

INEQUALITIES IN INFRASTRUCTURAL DEVELOPMENT OF RAJASTHAN IN THE ERA OF NEW ECONOMIC POLICY REFORMS

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ABSTRACT

Present paper traces the development pattern that emerged in the services and infrastructural sector in Rajasthan as an impact of New Economic Policy Reforms initiated in 1991. It is attempted to measure inequalities in infrastructural development in the State taking district as unit for study. The first part of the paper presents the methodology used and indicators chosen to devise composite indices. The second part sketches the present position of infrastructure and services in the state. The third part of the paper presents analysis of the composite index scores to ascertain the relative positions of the districts along with sketching the pattern of change over the years. In the last part an attempt has been made to assess the impact on inequalities by way of measuring developmental gap from most developed district and calculating Atkinson's measure of Inequality.

KEYWORDS: *Services and Infrastructural Sector, New Economic Policy Reforms, Composite Indices.*

Introduction

Infrastructure can be defined as the set of inter-connected structural elements that provides framework for supporting development. Infrastructure development is the key for economic growth and plays a significant role in setting and enabling platform for sustainable economic development. Broadly categorized into economic and social Infrastructure, it encompasses services such as water management, power and electricity, telecommunication, sewage and sanitation, gas, roads, railways, ports, airports that promote commercial activities, production and consumption. Further, financial services such as banking and insurance, tourism and entertainment centers also form part of economic Infrastructure. As a whole, service sector has become the biggest source of income generation in the economy. It has contributed 45.07 percent to the Gross State Domestic Product in 2016-17 as per revised estimates¹, and according to advance estimates of 2017-18 this sector is estimated to contribute 45.07 percent. The main objective of this paper is to find the growth pattern and inequalities in this sector taking district as unit devising composite indices for 31 districts of Rajasthan.

Methodology

In all seventeen indicators are selected to observe the development pattern in services and infrastructure sector in 31 districts during the study period chosen 1995-96 to 2007-08. The selected indicators are Average population served per school, Percentage of Population enrolled in schools, Student teacher ratio in schools, Average population served per, Percentage of Population enrolled in colleges, Student teacher ratio in colleges, Number of vocational institutes (ITI + Poly technique), Population served per Government Medical institute, Population served per bed in Government Medical institute, Per capita electricity consumption, Percentage of village electrified, Population served per bank branch, Per capita deposits in bank, Per capita credit in bank, Road length per 100 square kilometer of area, Population served per post-office, Population served per telegraph office. Time series data of above indicators have been collected from various government publications.

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For assessing the composite scenario of agricultural growth in a district the composite indices have been constructed. The relative score method given below is used for this purpose i.e.

$$X_{ijt} \text{ relative score} = \frac{x_{ijt} - x_{ijtmin}}{x_{jtmax} - x_{jtmin}} \times 100$$

The Principal Component Analysis is used for identifying relevant variables of Infrastructural growth for constructing composite indices, as PCA is a suitable technique for extracting the number of Principal Components. The eigen value for each principal component indicates the percentage of variation in the total data explained. The output from PCA is a table of factor scores or weights for each variable. Before devising the indices, the progress of major infrastructural indicators is being summarized below:

Education

As an indicator of educational progress, growth in literacy rate in Rajasthan can be visualized by table 1:

Table 1: Progress of Literacy in Rajasthan

Years	Persons	Male	Female
1951	8.50	13.88	2.66
1981	30.11	44.77	14.00
1991	38.55	54.99	20.44
2001	60.41	75.70	43.85
2011*	67.06	80.51	52.66

Source: Basic Statistics, 2008

* Census Report, 2011

As per the Census, 2011, Rajasthan has recorded a literacy rate of 67.06 per cent which is quite significant as it was only 8.50 per cent in 1951 and 38.55 in 1991. The state has registered an absolute percentage increase of 28.51 per cent in the literacy rate during last two decades. The male literacy rate is 80.51 per cent in the state. At 52.66 per cent the female literacy remains a challenge as it is the lowest amongst all the states and Union Territories of the country. At the elementary level, the Government is the major provider of education with 33 per cent schools in Rajasthan operating under the Department of Education of Government of Rajasthan, 42 per cent are under local bodies and rest only 21 per cent of schools are under private management, unaided by the Government. More than half (51.3 per cent) of the elementary schools and high schools (62.5 per cent) have been established in or after 1994 in the state, explaining the significant improvement in most educational indicators between 1991 and 2001.

