

# Empirical Analysis of Inter District Infrastructural Development in Odisha

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## Abstract

The present paper is an effort to measure the level of Infrastructural development in Odisha at two points of time i.e. 1994-95 and 2011-12. The inter-district Infrastructural development has been measured by using a composite development index named as equal weightage Index method. The districts are classified into developed (D), moderately developed (MD) and less developed (LD) category and then ranked on the basis of the values of Infrastructural Development Indices (IDI). The study reveals that in terms of Infrastructural development in Odisha, the number of less developed (LD) districts increases from 9 to 11, whereas the number of developed (D) remains same over the years. This shows specific evidence about the fact that there has been slow progress of Infrastructural development in the state. It is therefore, a matter of serious concern and requires immediate attention of the Government.

**Keywords:** *Infrastructural development, Index method, Less developed, Odisha, Infrastructural development index (IDI)*

## I. INTRODUCTION

Infrastructure plays an important role, so far as theories of economic development and growth is concerned. Infrastructure is just like an umbrella which collectively describe all such activities, services and facilities which support the operation and growth of other economic sectors like industry, trade, agriculture, etc. Without adequate expansion of infrastructure which includes such activities as energy, transport, communication, education, health, etc, not much development can take place in other sectors of the economy. Availability of appropriate infrastructure services is a precondition of rapid economic development.

Rostow (1960) in his theory of 'Stages of Growth' considered social overhead capital as one of the main pre-conditions for takeoff. The role of social overhead capital in accelerating economic growth and in enhancing public welfare is more pronounced in developing economies as the indivisibility in the social overhead capital has been identified as one of the main obstacles to development of under-developed countries (Rosenstein-Rodan, 1957).

Thus, it is increasingly recognized and widely understood by the practitioners and policymakers that infrastructure is the key to growth. A large number of development literature, Aschauer (1989), Ebert *et al.* (1991), Queiroz and Gautam (1992), Gramlich (1994), Cutanda and Paricio (1994), Esfahani and Ramirez (2003), Rao (1977), Ghosh and De (1998, 2004), Sahoo and Saxena (1999), Patra and Acharya (2011), Nayak (2014). is available to prove that better quantity and quality of infrastructure can directly raise the productivity of both human and physical capital.

The World Bank's (1994) World Development Report landmark study on infrastructure highlighted the critical role of infrastructure in the development process. Thus, the linkage between infrastructure and economic growth is not a one-dimensional one, rather multiple and complex. Infrastructure not only affects production and consumption directly but also creates many direct and indirect externalities and involves large flows of expenditure thereby creating additional income and employment.

The state of Odisha is one of the 30th states of India located between the parallels of 17.49'N and 22.34'N latitudes and meridians of 81.27'E and 87.29'E longitudes. The state is bounded by the Bay of Bengal on the east; Madhya Pradesh on the west, Andhra Pradesh on the south, Bihar in North, and West Bengal in North-East. The area of the state is 155707 sq. km which is 4.7 per cent of India's land mass. It has 30 districts viz. Anugul, Balasore, Baragarh, Bhadrak, Bolangir, Boudh, Cuttack, Deogarh, Dhenkanal, Gajapati, Ganjam, Jagatsingpur, Jajpur, Jharsugura, Kalahandi, Kandhamala, Kendrapara, Keonjhar, Khurda, Koraput, Malkangiri, Mayurbhanj, Nawarangpur, Nayagarh, Nuapada, Puri, Rayagada, Sambalpur, Sonepur and Sundargarh.

The state is one of the most backward states of India measured in terms of various indicators of infrastructural development. Therefore, infrastructural development is very crucial for the development of the state. Moreover, infrastructural development is considered necessary to help the Government in better targeting of schemes and projects within the state in order to achieve economic development.

## II. OBJECTIVES

With the above analysis, the present study makes an attempt to construct infrastructural development index for the districts of Odisha .

The specific objectives are:

- To rank the districts on the basis of the levels of Infrastructural development.
- To classify the districts on the basis of the levels of Infrastructural development.
- To find out changes in the level of Infrastructural development over the year.

## III. DATA SOURCE AND METHODOLOGY

The study is carried out on the basis of secondary data from published and unpublished sources of both the Government and Non-government organizations. Odisha Economic Survey, District Statistical Handbook, RBI Bulletins, Odisha Statistical Abstracts and Annual Survey of Industries, CSO, Government of India, Census of India 1991 and 2011 constitute the major sources of data. The study is made on two points of time, i.e. 1994-95 and 2014-15.

