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# **Analyzing Infrastructure for Improving Trade Performance – an Empirical Analysis**

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#### ABSTRACT

Infrastructure is an architecture of facilities which enables smooth flow of goods and services to the public. Thus they act as facilitators for socio-economic activities rather than directly producing goods or services. Infrastructure includes roads, bridges, railways, and similar public works which boost economic activities in a country. In the context of India, infrastructure investments are highly difficult to be projected due to the geo-physical status of the country. The Country has ports, railways and roads across different physical states like hilly regions of North and North East, Coastal regions of South with low draft, coastal regions of West like Maharashtra and Gujarat. Hence, the planned development of the Infrastructure of the country depends upon the State level requirements, plans and execution. It is a matter of fact that a state's prosperity depends largely on its Infrastructure and a good Infrastructure makes a state richer and richer through increasing trades. In this paper an attempt is made to analyze the infrastructure of a Central Indian State – Madhya Pradesh through Infrastructure Index which highlights the imbalances and areas for growth the smoothen the flow of trade.

#### 1. Introduction

The pace of global economic growth has come down in the recent years. The reasons attributed for the subdued growth of world economy varied from country to country and also across the region. As far as the developing /emerging economies are concerned, the notable slowdowns are attributed to both international and domestic policy paranoia. Though the western developed economy suffered due to the fiscal issues, in case of countries like India and China, the underperformance is more due to the imbalances across the sectors within the economy.

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Responsibility of Contents of this paper rests upon the authors and not upon GRIET publications ISSN: 2348-3989 (Online) ISSN: 2230-9764 (Print) Doi: http://dx.doi.org/10.11127/gmt.2018.06.09 pp. 188-207 Copyright@GRIET Publications. All rights reserved. Infrastructure is a key factor in emerging economies for sustainable growth, especially in the current context, where in, the growth propelled by the western markets has lost steam. Over half of the world's infrastructure investment is now taking place in emerging countries (Economist, 2008). However, the focus of such infrastructure development initiatives should be clearer, as the infrastructure can be related to business, economic and social sectors.

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Infrastructure can be classified, based on their physical features into the following two categories:

#### Infrastructure for Trade

- Transport (e.g., roadways, airways, seaways, railways, bridges)
- Utilities (e.g., Electricity Generation and distribution system, Drinking Water supply system, sewage system, Oil and gas supply systems)
- Communication (e.g., radio, television, telecommunication facilities and related physical structures)
- Renewable energy.

#### Infrastructure for Society

- Public Educational Institutions
- Health (Hospitals and health centers)
- Security (e.g. Prisons, police, defense )
- Others (e.g. Public Parks)

The development strategy and initiatives of a country focusses on both the components of infrastructure. Productivity and growth are functions of efficient and affordable infrastructure.

#### 2. Literature Review

Infrastructure is pivotal for the development and growth of an economy. The multi-dimensional impact of trade and infrastructure on development leads to the sustainable development of the country. Superior infrastructure stimulates direct investments from the private sector. It also helps in narrowing the developmental gaps across, as well as within, the countries. Empirical econometric studies have indicated a positive relationship between quality of domestic and international infrastructure and higher flow of trade.

The quality of infrastructure also creates a comparative advantage. The difference in the quality of infrastructure impacts the factor productivity of a country. However, this difference in total factor productivity varies between sectors due to difference in intensity of use of infrastructure and dependence on good infrastructure by various service sectors. Empirical results suggests that public investments in building new roads have a positive impact on exports penetrating foreign markets, thereby increasing employment in an economy and, hence, higher economic growth (C.V. Martincus, J.Carballo and A. Cusolito, 2012).

Infrastructure and trade flows are inter-related. Their relationship is based on the geographic position of trading countries, their strength of infrastructure, along with trends in the commodities traded. This relationship is also subjected to the cost of physical location, cost of quality, and ease of infrastructure availability. Thus, this relationship is assessed in relation to space and trade cost (**M.G. Celbis, P. Nijkamp and Jaques Poot, 2014**).

In a study, **Donaghy (2009)** pointed out that transaction costs are involved irrespective of whether trade is international

or intra-national. A strong relationship between infrastructure and transportation costs is also empirically demonstrated. (Bougheas et al., 1999, Limao and Venables, 2001).

The relationship between the infrastructural development and trade flows also depends upon the development of domestic and international infrastructure of a country. In the presence of higher economies of scale and better international infrastructure, firms get motivated to establish operations in countries with better internal infrastructure. Therefore, developing countries should invest in improving their poor internal infrastructure in order to attract more firms to set up their operations. This, in turn, will lead to investments in international infrastructure by countries with better internal infrastructure, to serve the market in developing countries. Hence, countries with better infrastructure get benefitted investing both on domestic as well as international infrastructure, while the developing countries with poor infrastructure benefit by investing more in their domestic infrastructure (Martin and Rogers, 1995).

However, the definition of infrastructure faces challenges due to the relationship among different types of infrastructure, making quantification of the true effect of infrastructure on trade, difficult. There is uncertainty about the dependence among infrastructure and, also, there are no theoretical basis for establishing the interaction among the forms of infrastructure (Bouët et al., 2008).

There are studies which have concentrated on the quality of infrastructure. Such studies considered the quality of communication infrastructure measured by telephone connectivity and related them to trade reforms, trade openness, and GDP growth (**Chang, Kaltani and Loayza, 2009**).

Some of the other studies looked at the dimensions of hard and soft infrastructure and their impact on trade, using the Gravity Model (**Ismail and Mahyideen, 2015**). However, their studies faced some limitations in the framework of gravity model, like the changes in trade flows among two nations and aggregated measurement of infrastructure, which do not impact the importing partner.

The endogeneity of infrastructure and institutional quality also failed to show the proper impact of the infrastructural determinants on trade. **Francois and Manchin, 2013**, have used the laggard values to resolve this but question on the implication of proper instruments given the time persistence of infrastructural variables, remained.

Principal Component Analysis (PCA) was used by some of the studies in establishing the role of infrastructure on international trade, with selected indicators like transport and communication infrastructure. However, the weights used for PCA could not suggest specific reasons for relationship between trade and infrastructure. Moreover, the problem of endogeneity of infrastructure was also neglected in such papers (Francois and Manchin, 2013).

J. Donaubauer, A. Glas and P. Nunnenkamp, 2015, assessed the effect of infrastructure on disaggregated bilateral trade of select developed and emerging economies during twenty-five years ending 2011. Their study adapted the Gravity Model by including communication, energy, logistics and finance to arrive at a composite index. In order to address the endo-geneity concern they have used Two Stage Least Squared estimations to find out the relationship between infrastructure and natural resources of the country. A non-linear effect of infrastructure was found, while controlling for potential reverse causality with similar trends of reducing marginality of infrastructural variables except communication infrastructure. On the contrary, communication infrastructure showed a greater importance for the rise in per capita income of the nation. However, these results hold under certain conditions which exclude collusion among trade partners, and political checks and balances, among others.

A review of the literature suggests that most of the empirical studies have used Gravity Model or PCA or Customized variable on measuring the impact of infrastructure on trade. There are broad indices which are available like Global Logistics Index, Competitiveness Index, and the measures of doing business report. However, they are suggestive of the status of overall infrastructure which may or may not have an impact on trade. This paper attempts to fill up the literature gaps on measuring the trade infrastructure in developing economy context, highlighting the importance of balanced regional infrastructure. The measure also helps in understanding the relationship between overall infrastructural development and the additionalities for strengthening of trade infrastructure.

#### 3. Objectives

The overall objective of this paper is to analyze infrastructure as a facilitator for improving trade performance of a country. In the process, the paper tries to explore the following questions:

- 1. What is the role of overall infrastructure in trade?
- 2. What are the constituents of infrastructure? Can the overall infrastructure be segregated into different forms?
- 3. How do we measure the quality of infrastructure and whether such measures can identify gaps for improvements in infrastructure?
- 4. How to analyze the infrastructural data at various levels and demonstrate the use of such developed measure for investments and improvement in trade facilitation?

#### 4. Methodology

In order to achieve the objectives, both primary and secondary data are used in this paper. The sectional data from reliable public sources are gathered and used for state level comparison within India and district level comparison within the states selected for study. Statistics on infrastructural variables are collected and the following detailed methodology is used.

The infrastructural assessment was done using the following process:

- 1. Identification and tabulation of district wise primary infrastructure
- 2. The components were segregated and grouped considering their contribution to trade development.
- 3. Such segregated data is used for finding Composite Trade Infrastructure Index

The variables impacting infrastructure are grouped into the following five sets, based on economic principles:

- Set 1: Physical Infrastructural factors
- Set 2: Fiscal Infrastructural factors
- Set 3: Industrial Infrastructural factors
- Set 4: Agriculture related Infrastructural factors
- Set 5: Social Infrastructural factors

The indicators for these sets are as follows:

#### **Physical Infrastructural Factors (Set 1)**

- ➢ Motorable Road Length (per 1000 km)
- ➤ Total Road Length (per 1000 km)
- Capacity of Warehouse per Registered Enterprise
- > % Villages Electrified

#### Fiscal Infrastructural Factors (Set 2)

- Credit Deposit Ratio (%)
- Average population per bank
- > No. of Banks per Registered Enterprise
- **Industrial Infrastructural Factors (Set 3)**
- ➢ Investment per Registered Enterprise
- Employment per Registered Enterprise
- Industrial Consumption of Electricity (%)

#### Agriculture related Infrastructural Factors (Set 4)

- ➢ % of Net Irrigated Area
- Fertilizer Consumption
- Average Yield of Important Crops

#### Social Infrastructural Factors (Set 5)

- Net District Domestic Product at Current Prices
- Number of High schools per 1000 Population
- Number of Colleges per 1000 Population
- ▶ Number of Post offices per 1000 Population

The data set developed using the above indicators are brought under single category through statistical normalization method. The mean and standard deviation of all the indicators are calculated and standard normal variable applicable to each district with respect to each indicator were derived. The indicators were prioritized on 100 point scale. The standard methodology of Principle Component Analysis (PCA) was referenced and weights were assigned based on relative importance of indicators.