The number of schools educational institutes i.e. Primary Schools, Upper Primary Schools, Secondary Schools and Senior Secondary Schools has risen from 4656, 792, 205 and nil in 1951-52 to 56752, 30392, 8261 and 4430 in 2006-07 respectively. Viewed relatively there are 72 pre primary and primary schools, 57 middle schools and 27 secondary and senior secondary schools per lakh of population in Rajasthan. But this large increase in the number of schools has meant inadequate school facilities in many cases. According to the DISE data of 2008-09 for Government sector schools, 11.5 per cent schools do not have own school building, 10 per cent schools do not have any facility of drinking water, 18.5 per cent schools do not have girls toilet and more than 83 per cent of schools in Rajasthan still do not have electricity connection. 75 per cent of Primary Schools do not have any book bank in school. More-over, although enrollment ratios have been increasing for two decades, female enrollment ratio still needs to catch-up. There are high drop-out ratios in the state and only 60 per cent of those who enroll in class one are able to reach class eight.

In terms of higher education, Rajasthan has shown inspiring trends in last decade. The number of college increased from 278 in 2000-01 to 996 in 2007-08. There are 9 deemed universities and 20 universities. Although professional and technical education did not prosper in the same proportion. The state has 127 engineering and 9 medical colleges, number of poly-technique colleges and Industrial Training Institutes (ITI) increased from 130 in 2000-01 to 154 in 2007-08, which is a matter of concern looking at the high rate of unemployment.

Health

The performance of the state is low in health, water supply and sanitation, despite the fact that the state spends one of the highest shares of its budgetary expenditure (in comparison to other major states) on health, family welfare, water supply and sanitation. The state however spends a substantially

high share of its expenditure towards tertiary health care services and a relatively low share towards primary and secondary health care services. The primary reason for this is the high number of urban health facilities in the state relative to rural facilities. While the state appears to be close to meeting the national population norms on rural health infrastructure, these infrastructure are grossly inadequate due to the low density of population in the state.

The health infrastructure in the state comprises of 127 hospitals, 199 dispensaries, 1504 Rural Primary Health Centers, 37 Urban Primary Health Centers, 368 CHCs, 118 maternity and child health centers, 13 urban Aid Posts, 11487 sub-health centers and 43,864 in-patient beds as on 31 December, 2009. On average there is one Government medical institute for a population of 5238 in 2010-11 where as in 2000-01 there was one institute serving population of 4538. Population served per bed in 2000-01 was 1894 while it has risen up to 2214 in 2010-11. Number of medical institutes and beds has increased at a lower rate than population. Rajasthan is one of the poor performing states in India in terms of health indicators like Infant Mortality Rate (IMR) and Maternal Mortality rate (MMR). Both the Sample Registration System (SRS) and National Family Health Survey (NFHS) indicate that IMR in the state is significantly worse than the average figures for the country as a whole. Major health indicators are given in the table 2.

Table 2: Major Health Indicators

Life expectance at Birth (2011-15)	67.7 years
Infant Mortality Rate (IMR) – 2016	41 per 1000 live births
Maternal Mortality Rate (2010-12)	255 per 1,00,000 live births
Total fertility Rate (2016)	3.1 child born per women
Birth Rate (2016)	24.3 per 1,000 population
Death Rate (2016)	6.1 per 1000 population

Source: SRS based Abridged Life Tables RGI

Power

Rajasthan has made significant strides in past few years in the power sector. Table 3 shows the position of power generation in the state. Total electricity generated and purchased has increased from 57.04 million kilo watts units in 1951-52 to 36250.81 million kilo watts units in 2007-08. Per capita electricity consumption was 269.10 k.w. in 2000-01 which has risen to 322.18 k.w. in 2007-08. Rajasthan aims to be self-sufficient in power by 2013-14. The power sector accounts for the major allocation of 2011-12 Rajasthan budget with 42 per cent of total budgeted out-lay. The main source of power generation for the state are Kota and Suratgarh Thermal Projects, Dholpur Gas Thermal Project, Mahihydral, wind farms, solar farms, Biomass, Captive Power Plants, Bhakra, Vyas, Chambal, Satpura inter-state partnership projects. Rajasthan has an advantage in the field of non-renewable energy resources.

