4.1 Introduction

The main objective of the study is to make a consensus on Urban Development establishing its importance. The Urban Development is an Engine of Economic Growth and Rural Development. Urban Development is both a challenge and an opportunity. The Urban Local Bodies have been given the responsibilities but not the resources. The 74th Constitutional Amendment Act is to be implemented in spirit.

This Urban Infrastructure study is in a Global India, M.P. and Indore perspective to focus on the long neglected urban sector and to achieve the desired urban living standards for Economic Growth. The urban sector, if properly planned, shall be the engine of Economic Growth as centers of employment generation, of opportunity creation, of urban living and quality of life.

The urban sector has long been neglected until the Constitutional Amendment act in 1992. Urban sector has being a State subject and only after the Constitutional Amendment and creation of Ministry of Urban Development (MoUD) in 1985, urban sector has been given some importance.

No serious efforts to strengthen Urban Infrastructure seen till the onset of JNNURM in 2005. India's Urban Population exceeds the Urban Development and second to only China. We have the biggest number of urban dweller in gross terms and this number will increase. Massive works have to be undertaken for clearing the backlog arising from years of neglect of the urban sector.

Biggest challenge in the development of urban sector is that of mindset. The political leadership has to recognize the urban sector as an engine of economic growth as synergy exists between Urban Infrastructure Development, Urbanization, Rural Development, Human Development Index (Health, Per Capita Income and Education) and Economic Development. This synergy needs to establish in its proper perspective by further research. This synergy has to be the basis of future planning and for this the political leadership has to recognize and understand the intricate relationship between these. Only then there will be a change in mind set of the people towards Urbanization which will be central to the Urban Development.
There is a mismatch in the Resource and Responsibilities enshrined to the ULB's and resources at their disposal. They have to be recognized as a 3rd tier having a separate list, prepare share in taxes and the 74th CAA implemented in spirit. The resource allocation has to be shifted to resource sharing. The ULB's needs capacity building, capacity creations, autonomy and resources at their disposal. Urbanization can no longer be neglected, in fact it needs a focus to make for the post-neglect Urbanization and the only answer is achieve global competitiveness, attract global capital, technology and achieve the Economic Growth necessary to meet the aspiration of people of food, shelter, employment health and education for all.

Local Government plays a vital role in Urban Infrastructure, Urbanization and thereby Economic Development. The Urban Infrastructure Services are provided by the Urban Local Government and therefore directly affect the Economic Development, Employment Generation, Opportunity Creation and demand for the nonfarm sector and Opportunities for the farm sector. The present study aims for establishing the importance of Urbanization in the overall Economic Development, Synergy between the Economic Development, Per-Capita Income, GDP and Employment in the planned Economic Growth of the country.

The present challenges can be converted into opportunities and this study seeks to find the gaps in the Urban Infrastructure and ways to meet this gap. The present study seeks to trace out the causes of neglect of the urban sector. The quantitative indicators of Water, Sewerage, Solid Waste Management and Drainage have been studied and their correlation finds out with Economic Human Development Indicators. The present study compares Indore with the major cities of the country and the small and medium towns of Madhya Pradesh. The identification of gaps provides a basic feature of planning by decision makers as well as the ULBs to identify, plan and fill the gap.

4.2 Research Gaps

It is evident from the Literature Review that Urban Infrastructure has many cross cutting issues and there are significant knowledge gaps in the literature dealing with these aspects. The entire subject matter of Urban Infrastructure is Local Government and Public Sector dominated. Thus there are gaps in literature, study, research and focus. There are no independent comprehensive studies on Urban Development. The Recommendations, Commissions Reports, Research Papers and Surveys have done, form the basis of present research. The gaps in Urban Infrastructure are as follows:
There is total Government Monopoly in providing the Urban Infrastructure services and hence the data is closely Government held data. It is beyond the comprehension of normal researcher to have an access to the closely held data. It is beyond the capability of a researcher to collect the widely dispersed urban data. Whatever data is available is through the Census Statistical Data, Planning Commission, Reserve Bank of India, State Urban development and Ministry of Urban Development (MoUD), Government of India. The studies till now are either in form of Reports, Commissions and High-Powered Presentations, all of which reflect the Government point of view. There are very few researches in the field.