Thus, the Composite Trade Infrastructure Index of each district was annexed as follows:

**CTII**<sub>i</sub>=  $\sum_{j} W_{j} X_{ij}$  (i: Number of districts, j: Number of indicators)

#### 5. Trade Infrastructure in India and States

The growth phase of Indian Economy has already highlighted the need for huge infrastructure development. The 12<sup>th</sup> Economic Plan for India has already projected infrastructure Investment of US \$1024.81 (40,99,240 Rs Crores). (Refer:**Table 5.1**) Though the Infrastructure Investment for the 12<sup>th</sup> plan is ambitious, the investment as a percentage of GDP is just around 10 percent which seems to be low given the estimated GDP Growth of 9 percent during 12<sup>th</sup> Plan. Moreover, it has also been seen in the past that the Infrastructure spent remained below planned spend, especially in power and ports. (Refer: **Fig 5.1**)

In the context of India, infrastructure investments are highly difficult to be projected due to the geo-physical status of the country. The Country has ports, railways and roads across different physical states like hilly regions of North and North East, Coastal regions of South with low draft, coastal regions of West like Maharashtra and Gujarat. Hence, the planned development of the Infrastructure of the country depends upon the State level requirements, plans and execution. It is a matter of fact that a state's prosperity depends largely on its Infrastructure and a good Infrastructure makes a state richer and richer through increasing trades. (Refer: **Table 5.2**)

As observed by the World Bank, while all Indian states need to focus on improving their investment climate, efforts in the lagging states will need to be twice as intensive as the better States.

Time to start a business is longer in poorer states – 79 days in Orissa compared to 57 in Karnataka and Punjab. Registering property in poorer states take longer time and cost – 1165 days in Uttar Pradesh versus 425 in Maharashtra. It takes 15 years to close a business in Uttar Pradesh; it takes 8 years in Karnataka. (Doing Business Report – India Regional Profile, World Bank, 2004)

Though, this is the status reported in 2005, focused efforts by the government have helped building the infrastructure of the country through the years. The Infrastructure across the states can be accessed based on components like power, telecom and roads. The ranking of the states on these parameters are given. (Refer: **Table 5.3**)

In spite of better CAGR growth & improvement in position in 2010, Madhya Pradesh is ranked in the bottom ten states in the Road Index during 2006-10.

The poor performance of Madhya Pradesh in all the three key variables of Infrastructure is the reason for the state to move

to the bottom position in the Infrastructure Index of the Country and the state is taken for analysis in this paper.

# 6. Trade Infrastructure of Central India- Empirical analysis of Madhya Pradesh

Madhya Pradesh, a state in Central India, has a population of 72.5 million (Census 2011) covering an area of 308,000 Sq.km. The State accounts for a GDP of 5.08 lakh Crores (2014-15) consisting of 51 revenue districts covering 476 cities and towns and 54,903 villages. The state borders with Uttar Pradesh, Chhattisgarh, Maharashtra, Gujarat and Rajasthan. (*IBEF*)

The GSDP of the State has registered a growth of 13.9% during 2005-2010 compared to the registered growth of 15.5% in the country. The Contribution of the State to the domestic product is 3.7%. In terms of physical Infrastructure, the State has installed power capacity of 8,381.3 MW accounting for 4.8% of installed power capacity in the country. The State also accounts for 7% of the National Highway and has 5 airports. There are 5 SEZs which are sanctioned for the State. The FDI inflows of the state remained negligible. (Refer: **Table 6.1**)

The power performance score card of Power Ministry ranks the state in 20<sup>th</sup> position. The power Sector investments by the state has helped the Country to improve installed power capacity by more than 26 % since 2006 -2011. (Refer: **Fig 6.1**)

The Telecom sector of the State has witnessed slow improvement over the years, 52.23% tele-density from the state is below the All India Average of 73.34%. (*Dept. of Telecom, December 2012*)

In case of Road, the state has 18 National Highways covering 5.027 km with connectivity to major cities, markets, and ports on the Western coast including Kandla & Jawaharlal Nehru Port Trust. (*IBEF*)

Trade Infrastructure of the State has undergone a tremendous change in past five years. Industrial areas, Biotechnology Park, SEZs and ICDs have come up in the state encompassing number of products.

#### 7. Infrastructure Profile of Madhya Pradesh

The state of Madhya Pradesh is divided into 50 revenue districts, for ease of governance. The infrastructure profile of these districts are shown in table 7.1. (Refer: **Table 7.1**)

This huge state of Madhya Pradesh is an example of a mixed infrastructure profile. The overall infrastructure strength of the state may not be analyzed with such absolute data for its effectiveness. In the road Infrastructure, Chhindwara and Anuppur are the districts where the total road length is a maximum at more than 10,000 kms while Alirajpur and Sheopur are the districts where the total road length is a minimum at less than 200 kms.

In terms of electricity, only in Ashoknagar & Bhind districts, all villages are fully electrified followed by the districts Morena and Indore in which more than 99% villages

are electrified. In the districts Dindori, Annuppur, Umaria & Bhopal, less than 25% villages are electrified. Indore district tops in terms of credit deposit ratio followed by Raisen. Half of the districts in the state could not achieve 50% Credit deposit ratio.

In the Primary Communication Infrastructure through post offices, Shajapur District has the maximum number of post offices followed by Rewa, Balaghat, Chhindwara and Satana. From the macro indicators, the scope for improvement in the primary infrastructure investments for the state is widely apparent. In order to understand the status of trade infrastructure of the state, and to suggest improvements require a detailed analysis of the infrastructure using quantitative methodology like creating trade infrastructure index.

#### 8. Trade Infrastructure Index of Madhya Pradesh

The future Infrastructure development of the state needs an assessment across the state, so that the investment in infrastructure can be focused to enable trade–led growth of the State. Accordingly, in this study, district wise primary infrastructure is analyzed and based on the importance of the components of such primary infrastructure for favourable trade development, a Composite Trade Infrastructure Index is derived.

The Factors impacting the Trade Infrastructure Index of the State of Madhya Pradesh is first grouped into different sets on the basis of their direct or indirect impact of the trade. The indicators are grouped into five broad sets (Refer: **Table 8.1**).

The values of each of the indicators under different sets for the districts of Madhya Pradesh are obtained (Refer: Table 8.2).

Based on subjective evaluation, weights are equally assigned across all the sets. However they have been distinguished with the following reasons:

- a) Higher weightage of 30% is assigned to set 3 since industry development precedes trade development.
- b) Higher weightage of 30% is assigned to set 2 since industry development is highly dependent on fiscal support.
- c) Weightage of 20% is assigned to set 1 since the industry and fiscal environment should have adequate support of physical infrastructure.
- d) A lower weightage of 10% is assigned to each of set 4 and set 5 since the agricultural and social infrastructure are assumed to be impacted by other three.

It may be noted that each set of variables account for as many relevant independent variables as required. The pre assigned weights for the sets take care of the influence of individual factors (Refer: **Table 8.3**).

Since each of these variables are having different units, statistical normalization methods are used to bring all these variables in single category representing numbers only without any unit. Accordingly, standard normal variables applicable for each district respective to each indicator are arrived. The values of the normalized variables for all the districts of the state of Madhya Pradesh together with their weights are compiled (Refer: **Table 8.4**) and Composite Trade Infrastructure Index (CTII) of a district is arrived by sum of products of indicators and weightages attached to corresponding indicators.

 $CTII_i = \sum_j W_j X_{ij}$ 

Where i=1,2,....,50; j=1,2,...,17

The Composite Trade Infrastructure index constructed for the districts of Madhya Pradesh is shown in table 8.5 (Refer: **Table 8.5**).

Accordingly, twenty-two out of fifty districts are placed under better trade infrastructure. Twenty-three districts with negative index values indicate huge scope of improvement in trade infrastructure. The district Indore is having maximum index value indicating best performer in trade infrastructure. The districts Raisen, Gwalior, Morena, Shajapur, Burhanpur, Sehore, Khargone and Dhar are also on the top, showing better status of trade infrastructure compared to the other districts. The districts Singrauli, Ashoknagar, Alirajpur, Satna, Bhopal, Rajgarh, Ujjain, Harda, Hoshangabad, Chhindwara, Katni, Vidisha and Dewas are in medium position in terms of trade infrastructure. Balaghat, Panna, Guna, Barwani, Narsimhapur have also scored positive index values but negligible. All the other districts are scoring negative values.

For better understanding of status of district wise trade infrastructure, the Composite Trade Infrastructure Index is grouped into seven categories and placed on ordinal scale in order of their trade infrastructure. The scale is built considering both lead indicators like motorable road, CDR etc. and lag indicators like average population per bank etc (Refer: **Table 8.6**).