Table 3: Position of Power and Electricity

Total installed power generation capacity	18,677.18MW
State generated of which	56.66 per cent
Coal based power	71 per cent
Hydro based power	20 per cent
Centre generated	24.26 per cent
Private sector generated	19.06 per cent

Source: PhD Research Bureau, compiled from monthly Review of Power Sector, April 2017

Communication

The total length of roads in Rajasthan is estimated at 2,26,853.86 kilometers in year 2017. The road density in the state is 66.29 Km per 100 sq. Km at the end of March 2017. The state forms a corridor between the northern and southern states. It provides passage to and from the ports of Gujarat to the landlocked states in the north of the country. The total length of national highways passing through the state stood at 8202 Km in March, 2017. Total length of railways network in Rajasthan is 5893 kilo meter in March, 2016. 77.25 per cent was covered under broad gauge, 21.25 per cent under meter gauge and 1.53 per cent under narrow gauge. Postal and Telecommunication facilities are growing speedily in the state. The total number of post offices was 10,313 at the end of 2017. The number of Telephone Exchanges in the state stood at 2,057.

Composite Indices of Infrastructural Development

The principal component analysis is used for ascertaining weights for each indicator for all the years selected for the study i.e. from 1995-96 to 2007-08. The seventeen indicators as discussed in the earlier section are found significant for the purpose of explaining variations among districts. As an outcome of efforts to trace out proper methodological process by which inequalities between districts be analysed objectively, the relative score data comparatively present consistent results in terms of weight ordering. Hence composite indices are prepared by using weights of relative data. First of all raw data are transformed into relative-scores. Using the principal component analysis, factor weights are obtained. Finally the dimensional variables are then converted into indices. Table 4 A & B shows composite indices for infrastructural growth of 31 districts for 13 years i.e. from 1995-96 to 2007-08

Table 4(A): Composite Indices – Infrastructure

District	1995-96	1996-97	1997-98	1998-99	1999-2000	2000-01	2001-02
Ajmer	35.99	41.65	38.15	33.99	29.64	31.01	42.86
Alwar	40.06	33.85	25.98	27.76	24.61	25.23	30.66
Banswara	27.78	29.82	22.90	20.92	19.36	20.48	24.23
Baran	49.58	29.59	13.70	20.60	21.51	22.19	31.76
Barmer	31.48	24.48	13.89	18.94	16.96	17.96	19.67
Bharatpur	32.25	30.36	23.27	25.13	23.95	24.61	31.63
Bhilwara	32.14	35.80	24.43	32.53	28.14	28.85	34.83
Bikaner	40.56	37.22	30.35	29.64	26.36	25.37	34.87
Bundi	34.57	29.65	19.20	23.08	22.57	23.52	27.62
Chittorgarh	35.29	26.22	21.75	22.13	19.97	20.80	26.77
Churu	28.15	24.77	19.82	23.79	20.57	21.28	30.41
Dausa	37.94	28.39	26.24	22.47	20.98	20.16	24.19
Dholpur	28.00	25.80	17.72	23.89	23.71	22.93	23.34
Dungarpur	41.40	25.33	18.28	17.51	17.42	19.12	22.95
Ganganagar	42.70	41.60	31.37	29.41	29.17	28.06	32.73
Hanumangarh	47.89	32.63	29.48	26.60	25.52	24.33	30.75
Jaipur	70.81	69.93	61.85	74.53	70.20	67.30	79.89
Jaisalmer	5.00	9.77	9.71	10.67	9.32	8.04	12.31
Jalore	21.91	21.95	15.82	25.33	23.13	25.54	25.09
Jhalawar	28.73	23.82	13.40	18.63	17.10	17.59	22.09
Jhunjhunu	47.27	38.81	45.88	24.69	21.81	21.55	28.05
Jodhpur	61.98	42.31	31.61	30.55	31.62	30.41	34.79
Kota	47.74	50.70	41.98	43.42	37.87	34.60	46.71
Nagaur	32.09	27.08	16.05	23.24	21.58	21.67	27.82
Pali	27.93	24.85	19.05	23.12	21.13	25.76	28.31
Rajsamand	23.96	26.24	20.97	22.12	18.72	19.10	24.13
SawaiMadhopur	23.63	23.27	13.48	19.56	22.16	22.53	19.36
Sikar	36.49	30.53	22.38	31.35	31.78	32.45	53.41
Sirohi	27.59	32.61	30.78	27.90	21.92	22.80	23.50
Tonk	23.24	24.26	15.73	17.24	13.95	14.68	22.31
Udaipur	34.14	37.16	31.70	28.06	25.39	29.17	35.12
Average	35.43	31.63	27.58	26.41	24.46	24.81	30.71