Development is a multidimensional phenomenon. It is not only affected by several factors but also by their interrelationships. Therefore it is very difficult to isolate the effects of other factors while analysing development in terms of individual factors. In order to avoid this problem researchers usually prefer to construct composite index to explain the overall development at the aggregate level. There are different methods, weight free and weighted, to construct a composite index of development. A brief review of literature shows that researchers like Iyengar and Sudarshan, (1982), Gulati (1991) Mohanty and Ram (2001) Ram and Chandrasekhar (2006), Bishnoi and Aneja (2008) have used different techniques including multivariate ones in order to rank districts of a country on this basis of index values representing levels of development. While some researchers like Dasgupta (1971), Rao (1973), Rao (1977) and Narain et al. (1991) have followed the techniques developed by Iyengar and Sudarshan, others have used weight free method (Bishnoi and Aneja, 2008). It has remained as a contentious issue whether the weight free index method or weighted index method is a better technique in comparison to each other. Swain and Mohanty (2010) in their article have discussed several shortcomings associated with the method developed by Iyengar and Sudarshan and suggested in support of using Principal Component Analysis (PCA) in multivariate development analysis for ranking of districts of a country.

Out of the above methods, it is proposed to construct a Infrastructural Development Index (IDI) by using equal weightage Index Method

## IV. EQUAL WEIGHTAGE INDEX METHOD

In equal weightage Index Method, the selected indicators for each district are expressed in percentage taking the state value of each indicator as 100. The total index is a measure of the level of development of a district. It provides the value of sum total of indices of selected indicators for a particular reference year. The total index value is divided by the total number of indicators used gives the average index of development for a district.

It is expressed as follows:

$$\text{Index (I)} = \frac{1}{n} \left[ \sum_{i=1}^n \left( \frac{x_i}{s_{xi}} \right) \times 100 \right]$$

Where, x is the indicator,  $s_x$  is the state value of the indicator,  $i = 1, 2, 3, \dots, n$

The district wise Agricultural development indices have been constructed for the year 1994-95 and 2011-12. For comparison among the districts over time the study has classified all the districts into three categories namely; developed (D), moderately developed (MD) and less developed (LD). The study categorized districts assuming that the composite index follows a normal distribution with mean ( $\mu$ ) and standard deviation ( $\sigma$ ). The classification is made by using the following class intervals as follows:

$$\text{Developed (D)} = \geq \mu + 0.5 \sigma$$

$$\text{Moderately Developed (MD)} = \text{in between } \mu - 0.5 \sigma \text{ and } \mu + 0.5 \sigma$$

$$\text{Less Developed (LD)} = \leq \mu - 0.5 \sigma$$

## V. INDICATORS OF INFRASTRUCTURAL DEVELOPMENT

Infrastructure can be measured either in terms of investment on a particular service or in terms of physical quantity of services available to the end users. In the present study 13 indicators of physical infrastructure facilities in the state of Odisha are selected to construct the infrastructural development index. The indicators selected are:

X1 = Percentage of literacy

X2 = Percentage of urban population

X3 = Number of primary and middle schools per 10 thousand population

X4 = Number of high schools per 10 thousand population

X5 = Number of Colleges per lakh population

X6 = Number of hospitals, PHC and dispensaries per lakh population

**Table 1**  
**Ranking of Districts of Odisha on The Basis of Levels of Infrastructural Development By Index Method**

Sl.No	Districts	1994-95			2011-12		
		IDI	Rank	Status	IDI	Rank	Status
1	Anugul	102.96	15	MD	102.19	15	MD
2	Balasore	99.96	17	MD	95.31	19	MD
3	Baragarh	86.47	26	LD	86.95	27	LD
4	Bhadrak	92.06	25	LD	102.29	14	MD
5	Bolangir	97.54	18	MD	87.94	26	LD
6	Boudh	104.19	11	MD	106.63	10	MD
7	Cuttack	115.59	7	D	113.38	9	D
8	Deogarh	109.17	8	D	122.08	4	D
9	Dhenkanal	104.33	10	MD	96.35	18	MD
10	Gajapati	103.18	12	MD	115.99	7	D
11	Ganjam	103.63	14	MD	103.74	13	MD
12	Jagatsingpur	93.24	22	LD	105.25	11	MD
13	Jajpur	92.34	23	LD	94.46	23	LD
14	Jharsugura	117.55	4	D	117.35	6	D
15	Kalahandi	92.14	24	LD	95.02	21	LD
16	Kandhamala	117.49	5	D	124.68	2	D
17	Kendrapara	96.34	19	MD	95.06	20	LD
18	Keonjhar	95.58	20	MD	91.66	25	LD
19	Khurda	119.21	3	D	123.06	3	D
20	Koraput	80.01	29	LD	80.95	29	LD
21	Malkangiri	81.41	28	LD	84.62	28	LD
22	Mayurbhanj	95.38	21	LD	94.94	22	LD
23	Nawarangpur	66.55	30	LD	69.98	30	LD
24	Nayagarh	116.14	6	D	115.22	8	D
25	Nuapada	101.56	16	MD	97.43	17	MD
26	Puri	121.59	2	D	117.73	5	D
27	Rayagada	82.88	27	LD	91.88	24	LD
28	Sambalpur	136.27	1	D	135.76	1	D
29	Sonepur	103.45	13	MD	104.82	12	MD
30	Sundargarh	108.51	9	D	101.80	16	MD

