24 Parganas (N), 24 Parganas (S), Kolkata, Hooghly and Kolkata emerged as developed category districts, having relatively higher value of indices relative to the state average in respect of (first dimension) modernized industrial development and remaining thirteen districts lagged behind in this respect.

Likewise, in case of overall industrial development (second dimension) four districts, namely Kolkata, Howrah, 24 Parganas (N) and Hooghly districts emerged as developed category districts, but majority of the districts, i.e. fourteen districts, fell in the category of backward when compared with the state average. It is to be mentioned that in respect of ranking district Howrah change their position in lieu of first to second in the second dimension in industrial development.

**Table 4.17: Dimensions of Industrial Development in 1990-91**

Sl. No.	Districts	First Dimension Index	Rank	Second Dimension Index	Rank
1	Burdwan	0.0824	8	0.0379	8
2	Birbhum	0.0391	11	0.0099	14
3	Bankura	0.0226	13	0.0056	16
4	Midnapore	0.0623	9	0.0203	11
5	Howrah	1.0000	1	0.4873	2
6	Hooghly	0.4095	4	0.1248	4
7	24 Parganas (N)	0.9035	2	0.2872	3
8	24 Parganas (S)	0.6357	3	0.0543	6
9	Nadia	0.0622	10	0.0686	5
10	Murshidabad	0.0066	15	0.0169	12
11	Malda	0.0000	18	0.0262	9
12	Uttar Dinajpur	0.0102	14	0.0051	17
13	Dakshin Dinajpur	0.0063	16	0.0058	15
14	Jalpaiguri	0.1569	7	0.0159	13
15	Darjeeling	0.1749	6	0.0461	7
16	Cooch Behar	0.0030	17	0.0220	10
17	Purulia	0.0297	12	0.0000	18
18	Kolkata	0.3328	5	1.0000	1
Mean		0.2188		0.1241	
C.V.		150.91		208.18	