Table 4(B): Composite Indices – Infrastructure

District	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08
Ajmer	33.53	24.46	24.31	37.89	31.18	34.66
Alwar	24.54	24.03	22.90	34.96	25.67	35.11
Banswara	24.20	25.43	24.15	20.82	21.43	21.03
Baran	25.57	22.06	18.62	20.82	30.07	22.67
Barmer	17.98	24.75	19.76	15.97	19.74	22.01
Bharatpur	34.44	28.15	25.12	27.66	23.60	22.85
Bhilwara	30.01	20.94	18.79	27.69	24.21	34.80
Bikaner	31.07	19.58	18.03	28.24	27.92	29.00
Bundi	26.82	22.91	20.61	24.57	17.64	18.37
Chittorgarh	22.45	20.13	18.15	25.08	19.27	25.26
Churu	25.40	23.27	21.81	29.03	26.99	18.14
Dausa	23.78	27.65	24.67	25.66	21.95	9.99

Dholpur	23.72	24.60	21.95	25.38	19.82	14.61
Dungarpur	19.55	21.53	20.21	14.51	18.46	15.25
Ganganagar	33.08	25.76	23.70	31.41	26.12	23.02
Hanumangarh	38.16	29.86	26.60	30.13	24.15	19.87
Jaipur	68.18	34.82	34.40	67.66	53.57	67.60
Jaisalmer	14.46	15.14	13.76	11.34	13.78	15.53
Jalore	30.73	25.91	21.48	23.02	25.09	24.47
Jhalawar	20.13	19.81	16.61	19.97	22.35	21.65
Jhunjhunu	22.45	21.98	19.84	24.91	26.29	21.03
Jodhpur	31.18	18.68	16.24	33.29	29.32	42.42
Kota	42.30	29.53	32.24	47.04	34.85	40.91
Nagaur	23.69	25.66	22.84	23.17	20.26	19.60
Pali	27.72	21.21	17.44	24.20	21.09	18.95
Rajsamand	26.42	20.44	16.45	18.91	18.54	18.95
SawaiMadhopur	17.40	24.09	22.91	22.29	19.70	20.64
Sikar	34.67	28.86	29.32	52.59	51.62	28.68
Sirohi	23.41	21.21	18.31	20.65	20.63	22.96
Tonk	29.54	22.06	19.27	20.10	18.56	14.12
Udaipur	34.70	19.57	17.88	30.83	23.14	34.93
Average	28.43	23.68	21.56	27.73	25.06	25.13

Source: Calculated Figures

Rajasthan is infrastructurally under-developed which can be easily visualized by this table as the average Composite Index for infrastructural development for the entire study period has been just 27.12. Jaipur is the only district which has attained Composite Index higher than 70 and that is also observed for only three times in the study period. In addition to Jaipur, only in the districts Jodhpur, Kota and Sikar Composite Index for Infrastructural development has been observed above 50 for some specific years. Composite Index for Infrastructural development ranges between 5 for Jaisalmer to 70.81 for Jaipur in 1995-96 and in 2007-08, the minimum Composite Index was observed as 9.99 for Dausa to 67.60 for Jaipur. Thus the range being more or less the same way can say that developing trends were not observed in Rajasthan during the study period. To analyze district-wise trends and observe inter-district and intra-district inequalities in terms of Composite Index Infrastructural development the value of Composite Index has been classified into the intervals of 10 and presented in table 5.