Note:

- (i) IDI refers to Basic Infrastructural Development Index
- (ii) D, MD and LD stand for developed, moderately developed and less developed, respectively.
- (iii) Where, D = >108.472, MD = >93.977 & < 108.472 and LD = <93.977 for the year 1994-95
- (iv) Where, D = >109.809 MD = >95.158 & < 109.809 and LD = <95.158 for the year 2011-12

Source: own computation

- X7 = Number of medical beds per lakh population
- X8 = Road length in km per lakh population
- X9 = Road length in km per 100 sq km
- X10 = Percentage of villages electrified
- X11 = Number of post offices per 10 thousand population
- X12 = Number of banks per lakh population
- X13 = Number of PACS per 10 thousand population

## VI. DATA ANALYSIS

From Tables 1 and 2, it is observed that nine districts out of 30 districts viz. Sambalpur, Puri, Khurda, Jharsuguda, Kandhamal, Nayagarh, Cuttack, Deogarh and Sundargarh are found to be developed districts with respect to the levels of Infrastructural Development. An equal numbers of districts such as Jajpur, Kalahandi, Jajpur, Bhadrak, Baragarh, Rayagada, Malkangiri, Koraput and Nawarangpur are classified as less developed districts in 1994-95. The remaining 12 districts are in the

moderately developed category. In 2011-12 there are nine districts in the developed category and only one district, i.e. Sundargarh, has moved from D to MD category compared to 1994-95. value of 136.27 and the district Nawarangpur is at the 30th rank with the index value of 66.55 in 1994-95. No change is observed in their respective ranking orders in the year 2011- 12. The changes in the level of Infrastructural development over the year is shown in table over the year is shown in tab3 .

**Table 2**  
**Classification of Districts on The Basis of Levels of Infrastructural Development By Index Method: 1994-95 And 2011-12**

Category	Index Score	Number	Districts
<b>1994-95</b>			
Developed	108.472 and above	9	Sambalpur, Puri, Khurda, Jharsugura, Kandhamala, Nayagarh, Cuttack, Deogarh, Sundargarh
Moderately Developed	93.977 to 108.472	12	Dhenkanal, Boudh, Ganjam, Sonepur, Gajapati, Nuapada, Anugul, Balasore, Bolangir, Kendrapara, Keonjhar, Mayurbhanj
Less Developed	below 93.977	9	Jagatsingpur, Jajpur, Kalahandi, Bhadrak, Baragarh, Rayagada, Malkangiri, Koraput, Nawarangpur
<b>2011-12</b>			
Developed	109.809 and above	9	Sambalpur, Kandhamal, Khurda, Deogarh, Puri, Jharsugura, Gajapati, Nayagarh, Cuttack
Moderately Developed	95.158 to 109.809	10	Boudh, Jagatsinghpur, Sonepur, Ganjam, Bhadrak, Anugul, Sundargarh, Nuapada, Dhenkanal, Balasore
Less Developed	below 95.158	11	Kendrapara, Kalahandi, Mayurbhanj, Jajpur, Rayagada, Keonjhar, Bolangir, Baragarh, Malkangiri, Koraput, Nawarangpur

Source: Table 1

**Table 3**  
**Changes of Top And Bottom Six Districts of Odisha in**  
**Terms of Infrastructural Development Index**  
**For The Year 1994-95 And 2011-12**

Method	1994-95		2011-12	
	Top Six Districts	Bottom Six districts	Top Six Districts	Bottom Six districts
Index Method	Sambalpur	Nawarangpur	Sambalpur	Nawarangpur
	Puri	Koraput	Kandhamala	Koraput
	Khurda	Malkangiri	Khurda	Malkangiri
	Jharsugura	Rayagada	Deogarh	Baragarh
	Kandhamala	Baragarh	Puri	Bolangir
	Nayagarh	Bhadrak	Jharsugura	Keonjhar

Source: Table 1

## VII. CONCLUSION

The present study is an attempt to examine the incidence of inter-district Infrastructural development over the period 1994-95 – 2011-12. It can be concluded that the Infrastructural development in the state of Odisha is increasing over the years. Moreover, the district wise Infrastructural development indices indicate that the major development is found to be concentrated in districts like Sambalpur, Puri, Khurda, Jharsugura, Cuttack, Nayagarh and Kandhamal. On the other hand, seven out of eight districts in the KBK region viz. Nawarangpur, Malkangiri, Koraput, Kalahandi, Rayagada, Baragarh and Bolangir have remained at the bottom of the ladder of Infrastructural development index. This is as good as to believe that there has been unbalanced Infrastructural development in the state of Odisha.

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