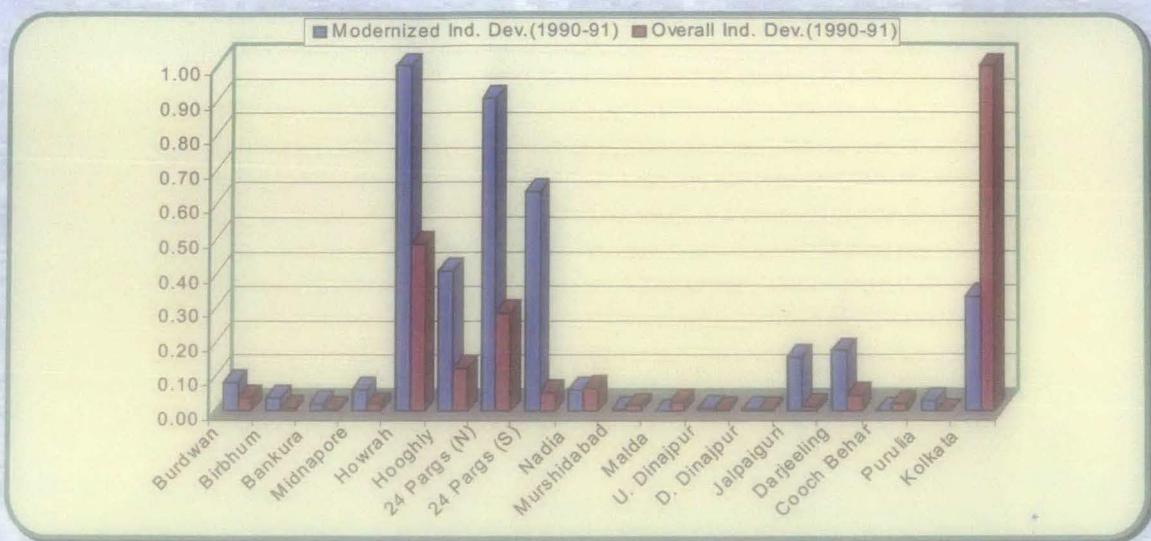


Figure 4.4: Dimensions of Industrial Development in 1990-91

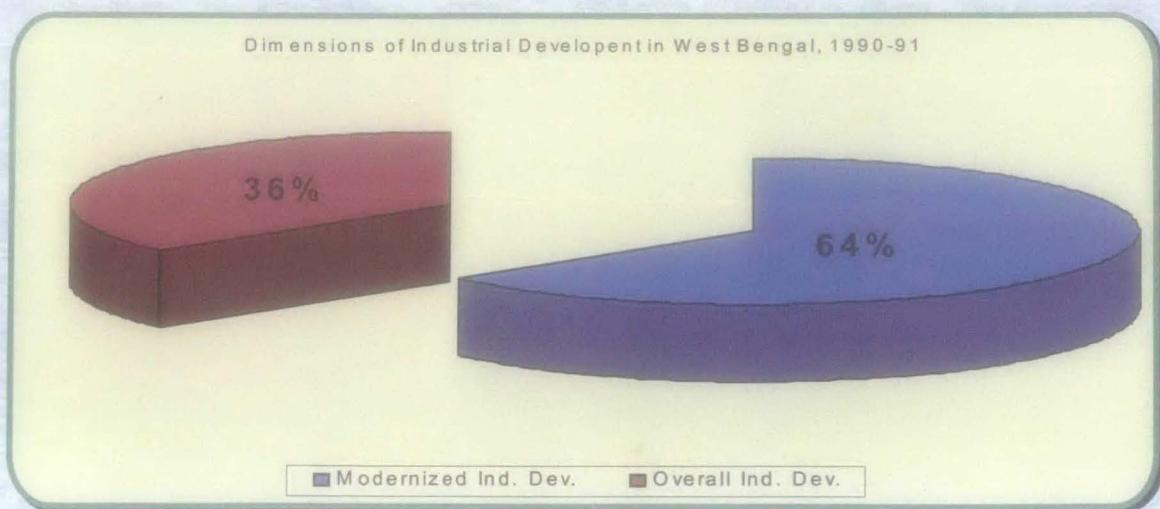


Figure 4.5

#### 4.6.3 (C) Dimensions of Industrial Development, 2000-01:

Different dimensions of industrial development for the year 2000-01 have been examined with the help of Rotated Factor Matrix. For this purpose, the Principal Component Matrix has been transformed into Factor Matrix after Varimax Rotation and is presented in Table 4.18.

From Table 4.18, it is apparent that the six selected indicators of industrial development are positively correlated with the first factor. Out of seven, four indicators, namely number of registered factories per lakh of population, number of workers engaged in registered factories per thousand Sq. Kms. of area, number of workers engaged in registered factories per lakh of population and percentage of workers in manufacturing to total workers have positive and significantly correlated with the first factor of industrial development. Thus, first factor measures *overall industrial development* in the year 2000-01. Further, first factor explains 44.37 per cent of the total variance.

The indices corresponding to the first factor have been calculated with the help of the equation:

$$ID_8 = (0.9110) Z_2 + (0.6159) Z_3 + (0.9867) Z_4 + (0.9501) Z_7 \dots\dots\dots (VIII)$$

Where  $ID_8$  is the first dimension of industrial development,  $Z_2$ ,  $Z_3$ ,  $Z_4$  and  $Z_7$  are values of variables in standardized form and the figures in parentheses are factor scores with respect to the first factor.

**Table 4.18: Rotated Factor Matrix (Varimax Method) 2000-01**

Variable	Factor-1	Factor-2	Factor-3	$h^2$
1	0.1233	0.9756	-0.1675	0.9950
2	0.9110	0.3098	-0.0449	0.9280
3	0.6159	0.7609	-0.0792	0.9646
4	0.9867	0.0828	-0.0232	0.9809
5	0.0303	0.9847	0.1158	0.9840
6	-0.0639	-0.0401	0.9970	0.9997
7	0.9501	0.0164	-0.0642	0.9070
<i>Eigenvalue</i>	3.11	2.61	1.05	
<i>Percentage of Variance</i>	44.37	37.22	14.98	
<i>Cumulative Variance (%)</i>	44.37	81.58	96.56	

Note: Critical value at 5 per cent level = 0.576  
 Critical value at 1 per cent level = 0.714

It may be observed that the three indicators, namely number of registered factories per thousand Sq. Kms. of area, number of workers engaged in registered factories per thousand Sq. Kms. of area and number of industrial units

(small-scale) per thousand Sq. Kms. of area have positive and significant correlation with second factor of industrial development. This factor can be identified with the development of *small-scale industrial development*. The second factor explains 37.22 per cent of the total variance.