Ranks of the Districts

Table 5 shows the ranks of all districts for Infrastructural development in the study period.

Table 5 (A)

Ranks	1996	1997	1998	1999	2000	2001	2002
Ajmer	13	4	4	3	5	4	4
Alwar	10	10	12	11	11	12	13
Banswara	25	15	15	24	25	24	21
Baran	3	17	28	25	20	19	10
Barmer	20	26	27	27	29	28	29
Bharatpur	17	14	14	14	12	13	11
Bhilwara	18	9	13	4	7	7	7
Bikaner	9	7	9	7	8	11	6
Bundi	15	16	20	20	15	15	18
Chittorgarh	14	21	17	22	24	23	19
Churu	22	25	19	17	23	22	14
Dausa	11	18	11	21	22	25	22
Dholpur	23	22	23	16	13	16	25
Dungarpur	8	23	22	29	27	26	26
Ganganagar	7	5	7	8	6	8	9
Hanumangarh	4	11	10	12	9	14	12
Jaipur	1	1	1	1	1	1	1
Jaisalmer	31	31	31	31	31	31	31
Jalore	30	30	25	13	14	10	20
Jhalawar	21	28	30	28	28	29	28
Jhunjhunu	6	6	2	15	18	21	16
Jodhpur	2	3	6	6	4	5	8

Kota	5	2	3	2	2	2	3
Nagaur	19	19	24	18	19	20	17
Pali	24	24	21	19	21	9	15
Rajsamand	27	20	18	23	26	27	23
SawaiMadhopur	28	29	29	26	16	18	30
Sikar	12	13	16	5	3	3	2
Sirohi	26	12	8	10	17	17	24
Tonk	29	27	26	30	30	30	27
Udaipur	16	8	5	9	10	6	5

Table 5 (B)

Ranks	2003	2004	2005	2006	2007	2008
Ajmer	7	13	7	4	5	5
Alwar	19	15	11	5	6	7
Banswara	20	10	8	20	29	14
Baran	17	19	22	25	11	22
Barmer	29	11	19	30	25	15
Bharatpur	6	5	5	10	17	18
Bhilwara	12	24	21	15	13	4
Bikaner	10	28	25	9	7	8
Bundi	15	17	16	16	27	23
Chittorgarh	26	26	24	19	21	13
Churu	18	16	14	12	9	24
Dausa	21	6	6	14	22	30
Dholpur	22	12	13	17	20	27
Dungarpur	28	21	17	29	31	29
Ganganagar	8	8	9	6	14	11
Hanumangarh	3	2	4	8	15	16
Jaipur	1	1	1	1	1	1
Jaisalmer	31	31	31	31	30	26
Jalore	11	7	15	26	8	12
Jhalawar	27	27	28	24	24	17
Jhunjhunu	25	20	18	11	16	21
Jodhpur	9	30	30	7	4	3
Kota	2	3	2	3	3	2
Nagaur	23	9	12	22	19	25
Pali	14	23	27	21	18	19
Rajsamand	16	25	29	27	23	20
SawaiMadhopur	30	14	10	18	26	28
Sikar	5	4	3	2	2	10
Sirohi	24	22	23	28	10	9
Tonk	13	18	20	23	28	31
Udaipur	4	29	26	13	12	6

Source: Calculated Figures

Most of the districts have maintained the same relative position. Jaipur ranked first for all the years and Jaisalmer ranked 31 for all the years except one. The position of Ajmer improved from 13th in 1995-96 to 7th in 2007-08. Similarly infrastructure facilities also improved in Alwar as its position improved from 10th in 1995-96 to 4th in 2007-08. The position of Bundi deteriorated from 15th in 1995-96 to 25th in 2007-08. Jhunjhunu district has shown the varying trends with rank 6th in 1995-96, fell to 25th in 2002-03 and then achieved 18th rank in 2007-08. Jodhpur and Kota ranked mostly among the top 6 districts in Infrastructural development.