The Composite Trade Infrastructure Index (CTII) though indicates the overall status of infrastructure, does not specify the gaps. CTII indicates the specific variables for each of the districts with absolute values which help in identifying the gaps for improvement in infrastructure in each district. The trade infrastructure index of Indore is classified as exceptional with a composite score of 120.8. The district has performed well in all the five sets of factors taken for construction of CTII which is above the value of infrastructure index for the state as reported by IDFC in 2010 showing a value of 93.

There are two districts viz. Raisen with a composite score of 52.2 & Gwalior with a composite score of 51.8, classified as districts with superior CTII. The infrastructure of Raisen is more influenced by the strong agriculture related factors which have contributed towards building better physical, fiscal & social infrastructure. Gwalior, which is one of the oldest districts, has shown an all-round performance under all the infrastructural factors. There are districts which are having good CTII but need to further build on the same. Thirteen such districts with a CTII value in the band of (5, 25) are identified. The capital of the state, Bhopal comes under this category along with its neighboring districts Hosengabad and Vidisha. However, the physical infrastructure of Hoshangabad and industrial infrastructure of Vidisha are placed far below Bhopal.

In this analysis, five districts are identified as districts with moderate CTII and have index values in the band (0, 5). These districts need selective investments to improve upon the overall trade infrastructure index value.

Similarly, another nine districts are identified with a weak Composite Trade Infrastructure Index which have negative scores in the band of (-20, 0). These districts need capital intensive high investments on selective parameters of trade infrastructure index. This list includes some of well-established districts like Jabalpur, Sagar and Khandwa. In case of Jabbalpur and Sagar, the negative CTII, is more influenced by fiscal and social infrastructural factors while in case of Khandwa, the negative value of CTII is influenced by physical and social infrastructural factors. The districts like Ratlam, Betul and Seoni are prospective districts to strengthen infrastructural investments. The other districts in this group suffer from geographical disadvantage.

There are fourteen districts of Madhya Pradesh with very weak CTII value in the band of (-50, -20) and require a huge push in terms of composite trade infrastructure index. Surprisingly districts like Rewa, Sidhi, Shahdol are also falling under this category in spite of existing capital intensive industry operations like Coal mines, Cement Plants, etc. However, the district Shadol lags behind in industrial infrastructural factors. The districts Shivpuri, Chhattarpur and Sidhi have better industrial infrastructural factors – hence may be considered for focused over all investments.

The detailed analysis of CTII for the districts of Madhya Pradesh have identified not only the potential investments of trade infrastructure but also classified them with time and volume. Though, such infrastructure development for trade may fructify with time, the government may use the tools like PPP for further development.

#### 9. Conclusion

A favorable governance structure and regulatory environment precedes investments in hard and soft infrastructure. This paper shows the imbalances across the state on the components of infrastructure as barriers to smooth physical flow of goods and services and in turn impacts the trade performance of the state. The state should focus on logistics and communication and information technology for more investments. The government organized road shows may demonstrate the infrastructural gaps and invite investments in focused areas rather than improving already better districts. It should be noted that the productivity of infrastructure is more important than the quantum. As analyzed in the paper, the varying infrastructural imbalances need to be corrected to foster trade development. To be specific, the investment in Madhya Pradesh may concentrate on quality in the better districts and on quantity in the weaker districts. As the states are competing in the wake of market integration, the role of infrastructure has increased manifold. The huge allocation of investments in infrastructure in developing countries like India requires a suitable model (CTII) and approach for robust long term development and growth.

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#### List of Abbreviation

FDI – Foreign Direct Investment CAGR – Compound Annual Growth Rate GDP- Gross Domestic Product GSDP – Gross State Domestic Product PCA – Principal Component Analysis CTII – Composite Trade Infrastructure Index CDR – Credit Deposit Ratio PPP – Public Private Partnership ICD – Inland Container Depot 2SLS – Two Stage Least Squared Regression Analysis

#### Appendix



 Table 5.1: Projected Investment in Infrastructure during the Twelfth Five Year Plan

(Rs. crore at 2006 -07 prices)

Year	Base Year (2011-12)	2012-13	2013-14	2014-15	2015-16	2016-17	Total 12 <sup>th</sup> Plan
GDP at market prices (Rs. crore)	63,14,265	68,82,549	75,01,978	81,77,156	89,13,100	97,15,280	4,11,90,064
Rate of growth of GDP (%)	9.00	9.00	9.00	9.00	9.00	9.00	9.00
Infrastructure investment as % of GDP	8.37	9.00	9.50	9.90	10.30	10.70	9.95
Infrastructure investment (Rs. crore)	5,28,316	6,19,429	7,12,688	8,09,538	9,18,049	10,39,535	40,99,240
Infrastructure investment (US billion) @Rs.40/\$	132.08	154.86	178.17	202.38	229.51	259.88	1,024.81

Source: Investment in Infrastructure during the eleventh Five Year Plan-Planning Commission, Govt. of India, 2011

# Table-5.2: Ranking of States by Infrastructure

High	Goa, Maharashtra, Punjab
High middle	Gujarat, Haryana, Kerala, Tamil Nadu
Middle	Andhra Pradesh, Karnataka
Lower middle	Himachal Pradesh, Madhya Pradesh, Orissa, Uttar Pradesh, Uttaranchal, West Bengal
Low	Arunachal Pradesh, Manipur, Meghalaya, Jharkhand, Mizoram, Nagaland, Assam, Chhattisgarh, Sikkim,
LOW	Tripura, JandK, Bihar, Rajasthan
Source: Report of	the Twelfth Finance Commission, 2005

## Table-5.3: State-wise Combined Index Values

States	2006	2010	States	2006	2010
Himachal Pradesh	96	190	Tripura	63	111
Kerala	100	165	Nagaland	62	109
Punjab	95	163	Sikkim	64	109
Tamil Nadu	91	162	Meghalaya	59	108
Haryana	85	157	Manipur	60	107
Goa	100	157	Jammu and Kashmir	56	107
Gujarat	69	134	Uttarakhand	66	106
Maharashtra	68	129	Bihar	62	102
Rajasthan	61	128	Mizoram	57	101
Karnataka	77	128	Assam	62	101
Andhra Pradesh	70	124	Arunachal Pradesh	43	98
Uttar Pradesh	66	116	Chhattisgarh	55	97
West Bengal	67	114	Jharkhand	59	97
Orissa	66	114	Madhya Pradesh	55	93
		Sour	ce: IDFC		

# Table-6.1: Madhya Pradesh in Figures

Parameter	Madhya Pradesh	All-states	Source								
		Econo	my								
GSDP as a percentage of all states' GSDP	3.7	100	CMIE, as of 2009-10, current prices								
Average GSDP growth rate (%)*	13.9	15.5	CMIE, 2004-05 to 2009-10, current prices								
Per capita GSDP (US\$)	648.3	1,302.4	CMIE, as of 2009-10, current prices								
Physical Infrastructure											
Installed power capacity (MW)	8,381.3	173,626.4	Central Electricity Authority, as of March 2011								
GSM cellular subscribers (No)	31,677,228	618,284,322	Cellular Operators Association of India, as of September 2011								
Broadband subscribers (No)	418,091	10,737,850	Ministry of Communications & Information Technology, as of November 2010								
National Highway length (km)	5,027	70,934	Ministry of Road Transport & Highways, Annual Report 2010-11								
Airports (No)	5	133	Airport Authority of India								
		Social indi	icators								
Literacy rate (%)	70.6	74.0	Provisional Data – Census 2011								
Birth rate (per 1,000 population)	27.7	22.5	SRS Bulletin, 2009								
		Investn	nent								
FDI equity inflows (US\$ billion)	0.6*	132.9	Department of Industrial Policy & Promotion, April 2000 to April 2011								
Outstanding Investments (US\$ billion)	293.3	7449.3	CMIE (2009-10)								

Industrial Infrastructure											
PPP projects (No)	89	808	www.pppindiadatabase.com								
SEZs (No)	5	380	Notified as of October 2011, www.sezindia.nic.in								

\*In Indian Rupee Terms

^Includes Chhattisgarh

•PPP: Public Private Partnership, SEZ: Special Economic Zone, SRS: Sample Registration System Source: IBEF-India Brand Equity Foundation-November,2011



Figure-6.1: Installed Power Capacity (MW)

Source: 1. Economic Survey 2010-11, Central Electricity Authority, as of March 20.	11
Source: 2 .IBEF – India Brand Equity Foundation –November, 2011.	