The second factor scores of this dimension have been calculated with the help of following equation:

$$ID_9 = (0.9756) Z_1 + (0.7609) Z_3 + (0.9847) Z_5 \dots \dots \dots \text{ (IX)}$$

Where  $ID_9$  is second dimension of industrial development,  $Z_1$ ,  $Z_3$  and  $Z_5$  are values of variables in standardized form and the figures in parentheses are factor scores with respect to the second factor.

**Table 4.19: Dimensions of Industrial Development in 2000-01**

Sl. No.	Districts	First Dimension Index	Rank	Second Dimension Index	Rank
1	Burdwan	0.2733	6	0.0519	7
2	Birbhum	0.0376	12	0.0049	17
3	Bankura	0.0399	11	0.0098	14
4	Midnapore	0.0741	9	0.0193	11
5	Howrah	1.0000	1	0.4846	2
6	Hooghly	0.3943	4	0.1165	5
7	24 Parganas (N)	0.8193	2	0.2629	3
8	24 Parganas (S)	0.5752	3	0.0477	8
9	Nadia	0.0585	10	0.1289	4
10	Murshidabad	0.0038	16	0.0114	12
11	Malda	0.0011	17	0.0681	6
12	Uttar Dinajpur	0.0132	14	0.0095	15
13	Dakshin Dinajpur	0.0087	15	0.0106	13
14	Jalpaiguri	0.1642	7	0.0210	10
15	Darjeeling	0.1626	8	0.0320	9
16	Cooch Behar	0.0000	18	0.0060	16
17	Purulia	0.0266	13	0.0000	18
18	Kolkata	0.3197	5	1.0000	1
<i>Mean</i>		0.2207		0.1269	
<i>C.V.</i>		143.44		202.72	

It may be observed from Table 4.19 (Figures 4.6 and 4.7) that six districts — Howrah, 24 Parganas (N), 24 Parganas (S), Hooghly, Kolkata and Burdwan were positioned above the state average in respect of overall industrial development (i.e., first dimension) but majority of the districts were placed in less developed category districts. Therefore, remaining twelve districts are identified

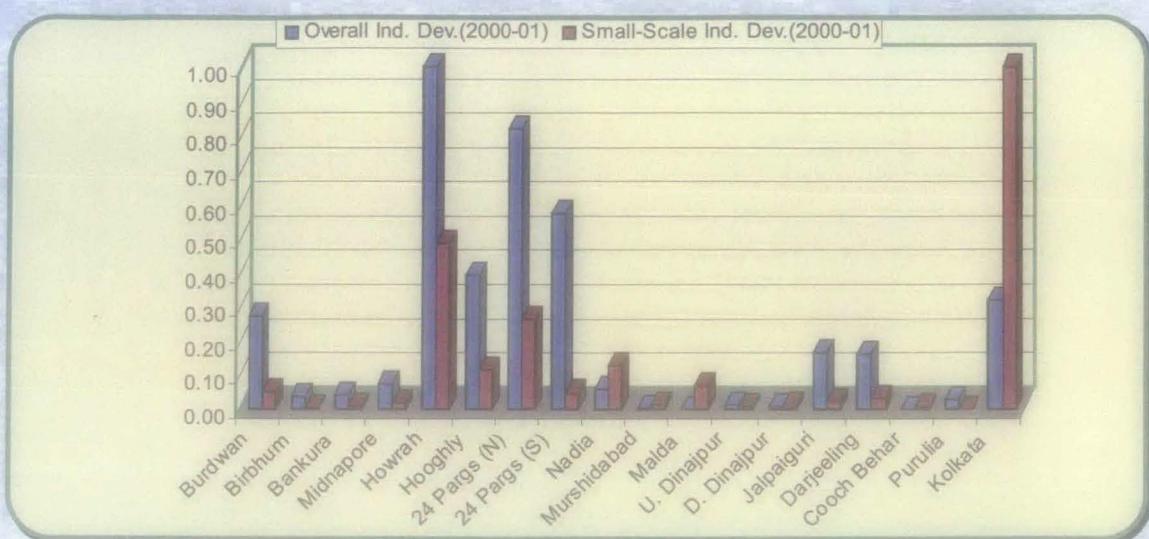


Figure 4.6: Dimensions of Industrial Development in 2000-01



Figure 4.7

as industrially backward districts. Obviously, extent of inter-district disparities was very high i.e. 143.44 per cent.