Effect on Inequalities

An attempt has been made in following section to study the impact on inequalities in the study period. The gap for each district from the most developed district has been calculated for year 1995-96 and 2007-08 and presented in table 6.

Table 6: Gap Analysis

	1996	Gap	2008	Gap	Difference of gap
Ajmer	35.99	34.82	34.66	32.93	-1.89
Alwar	40.06	30.75	35.11	32.48	1.73

Banswara	27.78	43.03	21.03	46.57	3.54
Baran	49.58	21.23	22.67	44.92	23.69
Barmer	31.48	39.33	22.01	45.59	6.26
Bharatpur	32.25	38.56	22.85	44.75	6.18
Bhilwara	32.14	38.67	34.80	32.80	-5.88
Bikaner	40.56	30.25	29.00	38.59	8.34
Bundi	34.57	36.24	18.37	49.23	12.99
Chittorgarh	35.29	35.52	25.26	42.34	6.82
Churu	28.15	42.66	18.14	49.45	6.80
Dausa	37.94	32.87	9.99	57.61	24.74
Dholpur	28.00	42.81	14.61	52.98	10.17
Dungarpur	41.40	29.40	15.25	52.34	22.94
Ganganagar	42.70	28.11	23.02	44.58	16.47
Hanumangarh	47.89	22.92	19.87	47.72	24.80
Jaipur	70.81	0.00	67.60	0.00	0.00
Jaisalmer	5.00	65.81	15.53	52.06	-13.75
Jalore	21.91	48.90	24.47	43.12	-5.77
Jhalawar	28.73	42.08	21.65	45.94	3.86
Jhunjhunu	47.27	23.54	21.03	46.56	23.03
Jodhpur	61.98	8.83	42.42	25.18	16.34
Kota	47.74	23.07	40.91	26.69	3.62
Nagaur	32.09	38.72	19.60	47.99	9.27
Pali	27.93	42.88	18.95	48.64	5.76
Rajsamand	23.96	46.85	18.95	48.65	1.80
SawaiMadhopur	23.63	47.18	20.64	46.95	-0.23
Sikar	36.49	34.32	28.68	38.91	4.59
Sirohi	27.59	43.22	22.96	44.64	1.42
Tonk	23.24	47.57	14.12	53.48	5.91
Udaipur	34.14	36.67	34.93	32.66	-4.01
Average		35.38		42.46	7.08

The average gap in Composite Index for Infrastructural development for a district has increased from 35.38 to 42.46 depicting an enhancement in inequalities. The difference in gap from 1995-96 to 2007-08 is positive for 25 districts meaning thereby that inequalities have increased in infrastructural development in almost 80 per cent of the district in Rajasthan. The difference of gap is very high for Hanumangarh (24.80), Dausa (24.74), Baran (23.69), Jhunjhunu (23.03), Dungarpur (22.94) implying widening of inequalities in these districts. The inequalities narrowed down in only six districts viz. Jaisalmer (-13.75), Jalore (-5.77), Bhilwara (-5.88), Udaipur (-4.01), Ajmer (-1.89) and SawaiMadhopur (-0.23) during the period of study.

Conclusions and Policy Implications

Over-all infrastructural development scenario of districts in Rajasthan indicates prevalence of wide disparities in the level of development among the districts. It is a matter of serious concern for devising policies and programmes aimed at enhancing inclusiveness. Inclusiveness of development goal requires specific and targeted development strategies for the least developed districts along with committed efforts in the implementation stage. Attention needs to be paid to the development of infrastructural facilities, especially the basic infrastructure, to ensure rapid economic growth of the lagging districts. The constraint of lacking infrastructure in districts has to be dealt by way of Public-Private Partnerships (PPP) investment in infrastructure projects with concessional agreement, which fulfils the needs of the people as well as the requirements of private partners. The region could attract huge investments in the development of infrastructure projects like hotels, sports complex, universities etc. PPP as well as domestic-foreign joint ventures which can change the development scenario of the state.

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