#### Table-7.1: Infrastructure of Districts of Madhya Pradesh

Sl	District / Infrastructure Variables	Motorable Road Length)	Total Road Length	% Villages Electrified	Credit Deposit Ratio (%)	Number of Banks	Number of High schools	Number of Degree and Eng. Colleges	Number of Post offices
1	Alirajpur	130	130	0.8921389	20.79%	20	NA	2	0
2	Anuppur	13009	13009	0.2228164	28.93%	38	24	5	111
3	Ashoknagar	2525.97	2574.97	1	61.13%	42	71	16	11
4	Balaghat	6689.5	9778.5	0.5330739	39.26%	87	270	7	320
5	Barwani	1006.17	1013.23	0.838256	82.19%	63	129	6	92
6	Betul	452.6	452.6	0.6790767	34.57%	84	323	12	219
7	Bhind	1319	1359	1	35.52%	62	271	18	50
8	Bhopal	2399.27	3429.27	0.0605469	52.58%	313	575	108	140
9	Burhanpur	265	265	0.5622642	80.40%	40	79	1	0
10	Chhattarpur	1376.21	1388.41	0.9112754	35.43%	80	260	14	226
11	Chhindwara	210	21443	0.8499475	42.61%	123	339	13	271
12	Damoh	987.8	1090.3	0.8	50.91%	63	126	5	161
13	Datia	410	440	0.4180887	61.86%	44	76	4	56
14	Dewas	1026	1727	0.9010368	80.68%	98	10	0	172
15	Dhar	640	870	0.8784793	56.38%	129	226	8	0
16	Dindori	4172.78	4451.38	0.2439024	26.63%	29	24	5	81
17	Guna	2051.7	2288.53	0.9126984	71.16%	65	135	31	1
18	Gwalior	1025	1051	0.496732	46.09%	160	112	19	37
19	Harda	105.8	944.26	0.7017544	92.28%	39	67	5	0
20	Hoshangabad	116.7	323	0.5156082	73.38%	98	69	12	0
21	Indore	3797	4718	0.9904	111.90%	361	3440	64	169