In the matter of small-scale industrial development (i.e., second dimension) in the year 2000-01, it is obvious from Table 4.19 that district Kolkata attained the top position, followed by Howrah, 24 Parganas (N) and Nadia. On the other hand, the least developed districts in respect of small-scale industrial development are Purulia just preceded by Birbhum, Cooch Behar, Uttar Dinajpur, Bankura and Dakshin Dinajpur.

#### 4.7 Summary

The main points which emerge from the analyses done in this chapter are as follows:

1. Inter-district variations in the variables of industrial development have shown rising trend in the consecutive reference years, i.e. 1980-81, 1990-91 and 2000-01. This is due to varied scope of industrialization of districts, bearing in mind the diverse geographical characteristic of the state.
2. Industrialization is the key to restructuring the economy and hence the role of industrial sector in economic development of different districts seems to be the most important. Adverse geographical features of the districts are the main factors of slow pace of industrial development and as such it may be observed that state level arithmetical mean of its composite indices for all the 18 districts has declined from 0.2349 in 1980-81, 0.2285 in 1990-91 and has marginally decreased to 0.2258 during 2000-01.
3. It has also been discerned (realized) from the Table 4.12 that inter-district disparities in levels of industrial development substantially increased from 141.61 per cent in 1980-81 to 147.75 per cent in 1990-91 and further slightly decreased to 145.76 per cent in 2000-01. This type of increasing trend in inter-district variations is mainly due to heterogeneous prospects of industrial development of the districts but after one decade has shown a decreasing trend which indicates a good prospect of industrial development of the districts as well as of the state of West Bengal.
4. Further, because of agglomerative tendencies of industries, Howrah, Kolkata, 24 Parganas (N), 24 Parganas (S), Hooghly and Burdwan districts emanated (emerged) as developed category districts in respect of industrial sector whereas remaining twelve districts were classified as backward districts

during the reference years. It is noticed that concentration of all factories per thousand of Sq. Kms. of area is very high in Howrah followed by Kolkata, 24 Parganas (N) and Hooghly districts. Whereas, Cooch Behar, Malda, Bankura, Murshidabad, Uttar Dinajpur, Dakshin Dinajpur and Purulia districts have almost trifling possibility of modern industrial development. Thus these districts are placed in backward category districts. Nevertheless, there is enough possibility for traditional artisan-based industries in the backward districts.

5. Various dimensions of industrial development in the state have also been identified at these points of time. These dimensions are modern industrial development, small-scale industrial development and overall industrial development.
6. In 1980-81, two dimensions of industrial development were recognized. First dimension was referred to as modernized industrial development due to positive association of indicators relating to factories with the first factor. At that point of time, six districts namely Howrah, 24 Parganas (N), 24 Parganas (S), Hooghly, Kolkata and Burdwan emerged as developed districts in respect of modern industrial development. Remaining twelve districts were categorized as backward due to their placement below the state average in respect of this dimension of industrial development. On the other hand, in respect of overall industrial development i.e. second dimension three districts, namely Kolkata, Howrah and 24 Parganas (N) districts fall in the developed category and remaining fifteen districts are less developed category in industrial development. After one decade, i.e. in 1990-91, Howrah, 24 Parganas (N), 24 Parganas (S), Hooghly and Kolkata districts are developed districts in respect of first dimension index. On the other hand, Kolkata, Howrah, 24 Parganas (N), and Hooghly districts are developed category in respect of second dimension index and others are lagged behind in respect of industrial development.
7. For the year 2000-01, two dimensions i.e. overall industrial development and small-scale industrial development were taken up. In the matter of overall industrial development Howrah, 24 Parganas (N), 24 Parganas (S), Hooghly, Kolkata and Burdwan appeared clearly as developed districts and two more districts, namely 24 Parganas (S) and Burdwan also came to be included in

the developed category, as composite factor scores of these districts are nearer to the value of the state average. But, the remaining twelve districts are identified as backward districts in respect of overall industrial development. In terms of the other dimensions, i.e. small-scale industrial development, district Kolkata achieved the top position, followed by Howrah, 24 Parganas (N) and Nadia. On the other hand, the least developed districts in this respect were Purulia preceded by Birbhum and Cooch Behar.

**Note:** *In the present study, three dimensions of industrial development have been identified. Modernized industrial development is a cluster of indicators pertaining to factories; small-scale industrial development is a cluster of indicators relating to only small-scale industrial units. Overall industrial development presents positive association of indicators relating to both factories and small-scale industrial units.*