22         Jabalpur         1981.59         2114.99         0.8658009         35.48%         215         167         44         65           23         Jhabua         275         295         0.9430524         36.15%         37         84         5         0           24         Katni         214         2089         0.4676339         45.64%         72         119         22         150           25         Khandwa         593.59         613.59         0.9378961         59.61%         72         116         3         230           26         Khargone         685         685         0.7612193         72.92%         87         213         100         168           27         Mandsaur         419.67         1228.77         0.384106         54.55%         68         212         13         100           29         Morena         388         468         0.9948849         81.45%         67         211         9         49           30         Narsimhapur         408.25         1144.65         0.9657795         69.24%         69         70         5         182           31         Neemuch         876.38         1542         <										
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	22	Jabalpur	1981.59	2114.99	0.8658009	35.48%	215	167	44	65
24         Katni         214         2089         0.4676339         45.64%         72         119         22         150           25         Khandwa         593.59         613.59         0.9378961         59.61%         72         116         3         230           26         Khargone         665         665         0.7612193         72.92%         87         213         10         168           27         Mandla         214         239         0.860676         26.18%         53         4499         6         13           28         Mandsaur         419.67         1228.77         0.384106         54.55%         68         212         13         100           29         Morena         388         468         0.9948849         81.46%         67         211         9         49           30         Narsimhapur         408.25         1144.65         0.9657795         69.24%         69         70         5         182           31         Neemuch         876.38         1542         0.3115727         47.34%         57         93         4         116           32         Panna         3423         4187         0.88905	23	Jhabua	275	295	0.9430524	36.15%	37	84	5	0
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	24	Katni	214	2089	0.4676339	45.64%	72	119	22	150
26Khargone685685 $0.7612193$ $72.92\%$ 87 $213$ 1016827Mandla214239 $0.860676$ $26.18\%$ 5349961328Mandsaur419.671228.77 $0.384106$ $54.55\%$ 682121310029Morena388468 $0.9948849$ $81.46\%$ 6721194930Narsimhapur408.251144.65 $0.9657795$ $69.24\%$ 6970518231Neemuch876.381542 $0.3115727$ $47.34\%$ 5793411632Panna34234187 $0.8890052$ $33.10\%$ 391211114233Raisen913.391273.19 $0.6449123$ $108.67\%$ 7462819634Rajgarh12701332 $0.9445438$ $89.53\%$ 801511216735Ratlam197.61523.24 $0.957265$ $57.12\%$ 89202610036Rewa929.121247.3 $0.731677$ 22.11%1381312233837Sagar17741800 $0.9484482$ $45.80\%$ 1383311523938Satna2179 $4442$ $0.9597502$ $38.17\%$ 138311716740Seoni3672.6885603.248 $0.7897727$ $40.43\%$ 67233723<	25	Khandwa	593.59	613.59	0.9378961	59.61%	72	116	3	230
27       Mandla       214       239       0.860676       26.18%       53       499       6       13         28       Mandsaur       419.67       1228.77       0.384106       54.55%       68       212       13       100         29       Morena       388       468       0.9948849       81.46%       67       211       9       49         30       Narsimhapur       408.25       1144.65       0.9657795       69.24%       69       70       5       182         31       Neemuch       876.38       1542       0.3115727       47.34%       57       93       4       116         32       Panna       3423       4187       0.889052       33.10%       39       121       111       142         33       Raisen       913.39       1273.19       0.6449123       108.67%       74       62       8       196         34       Rajgarh       1270       1332       0.9445438       89.53%       80       151       122       167         35       Ratlam       197.61       523.24       0.957165       57.12%       89       202       6       100         36       Rewa	26	Khargone	685	685	0.7612193	72.92%	87	213	10	168
28         Mandsaur         419.67         1228.77         0.384106         54.55%         68         212         13         100           29         Morena         388         468         0.9948849         81.46%         67         211         9         49           30         Narsimhapur         408.25         1144.65         0.9657795         69.24%         69         70         5         182           31         Neemuch         876.38         1542         0.3115727         47.34%         57         93         4         116           32         Panna         3423         4187         0.889052         33.10%         39         121         11         142           33         Raisen         913.39         1273.19         0.6449123         108.67%         74         62         8         196           34         Rajgarh         1270         1332         0.9445438         89.53%         80         151         122         167           35         Ratlam         197.61         523.24         0.957265         57.12%         89         202         6         100           36         Sagar         1774         1800 <td< td=""><td>27</td><td>Mandla</td><td>214</td><td>239</td><td>0.860676</td><td>26.18%</td><td>53</td><td>499</td><td>6</td><td>13</td></td<>	27	Mandla	214	239	0.860676	26.18%	53	499	6	13
29Morena3884680.994884981.46%6721194930Narsimhapur408.251144.650.965779569.24%69705518231Neemuch876.3815420.311572747.34%5793411632Panna342341870.889005233.10%391211114233Raisen913.391273.190.6449123108.67%7462819634Rajgarh127013320.944543889.53%801511216735Ratlam197.61523.240.95726557.12%89202610036Rewa929.121247.30.73167722.11%1381312233837Sagar177418000.948448245.80%1383311523938Satna217944420.959750238.17%1392171326339Sehore1041.1532107.1530.9205103107.81%83113716740Seoni3672.6885603.2480.789772740.43%67233723341Shahdol2801.483731.590.684981728.04%511631210442Shajapur16991864.350.739704102.80%8086749643Sheopur150 </td <td>28</td> <td>Mandsaur</td> <td>419.67</td> <td>1228.77</td> <td>0.384106</td> <td>54.55%</td> <td>68</td> <td>212</td> <td>13</td> <td>100</td>	28	Mandsaur	419.67	1228.77	0.384106	54.55%	68	212	13	100
30Narsimhapur408.251144.650.965779569.24%6970518231Neemuch876.3815420.311572747.34%5793411632Panna342341870.889005233.10%391211114233Raisen913.391273.190.6449123108.67%7462819634Rajgarh127013320.94454389.53%801511216735Ratlam197.61523.240.95726557.12%89202610036Rewa929.121247.30.73167722.11%1381312233837Sagar177418000.948448245.80%1383311523938Satna217944420.959750238.17%1392171326339Sehore1041.1532107.1530.9205103107.81%83113716740Seoni3672.6885603.2480.789772740.43%6723372341Shahdol2801.483731.590.684981728.04%511631210442Shajapur1501900.4307458.86%244882144Shivpuri1782.951853.450.506060642.33%70211621745Sidhi886 <td>29</td> <td>Morena</td> <td>388</td> <td>468</td> <td>0.9948849</td> <td>81.46%</td> <td>67</td> <td>211</td> <td>9</td> <td>49</td>	29	Morena	388	468	0.9948849	81.46%	67	211	9	49
31         Neemuch         876.38         1542         0.3115727         47.34%         57         93         4         116           32         Panna         3423         4187         0.8890052         33.10%         39         121         11         142           33         Raisen         913.39         1273.19         0.6449123         108.67%         74         62         8         196           34         Rajgarh         1270         1332         0.9445438         89.53%         80         151         12         167           35         Ratlam         197.61         523.24         0.957265         57.12%         89         202         6         100           36         Rewa         929.12         1247.3         0.731677         22.11%         138         131         22         338           37         Sagar         1774         1800         0.948482         45.80%         138         331         15         239           38         Satna         2179         4442         0.9597502         38.17%         139         217         13         263           39         Schore         1041.153         2107.153 <td< td=""><td>30</td><td>Narsimhapur</td><td>408.25</td><td>1144.65</td><td>0.9657795</td><td>69.24%</td><td>69</td><td>70</td><td>5</td><td>182</td></td<>	30	Narsimhapur	408.25	1144.65	0.9657795	69.24%	69	70	5	182
32Panna342341870.889005233.10%391211114233Raisen913.391273.190.6449123108.67%7462819634Rajgarh127013320.944543889.53%801511216735Ratlam197.61523.240.95726557.12%89202610036Rewa929.121247.30.73167722.11%1381312233837Sagar177418000.948448245.80%1383311523938Satna217944420.959750238.17%1392171326339Sehore1041.1532107.1530.9205103107.81%83113716740Seoni3672.6885603.2480.789772740.43%6723372341Shahdol2801.483731.590.684981728.04%511631210442Shajapur16991864.350.7397004102.80%8086749643Sheopur1501900.4307458.86%244882144Shivpuri1782.951853.450.50660642.33%70211621745Sidhi88611750.672401920.39%48152613244Shivpuri1732.25<	31	Neemuch	876.38	1542	0.3115727	47.34%	57	93	4	116
33Raisen913.391273.190.6449123108.67%7462819634Rajgarh127013320.944543889.53%801511216735Ratlam197.61523.240.95726557.12%89202610036Rewa929.121247.30.73167722.11%1381312233837Sagar177418000.948448245.80%1383311523938Satna217944420.959750238.17%1392171326339Sehore1041.1532107.1530.9205103107.81%83113716740Seoni3672.6885603.2480.78972740.43%6723372341Shahdol2801.483731.590.684981728.04%511631210442Shajapur16991864.350.7397004102.80%8086749643Sheopur1501900.4307458.86%244882144Shivpuri1782.951853.450.50606642.33%70211621745Sidhi88611750.672401920.39%48152613246Singrauli1223.252715.710.75335127.86%505972147Tikamgarh1333.4<	32	Panna	3423	4187	0.8890052	33.10%	39	121	11	142
34Rajgarh127013320.944543889.53%801511216735Ratlam197.61523.240.95726557.12%89202610036Rewa929.121247.30.73167722.11%1381312233837Sagar177418000.948448245.80%1383311523938Satna217944420.959750238.17%1392171326339Sehore1041.1532107.1530.9205103107.81%83113716740Seoni3672.6885603.2480.789772740.43%6723372341Shahdol2801.483731.590.684981728.04%511631210442Shajapur16991864.350.7397004102.80%8086749643Sheopur1501900.4307458.86%244882144Shivpuri1782.951853.450.506060642.33%70211621745Sidhi88611750.672401920.39%48152613246Singrauli1223.252715.710.75335127.86%505972147Tikamgarh133.41457.80.709826630.20%621326148Ujjain1370	33	Raisen	913.39	1273.19	0.6449123	108.67%	74	62	8	196
35Ratlam197.61523.240.95726557.12%89202610036Rewa929.121247.30.73167722.11%1381312233837Sagar177418000.948448245.80%1383311523938Satna217944420.959750238.17%1392171326339Sehore1041.1532107.1530.9205103107.81%83113716740Seoni3672.6885603.2480.78972740.43%6723372341Shahdol2801.483731.590.684981728.04%511631210442Shajapur16991864.350.7397004102.80%8086749643Sheopur1501900.4307458.86%244882144Shivpuri1782.951853.450.50606642.33%70211621745Sidhi88611750.672401920.39%48152613246Singrauli1223.252715.710.75335127.86%505972147Tikamgarh133.41457.80.709826630.20%621326148Ujjain13701556.940.802919762.88%1411481824749Umaria867	34	Rajgarh	1270	1332	0.9445438	89.53%	80	151	12	167
36Rewa929.121247.30.73167722.11%1381312233837Sagar177418000.948448245.80%1383311523938Satna217944420.959750238.17%1392171326339Sehore1041.1532107.1530.9205103107.81%831113716740Seoni3672.6885603.2480.789772740.43%6723372341Shahdol2801.483731.590.684981728.04%511631210442Shajapur16991864.350.7397004102.80%8086749643Sheopur1501900.4307458.86%244882144Shivpuri1782.951853.450.506060642.33%70211621745Sidhi88611750.672401920.39%48152613246Singrauli1223.252715.710.75335127.86%505972147Tikamgarh133.41457.80.709826630.20%621326148Ujjain13701556.940.802919762.88%1411481824749Umaria86719220.086587419.17%287536550Vidisha2337.71 <td>35</td> <td>Ratlam</td> <td>197.61</td> <td>523.24</td> <td>0.957265</td> <td>57.12%</td> <td>89</td> <td>202</td> <td>6</td> <td>100</td>	35	Ratlam	197.61	523.24	0.957265	57.12%	89	202	6	100
37Sagar177418000.948448245.80%1383311523938Satna217944420.959750238.17%1392171326339Sehore1041.1532107.1530.9205103107.81%83113716740Seoni3672.6885603.2480.789772740.43%6723372341Shahdol2801.483731.590.684981728.04%511631210442Shajapur16991864.350.7397004102.80%8086749643Sheopur1501900.4307458.86%244882144Shivpuri1782.951853.450.50606642.33%70211621745Sidhi88611750.672401920.39%48152613246Singrauli1223.252715.710.75335127.86%505972147Tikamgarh133.41457.80.709826630.20%621326148Ujjain13701556.940.802919762.88%1411481824749Umaria86719220.086587419.17%287536550Vidisha2337.713618.630.954966182.04%7914129159	36	Rewa	929.12	1247.3	0.731677	22.11%	138	131	22	338
38Satna217944420.959750238.17%1392171326339Sehore1041.1532107.1530.9205103107.81%83113716740Seoni3672.6885603.2480.789772740.43%6723372341Shahdol2801.483731.590.684981728.04%511631210442Shajapur16991864.350.7397004102.80%8086749643Sheopur1501900.4307458.86%244882144Shivpuri1782.951853.450.506060642.33%70211621745Sidhi88611750.672401920.39%48152613246Singrauli1223.252715.710.75335127.86%505972147Tikamgarh133.41457.80.709826630.20%621326148Ujjain13701556.940.802919762.88%1411481824749Umaria86719220.086587419.17%287536550Vidisha2337.713618.630.954966182.04%7914129159	37	Sagar	1774	1800	0.9484482	45.80%	138	331	15	239
39Sehore1041.1532107.1530.9205103107.81%83113716740Seoni3672.6885603.2480.789772740.43%6723372341Shahdol2801.483731.590.684981728.04%511631210442Shajapur16991864.350.7397004102.80%8086749643Sheopur1501900.4307458.86%244882144Shivpuri1782.951853.450.506060642.33%70211621745Sidhi88611750.672401920.39%48152613246Singrauli1223.252715.710.75335127.86%505972147Tikamgarh133.41457.80.709826630.20%621326148Ujjain13701556.940.802919762.88%1411481824749Umaria86719220.086587419.17%287536550Vidisha2337.713618.630.954966182.04%7914129159	38	Satna	2179	4442	0.9597502	38.17%	139	217	13	263
40Seoni3672.6885603.2480.789772740.43%6723372341Shahdol2801.483731.590.684981728.04%511631210442Shajapur16991864.350.7397004102.80%8086749643Sheopur1501900.4307458.86%2448882144Shivpuri1782.951853.450.506060642.33%70211621745Sidhi88611750.672401920.39%48152613246Singrauli1223.252715.710.75335127.86%505972147Tikamgarh1333.41457.80.709826630.20%621326148Ujjain13701556.940.802919762.88%1411481824749Umaria86719220.086587419.17%287536550Vidisha2337.713618.630.954966182.04%7914129159	39	Sehore	1041.153	2107.153	0.9205103	107.81%	83	113	7	167
41Shahdol2801.483731.590.684981728.04%511631210442Shajapur16991864.350.7397004102.80%8086749643Sheopur1501900.4307458.86%244882144Shivpuri1782.951853.450.506060642.33%70211621745Sidhi88611750.672401920.39%48152613246Singrauli1223.252715.710.75335127.86%505972147Tikamgarh1333.41457.80.709826630.20%621326148Ujjain13701556.940.802919762.88%1411481824749Umaria86719220.086587419.17%287536550Vidisha2337.713618.630.954966182.04%7914129159	40	Seoni	3672.688	5603.248	0.7897727	40.43%	67	233	7	23
42Shajapur16991864.350.7397004102.80%8086749643Sheopur1501900.4307458.86%244882144Shivpuri1782.951853.450.50606642.33%70211621745Sidhi88611750.672401920.39%48152613246Singrauli1223.252715.710.75335127.86%505972147Tikamgarh1333.41457.80.709826630.20%621326148Ujjain13701556.940.802919762.88%1411481824749Umaria86719220.086587419.17%287536550Vidisha2337.713618.630.954966182.04%7914129159	41	Shahdol	2801.48	3731.59	0.6849817	28.04%	51	163	12	104
43Sheopur1501900.4307458.86%244882144Shivpuri1782.951853.450.506060642.33%70211621745Sidhi88611750.672401920.39%48152613246Singrauli1223.252715.710.75335127.86%505972147Tikamgarh1333.41457.80.709826630.20%621326148Ujjain13701556.940.802919762.88%1411481824749Umaria86719220.086587419.17%287536550Vidisha2337.713618.630.954966182.04%7914129159	42	Shajapur	1699	1864.35	0.7397004	102.80%	80	86	7	496
44Shivpuri1782.951853.450.506060642.33%70211621745Sidhi88611750.672401920.39%48152613246Singrauli1223.252715.710.75335127.86%505972147Tikamgarh1333.41457.80.709826630.20%621326148Ujjain13701556.940.802919762.88%1411481824749Umaria86719220.086587419.17%287536550Vidisha2337.713618.630.954966182.04%7914129159	43	Sheopur	150	190	0.43074	58.86%	24	48	8	21
45Sidhi88611750.672401920.39%48152613246Singrauli1223.252715.710.75335127.86%505972147Tikamgarh1333.41457.80.709826630.20%621326148Ujjain13701556.940.802919762.88%1411481824749Umaria86719220.086587419.17%287536550Vidisha2337.713618.630.954966182.04%7914129159	44	Shivpuri	1782.95	1853.45	0.5060606	42.33%	70	211	6	217
46Singrauli1223.252715.710.75335127.86%505972147Tikamgarh1333.41457.80.709826630.20%621326148Ujjain13701556.940.802919762.88%1411481824749Umaria86719220.086587419.17%287536550Vidisha2337.713618.630.954966182.04%7914129159	45	Sidhi	886	1175	0.6724019	20.39%	48	152	6	132
47Tikamgarh1333.41457.80.709826630.20%621326148Ujjain13701556.940.802919762.88%1411481824749Umaria86719220.086587419.17%287536550Vidisha2337.713618.630.954966182.04%7914129159	46	Singrauli	1223.25	2715.71	0.7533512	7.86%	50	59	7	21
48Ujjain13701556.940.802919762.88%1411481824749Umaria86719220.086587419.17%287536550Vidisha2337.713618.630.954966182.04%7914129159	47	Tikamgarh	1333.4	1457.8	0.7098266	30.20%	62	132	6	1
49Umaria86719220.086587419.17%287536550Vidisha2337.713618.630.954966182.04%7914129159	48	Ujjain	1370	1556.94	0.8029197	62.88%	141	148	18	247
50         Vidisha         2337.71         3618.63         0.9549661         82.04%         79         141         29         159	49	Umaria	867	1922	0.0865874	19.17%	28	75	3	65
	50	Vidisha	2337.71	3618.63	0.9549661	82.04%	79	141	29	159

Source 1 : MSME, Industrial Profile of Districts,2011-12 Source 2: M.P. State Electricity Board, March 2011 Source 3: RBI Database, 2013. Source 4 : DTIC, Respective Districts, 2011-12

Table-8.1: Indicators of Trade Infrastructural Index for Madhya Pradesh

Set 1: Phy	sical Infrastructural Factors								
1	Motorable Road Length (per 1000 km.)								
2	Total Road Length (per 1000 km.)								
3	Capacity of Warehouse per Registered Enterprise								
4	% Villages Electrified								
Set 2: Fise	eal Infrastructural Factors								
5	Credit Deposit Ratio (in %)								
6	Average population per bank								
7	No. of Banks per Registered Enterprise								
Set 3: Ind	Set 3: Industrial Infrastructural Factors								
8	Investment per Registered Enterprise								
9	Employment per Registered Enterprise								
10	Industrial Consumption of Electricity (In %)								
Set 4: Agi	iculture related Infrastructural Factors								
11	% of Net Irrigated Area								
12	Fertilizer Consumption								
13	Average Yield of Important Crops								
Set 5: Soc	ial Infrastructural Factors								
14	Net District Domestic Product at Current Prices								

15	Number of High schools per 1000 Population
16	Number of Colleges per 1000 Population
17	Number of Post offices per 1000 Population

# Table 8.2 Indicators of Trade Infrastructure Index of Madhya Pradesh (District wise absolute Values)

District/ Infrastructure Variables	I	Phy nfrasti Fac	sical ructura tors	al	Infr	Fiscal astruct Factor	cural s	I	Indu nfrast Fac	istrial ructura ctors	al	Agricu relat Infrastru Facto	ilture ed ictural ors	I	Social Infrastructura Factors		
	Length (per 1000 km)	Total Road Length (per 1000 km)	Capacity of Warehouse per Regd Enterprise	% Villages Electrified	Credit Deposit Ratio (%)	Average population per bank	No. of Banks per Regd Enterprise	Investment per Regd Enterprise	Employment per Regd Enterprise	Industrial Consumption of Electricity (%)	% of Net Irrigated Area	Fertilizer Consumption	Average Yield of Important Crops	Net District Domestic Product at Current Prices	Number of High schools per 1000 Population	Number of Colleges per 1000 Population	Number of Post offices per 1000 Population
Alirajpur	0.13	0.13	57	0.89	0.21	36450	0.09	594	2.6	0.38	0.15	9190	984	13362	0.00	0.00	0.00
Anuppur	13.01	13.01	6	0.22	0.29	19717	0.04	1495	2.2	0.43	0.03	2739	502	65150	0.03	0.01	0.15
Ashoknagar	2.53	2.57	286	1.00	0.61	20121	0.07	679	2.1	0.11	0.50	11901	1155	42917	0.08	0.02	0.01
Balaghat	6.69	9.78	12	0.53	0.39	19560	0.01	9209	2.7	0.23	0.49	30460	1436	506731	0.16	0.00	0.19
Barwani	1.01	1.01	20	0.84	0.82	21998	0.03	3914	2.4	0.30	0.44	45800	993	356427	0.09	0.00	0.07
Betul	0.45	0.45	26	0.68	0.35	18754	0.01	4303	2.3	0.61	0.30	36946	1069	524508	0.21	0.01	0.14
Bhind	1.32	1.36	16	1.00	0.36	27468	0.01	3134	2.2	0.30	0.45	31037	1580	418840	0.16	0.01	0.03
Bhopal	2.40	3.43	21	0.06	0.53	7575	0.03	18254	3.1	0.44	0.63	33237	1142	1742607	0.24	0.05	0.06

Burhanpur	0.27	0.27	112	0.56	0.80	18946	0.05	2795	3.2	0.63	0.41	34483	1342	52704	0.10	0.00	0.00
Chhattarpur	1.38	1.39	30	0.91	0.35	22030	0.01	8504	2.1	0.12	0.55	30646	812	507888	0.15	0.01	0.13
Chhindwara	0.21	21.44	23	0.85	0.43	16999	0.01	11448	2.1	0.31	0.38	50369	2084	933481	0.16	0.01	0.13
Damoh	0.99	1.09	25	0.80	0.51	20067	0.01	2090	1.7	0.55	0.33	17648	1340	395250	0.10	0.00	0.13
Datia	0.41	0.44	37	0.42	0.62	17881	0.01	1310	2.1	0.34	0.88	23996	1264	250645	0.10	0.01	0.07
Dewas	1.03	1.73	52	06.0	0.81	15956	0.01	9141	2.0	0.64	0.66	72526	1263	577045	0.00	0.00	0.11
Dhar	0.64	0.87	31	0.88	0.56	16944	0.02	14324	3.2	0.49	0.62	98527	1409	715426	0.10	0.00	0.00
Dindori	4.17	4.45	S	0.24	0.27	24294	0.02	476	2.1	0.29	0.01	1952	510	127689	0.03	0.01	0.11
Guna	2.05	2.29	17	0.91	0.71	19100	0.01	3981	2.3	0.48	0.53	22887	1459	626871	0.11	0.02	0.00
Gwalior	1.03	1.05	41	0.50	0.46	12700	0.01	68099	2.7	0.55	0.64	51414	2255	1086455	0.06	0.01	0.02
Harda	0.11	0.94	161	0.70	0.92	14627	0.02	1224	1.9	0.54	0.92	49682	2511	246184	0.12	0.01	0.00
Hoshangabad	0.12	0.32	112	0.52	0.73	12667	0.01	6197	2.5	0.55	0.97	87128	2045	594914	0.06	0.01	0.00
Indore	3.80	4.72	37	0.99	1.12	7706	0.03	37931	4.0	0.41	0.71	83534	1353	2808664	1.05	0.02	0.05
Jabalpur	1.98	2.11	43	0.87	0.35	11457	0.01	12838	2.8	0.25	0.54	48817	1510	1560931	0.07	0.02	0.03

Jhabua	0.28	0.30	3	0.94	0.36	27704	0.01	4308	2.4	0.69	0.28	20782	967	415058	0.08	0.00	0.00
Katni	0.21	2.09	116	0.47	0.46	17945	0.02	9150	3.0	0.53	0.45	21847	691	468209	0.09	0.02	0.12
Khandwa	0.59	0.61	36	0.94	0.60	18195	0.01	6355	2.2	0.28	0.56	50633	1177	590933	0.09	0.00	0.18
Khargone	0.69	0.69	11	0.76	0.73	21529	0.00	19754	3.0	0.50	0.39	90029	1267	568124	0.11	0.01	0.09
Mandla	0.21	0.24	33	0.86	0.26	19904	0.02	3573	2.4	60.0	0.13	9356	781	282095	0.47	0.01	0.01
Mandsaur	0.42	1.23	16	0.38	0.55	19712	0.01	2306	1.4	0.46	0.58	53646	1398	560749	0.16	0.01	0.07
Morena	0.39	0.47	29	0.99	0.81	29343	0.01	8325	2.5	0.67	0.72	42020	1916	526786	0.11	0.00	0.02
Narsimhapur	0.41	1.14	30	0.97	0.69	15824	0.01	6182	2.3	0.53	0.64	28902	2087	338545	0.06	0.00	0.17
Neemuch	0.88	1.54	28	0.31	0.47	14492	0.01	4738	2.1	0.41	0.58	35598	1270	335447	0.11	0.00	0.14
Panna	3.42	4.19	17	0.89	0.33	26065	0.01	1433	2.4	0.50	0.47	12434	1007	280388	0.12	0.01	0.14
Raisen	0.91	1.27	129	0.64	1.09	17995	0.02	4286	2.9	0.82	0.65	51973	1112	442728	0.05	0.01	0.15
Rajgarh	1.27	1.33	31	0.94	06.0	19323	0.01	4039	2.5	0.43	0.67	59639	1011	452193	0.10	0.01	0.11
Ratlam	0.20	0.52	34	0.96	0.57	16349	0.01	9437	2.2	0.50	0.53	74803	1677	610499	0.14	0.00	0.07
Rewa	0.93	1.25	20	0.73	0.22	17138	0.02	8609	2.6	0.23	0.29	27098	711	601350	0.06	0.01	0.14
Sagar	1.77	1.80	21	0.95	0.46	17235	0.01	5445	2.4	0.53	0.51	32963	854	797224	0.14	0.01	0.10
Satna	2.18	4.44	17	0.96	0.38	16036	0.01	15229	2.6	0.79	0.43	36331	554	703021	0.10	0.01	0.12

Sehore	1.04	2.11	75	0.92	1.08	15799	0.01	2441	2.9	0.49	0.77	67934	1180	419423	0.09	0.01	0.13
Seoni	3.67	5.60	61	0.79	0.40	20584	0.01	2619	1.9	0.37	0.36	25344	1646	406523	0.17	0.01	0.02
Shahdol	2.80	3.73	4	0.68	0.28	20903	0.01	3276	2.1	0.43	0.16	7537	717	597603	0.15	0.01	0.10
Shajapur	1.70	1.86	25	0.74	1.03	18909	0.01	4237	2.4	0.80	0.58	58932	1138	493721	0.06	0.00	0.33
Sheopur	0.15	0.19	50	0.43	0.59	28661	0.02	383	2.1	0.08	0.74	20887	1961	197768	0.07	0.01	0.03
Shivpuri	1.78	1.85	27	0.51	0.42	24658	0.01	6259	2.2	0.19	0.57	34353	1436	499567	0.12	0.00	0.13
Sidhi	0.89	1.18	4	0.67	0.20	23480	0.00	6042	2.3	0.23	0.24	7604	614	922036	0.13	0.01	0.12
Singrauli	1.22	2.72	65	0.75	0.08	23565	0.17	614	2.7	0.23	0.17	4723	888	26905	0.05	0.01	0.02
Tikamgarh	1.33	1.46	9	0.71	0.30	23309	0.01	1951	2.0	0.29	0.75	19683	804	379147	0.09	0.00	0.00
Ujjain	1.37	1.56	38	0.80	0.63	14091	0.01	11054	2.5	0.57	0.61	81452	1284	979467	0.07	0.01	0.12
Umaria	0.87	1.92	11	0.09	0.19	23027	0.01	2504	2.7	0.50	0.25	4609	609	156631	0.12	0.00	0.10
Vidisha	2.34	3.62	71	0.95	0.82	18467	0.01	8163	2.1	0.35	0.58	35955	1261	472032	0.10	0.02	0.11
	1.59	2.52	44	0.72	0.54	19493	0.02	7693	2.42	0.43	0.50	37840	1241	553577	0.13	0.01	0.08
	2.09	3.60	49	0.25	0.26	5259	0.03	10849	0.44	0.18	0.22	24986	472	469859	0.15	0.01	0.07

# Table-8.3: Weightage for the Infrastructure Indicators

S. No	Indicators	Weightage (W <sub>j</sub> ) (in %)								
	Set 1: Physical Infrastructural Factors									
1	Motorable Road Length per 1000kms	5								
2	Total Road Length (per 1000 km.)	5								
3	Capacity of Warehouse per Registered Enterprise	5								
4	% Villages Electrified	5								
	Set 2: Fiscal Infrastructural Factors									
5	Credit Deposit Ratio (in %)	10								

6	Average population per bank	10								
7	No. of Banks per Registered Enterprise	10								
Set 3: Industrial Infrastructural Factors										
8	Investment per Registered Enterprise	10								
9	9 Employment per Registered Enterprise 10									
10	10									
Set 4: Agriculture related Infrastructural Factors										
11	11% of Net Irrigated Area3.33									
12	Fertilizer Consumption	3.33								
13	Average Yield of Important Crops	3.33								
	Set 5: Social Infrastructural Factors									
14	Net District Domestic Product at Current Prices	2.5								
15Number of High schools per 1000 Population2.5										
16	Number of Colleges per 1000 Population	2.5								
17	Number of Post offices per 1000 Population	2.5								

## Table-8.4: Indicators of Trade Infrastructure Index of Madhya Pradesh (District wise Normalized Variables)

		Phy	sical In Fac	frastruct tors	ural	Fiscal Infrastructural Factors			Industrial Infrastructural Factors			Agric Inf	culture r rastructu Factors	elated ıral	Social Infrastructural Factors				
SI. No.	District (j) /Infrastructure Variables (X <sub>a</sub> )	Motorable Road Length (per 1000 km)	Total Road Length (per 1000 km)	Capacity of Warehouse per Regd Enterprise	% Villages Electrified	Credit Deposit Ratio (%)	Average population per bank	No. of Banks per Regd Enterprise	Investment per Regd Enterprise	Employment per Regd Enterprise	Industrial Consumption of Electricity (%)	% of Net Irrigated Area	Fertilizer Consumption	Average Yield of Important Crops	Net District Domestic Product at Current Prices	No. of High schools per 1000 Population	No. of Colleges per 1000 Population	No. of Post offices per 1000 Population	
1	Alirajpur	-0.70	-0.66	0.28	0.68	-1.29	3.22	2.57	-0.65	0.42	-0.26	-1.57	-1.15	-0.54	-1.15	-0.85	-0.77	-1.27	
2	Anuppur	5.47	2.92	-0.77	-1.98	-0.98	0.04	0.95	-0.57	-0.52	0.00	-2.13	-1.40	-1.57	-1.04	-0.63	-0.25	0.95	
3	Ashoknagar	0.45	0.02	4.93	1.11	0.27	0.12	1.79	-0.65	-0.62	-1.77	0.03	-1.04	-0.18	-1.09	-0.29	1.40	-1.07	
4	Balaghat	2.44	2.02	-0.64	-0.75	-0.58	0.01	-0.39	0.14	0.55	-1.11	-0.01	-0.30	0.41	-0.10	0.21	-0.59	1.54	
5	Barwani	-0.28	-0.42	-0.48	0.47	1.08	0.48	0.37	-0.35	0.06	-0.70	-0.28	0.32	-0.52	-0.42	-0.23	-0.56	-0.28	
6	Betul	-0.55	-0.57	-0.35	-0.17	-0.76	-0.14	-0.38	-0.31	-0.29	66.0	-0.91	-0.04	-0.36	-0.06	0.51	-0.12	0.81	
7	Bhind	-0.13	-0.32	-0.56	1.11	-0.72	1.52	-0.47	-0.42	-0.61	-0.72	-0.22	-0.27	0.72	-0.29	0.21	0.28	-0.83	

8	Bhopal	0.39	0.25	-0.45	-2.63	-0.06	-2.27	0.36	0.97	1.63	0.05	0.60	-0.18	-0.21	2.53	0.76	4.97	-0.39
9	Burhanpur	-0.64	-0.63	1.39	-0.63	1.01	-0.10	1.22	-0.45	1.77	1.13	-0.38	-0.13	0.21	-1.07	-0.16	-0.96	-1.27
10	Chhattarpur	-0.10	-0.31	-0.27	0.76	-0.72	0.48	-0.30	0.07	-0.64	-1.67	0.27	-0.29	-0.91	-0.10	0.13	-0.08	0.65
11	Chhindwara	-0.66	5.26	-0.43	0.51	-0.45	-0.47	-0.32	0.35	-0.76	-0.63	-0.54	0.50	1.79	0.81	0.23	-0.31	0.67
12	Damoh	-0.29	-0.40	-0.39	0.32	-0.13	0.11	-0.40	-0.52	-1.55	0.68	-0.76	-0.81	0.21	-0.34	-0.19	-0.61	0.64
13	Datia	-0.57	-0.58	-0.13	-1.20	0.30	-0.31	-0.29	-0.59	-0.72	-0.51	1.76	-0.55	0.05	-0.64	-0.21	-0.46	-0.20
14	Dewas	-0.27	-0.22	0.17	0.72	1.02	-0.67	-0.32	0.13	-1.00	1.19	0.74	1.39	0.05	0.05	-0.85	-1.14	0.38
15	Dhar	-0.46	-0.46	-0.26	0.63	0.08	-0.48	-0.05	0.61	1.75	0.34	0.58	2.43	0.36	0.34	-0.16	-0.65	-1.27
16	Dindori	1.24	0.54	-0.78	-1.90	-1.06	0.91	-0.03	-0.67	-0.81	-0.78	-2.23	-1.44	-1.55	-0.91	-0.62	-0.19	0.45
17	Guna	0.22	-0.06	-0.54	0.76	0.65	-0.07	-0.45	-0.34	-0.34	0.29	0.16	-0.60	0.46	0.16	-0.13	2.21	-1.26
18	Gwalior	-0.27	-0.41	-0.05	-0.89	-0.31	-1.29	-0.32	5.57	0.63	0.66	0.65	0.54	2.15	1.13	-0.48	0.11	-1.00
19	Harda	-0.71	-0.44	2.38	-0.07	1.47	-0.93	-0.09	-0.60	-1.08	0.60	1.94	0.47	2.69	-0.65	-0.07	0.03	-1.27
20	Hoshangabad	-0.71	-0.61	1.40	-0.82	0.74	-1.30	-0.33	-0.14	0.17	0.66	2.18	1.97	1.70	0.09	-0.48	0.16	-1.27
21	Indore	1.06	0.61	-0.13	1.07	2.23	-1.98	0.26	2.79	3.60	-0.10	0.96	1.83	0.24	4.80	6.12	1.48	-0.50
22	Jabalpur	0.19	-0.11	-0.01	0.58	-0.72	-1.53	-0.30	0.47	0.80	-1.00	0.19	0.44	0.57	2.14	-0.40	1.26	-0.87
23	Jhabua	-0.63	-0.62	-0.83	0.89	-0.70	1.56	-0.52	-0.31	-0.10	1.44	-0.98	-0.68	-0.58	-0.29	-0.30	-0.49	-1.27
24	Katni	-0.66	-0.12	1.48	-1.01	-0.33	-0.29	0.21	0.13	1.20	0.54	-0.22	-0.64	-1.17	-0.18	-0.24	1.14	0.47
25	Khandwa	-0.48	-0.53	-0.16	0.86	0.21	-0.25	-0.40	-0.12	-0.41	-0.84	0.31	0.51	-0.14	0.08	-0.26	-0.83	1.36
26	Khargone	-0.43	-0.51	-0.67	0.16	0.72	0.39	-0.53	1.11	1.35	0.42	-0.49	2.09	0.05	0.03	-0.09	-0.43	0.07
27	Mandla	-0.66	-0.63	-0.21	0.56	-1.08	0.08	0.00	-0.38	-0.05	-1.88	-1.68	-1.14	-0.98	-0.58	2.29	-0.38	-1.08
28	Mandsaur	-0.56	-0.36	-0.56	-1.34	0.01	0.04	-0.46	-0.50	-2.36	0.19	0.40	0.63	0.33	0.02	0.20	0.16	-0.15
29	Morena	-0.58	-0.57	-0.30	1.09	1.05	1.87	-0.52	0.06	0.12	1.32	1.02	0.17	1.43	-0.06	-0.13	-0.53	-0.90

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30	Narsimhapur	-0.57	-0.38	-0.28	0.98	0.58	-0.70	-0.43	-0.14	-0.36	0.55	0.67	-0.36	1.79	-0.46	-0.42	-0.53	1.22
31	Neemuch	-0.34	-0.27	-0.33	-1.63	-0.27	-0.95	-0.27	-0.27	-0.66	-0.10	0.39	-0.09	0.06	-0.46	-0.10	-0.49	0.83
32	Panna	0.88	0.46	-0.55	0.67	-0.81	1.25	-0.17	-0.58	0.00	0.38	-0.13	-1.02	-0.50	-0.58	-0.06	0.31	0.82
33	Raisen	-0.33	-0.35	1.73	-0.30	2.10	-0.28	-0.08	-0.31	66.0	2.14	0.72	0.57	-0.27	-0.24	-0.54	-0.34	0.93
34	Rajgarh	-0.15	-0.33	-0.25	0.89	1.36	-0.03	-0.38	-0.34	0.20	0.03	0.80	0.87	-0.49	-0.22	-0.20	-0.10	0.35
35	Ratlam	-0.67	-0.55	-0.19	0.94	0.11	-0.60	-0.31	0.16	-0.57	0.40	0.18	1.48	0.92	0.12	0.07	-0.59	-0.24
36	Rewa	-0.32	-0.35	-0.48	0.04	-1.24	-0.45	-0.10	0.08	0.39	-1.12	-0.93	-0.43	-1.12	0.10	-0.48	0.11	0.87
37	Sagar	0.09	-0.20	-0.46	0.91	-0.32	-0.43	-0.31	-0.21	-0.06	0.56	0.07	-0.20	-0.82	0.52	0.08	-0.30	0.23
38	Satna	0.28	0.54	-0.53	0.95	-0.62	-0.66	-0.31	0.69	0.34	1.99	-0.29	-0.06	-1.46	0.32	-0.20	-0.36	0.50
39	Sehore	-0.26	-0.11	0.65	0.80	2.07	-0.70	-0.26	-0.48	1.17	0.33	1.24	1.20	-0.13	-0.29	-0.28	-0.43	0.64
40	Seoni	1.00	0.86	0.35	0.28	-0.53	0.21	-0.39	-0.47	-1.17	-0.34	-0.64	-0.50	0.86	-0.31	0.27	-0.46	-1.02
41	Shahdol	0.58	0.34	-0.80	-0.14	-1.01	0.27	-0.47	-0.41	-0.69	0.00	-1.53	-1.21	-1.11	0.09	0.17	0.37	0.19
42	Shajapur	0.05	-0.18	-0.37	0.08	1.87	-0.11	-0.47	-0.32	-0.09	2.03	0.37	0.84	-0.22	-0.13	-0.47	-0.52	3.63
43	Sheopur	-0.69	-0.65	0.14	-1.15	0.18	1.74	-0.12	-0.67	-0.78	-1.89	1.13	-0.68	1.53	-0.76	-0.38	0.42	-0.81
44	Shivpuri	0.09	-0.18	-0.34	-0.85	-0.46	0.98	-0.45	-0.13	-0.43	-1.34	0.36	-0.14	0.41	-0.11	-0.04	-0.68	0.61
45	Sidhi	-0.34	-0.37	-0.81	-0.19	-1.30	0.76	-0.54	-0.15	-0.27	-1.09	-1.18	-1.21	-1.33	0.78	0.05	-0.43	0.48
46	Singrauli	-0.18	0.06	0.43	0.13	-1.79	0.77	5.59	-0.65	0.70	-1.09	-1.51	-1.33	-0.75	-1.12	-0.52	-0.34	-1.00
47	Tikamgarh	-0.12	-0.29	-0.76	-0.04	-0.93	0.73	-0.46	-0.53	-0.89	-0.76	1.16	-0.73	-0.93	-0.37	-0.24	-0.58	-1.26
48	Ujjain	-0.11	-0.27	-0.10	0.33	0.33	-1.03	-0.28	0.31	0.13	0.77	0.50	1.75	0.09	0.91	-0.35	0.07	0.59
49	Umaria	-0.35	-0.16	-0.66	-2.52	-1.35	0.67	-0.27	-0.48	0.67	0.38	-1.15	-1.33	-1.34	-0.84	-0.08	-0.52	0.24
50	Vidisha	0.36	0.31	0.56	0.93	1.07	-0.20	-0.37	0.04	-0.82	-0.40	0.39	-0.08	0.04	-0.17	-0.21	1.53	0.36
V	Weight (W <sub>j</sub> )	5	5	5	5	10	10	10	10	10	10	3.33	3.33	3.33	2.5	2.5	2.5	2.5

Sl. No	Districts	Index	Sl. No	Districts	Index
1	Indore	120.8	26	Barwani	0.4
2	Raisen	52.2	27	Narsimhapur	0.3
3	Gwalior	51.8	28	Anuppur	-2.0
4	Morena	42.0	29	Ratlam	-3.3
5	Shajapur	36.7	30	Jhabua	-5.5
6	Burhanpur	33.7	31	Sagar	-7.8
7	Sehore	33.3	32	Jabalpur	-10.2
8	Khargone	31.9	33	Bhind	-14.5
9	Dhar	26.6	34	Khandwa	-16.5
10	Singrauli	18.2	35	Betul	-18.5
11	Ashoknagar	17.3	36	Seoni	-19.3
12	Alirajpur	17.2	37	Shivpuri	-23.2
13	Satna	15.2	38	Sheopur	-24.4
14	Bhopal	15.1	39	Damoh	-27.6
15	Rajgarh	12.8	40	Chhattarpur	-29.0
16	Ujjain	12.5	41	Datia	-33.1
17	Harda	11.7	42	Shahdol	-34.1
18	Hoshangabad	10.1	43	Rewa	-36.6
19	Chhindwara	9.9	44	Neemuch	-37.5
20	Katni	9.3	45	Umaria	-37.9
21	Vidisha	9.0	46	Mandsaur	-39.7
22	Dewas	8.9	47	Tikamgarh	-42.3
23	Balaghat	4.6	48	Sidhi	-44.7
24	Panna	3.8	49	Dindori	-49.5
25	Guna	1.9	50	Mandla	-49.9

# Table-8.5: Composite trade infrastructure Index

#### Table-8.6: Composite Trade Infrastructure Index on Ordinal Scale

Sl. No.	Group	District							
1.	Exceptional (More than 100)	Indore							
2.	Superior (Between 50 and 100)	Raisen, Gwalior							
3.	Strong and Sustain (Between 25 and 50)	Morena, Shajapur, Burhanpur, Sehore, Khargone, Dhar							
4.	Good and Built (Between 5 and 25)	Singrauli, Ashoknagar, Alirajpur, Satna, Bhopal, Rajgarh, Ujjain, Harda, Hoshangabad, Chhindwara, Katni, Vidisha, Dewas							
5.	Moderate and select invest (Between 0 and 5)	Balaghat, Panna, Guna, Barwani, Narsimhapur							
6.	Weak and select High Invest (Between -20 and 0)	Anuppur, Ratlam, Jhabua, Sagar, Jabalpur, Bhind, Khandwa, Betul, Seoni							
7.	Weak and High overall Invest (Less than – 20)	Shivpuri, Sheopur, Damoh, Chhattarpur, Datia, Shahdol, Rewa, Neemoch, Umaria, Mandsaur, Tikamgarh, Sidhi, Dindori, Mandla							

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