The present study seems to use the OGD (Open Government Data) and trace the gaps in the Urban Infrastructure. The researcher has used the HPEC Statistics of Per-Capita Investments (PCIC) and Per-Capita Operative Maintenance Cost (PCOM), to device the financial requirement, to fulfill the Urban Infrastructure Benchmark, Backlog and the Operation Projection requirements. In absence of sponsored studies and research, the Urban Infrastructure field is virtually barren.

There are significant knowledge gaps and little research that explicitly studies Urban Development from the point of view of ULBs. The special requirements of Women, Children, Elderly, Urban Poor and Physical Challenged regarding the Urban Infrastructure needs further study. An attempt has been made to touch upon these prevailing gaps.

There is prevailing perception of seeing Urban Development as different from Rural Development. The researcher has used the different studies to show that there is a synergy between Urban Development and Rural Development. Planned and fast Urbanization is the key to attain fast economic growth as desired by the country.

4.3 Research Objectives

Once the gap is identified in quantitative terms, we can assess the gap in the Urban Infrastructure Services such as Water, Sewerage, Solid Waste Management and Drainage with respect to Benchmark set and find out ways to meet the gap. Present research contribute to useful research in the area of Urban Infrastructure Services in the country in general or a whole with respect to M.P. in particular and Indore in specific with a focus to make a Country, State and ULB comparison and thereby laying the foundation of urban planning and resource allocation. The link of India, MP and Indore can be configuration to all the ULB's of the country and thus this will be a useful document for all the ULB's. This research has been done from the point of view of ULB's and can be used as decision making at
Government decision making level. This research can be of general and can be further crafted to the needs of all the ULB’s that require a Country, State and ULB specific comparison and that require their services to be quantified for decision making and funds allocation. This research also contributes to the provision of urban service for improving the quality of life of the city and to stimulate further research in each of the specific sector area.

The researcher examines the role of Urban Local Governments in creation of Urban Infrastructure Services and the problems of Urban Local Governments.

The present research aims at following main objectives:

4.3.1. To study all the 8 major Urban Service Performance Indicators viz. Water, Sewerage, Solid Waste Management, Drainage, Road, Urban Transport, Urban Transport Infrastructure and Street Light.

4.3.2. To study all the sub-indicators of these major performance indicators viz. Water (9), Sewerage (8), Solid Waste Management (8), Drainage (2), Road, Urban Transport, Urban Transport Infrastructure and Street Light.

4.3.3. To grade the Cities according to the Major Performance Indicators.

4.3.4. To find out the Urban Infrastructure provided by the Cities / Urban Local Governments and the gaps that exists with respect to the present service level and the Benchmarks set.

4.3.5. To convert the gaps in the quantum terms and find out the financial equivalent in monetary terms to fill the gaps.

4.3.6. To help the Urban Local Bodies (ULBs) to make an assessment of their services and estimate the quantum of funds required to meet them based on the formula and recommendations of study groups appointed by the competent authority.

4.3.7. To show that the Consolidated Urban Infrastructure Services (C UIS) calculated by the Researcher is related to Economic Development measured by GDP, State GDP and Human Development Index measured by (Education, Health and Per Capita Income).

4.3.8. To bring out the root cause of the financial weakness of the ULBs which is the chief cause of the poor Urban Infrastructure.
4.3.9. Case study of Indore Municipal Corporation (IMC) budgetary expenditure on basic Urban Infrastructure with respect to actual expenditure and the expenditure suggested by HPEC to meet the Benchmark set.

4.3.10. The case study of IMC to show the Actual Cost of Recovery of Water i.e. the Cost of Water Supply Incurred compared to Cost Recovered.

4.4 Research Framework

Table 4.1: Research Framework

<table>
<thead>
<tr>
<th>The importance of Urbanization and the Causes and Consequences of its neglect.</th>
<th>Chapter – 1 presents the Introduction to the subject matter of Urban Development.</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Present Literature on Urbanization and Urban Infrastructure Development.</td>
<td>Chapter- 2 Reviews the Literature and identifies the gaps therein.</td>
</tr>
<tr>
<td>To study the present state of Basic Urban Infrastructure Services with regard to Water, Sewerage, Solid Waste Management, Drainage, Road, Urban Transport, Urban Transport Infrastructure and Street Light.</td>
<td>Chapter – 3 Discusses the Basic Urban Infrastructure i.e. prevalent in the country with respect to Benchmarks set. The gaps present and the ways to fill these gaps</td>
</tr>
<tr>
<td>The special requirements of Women, Children, Elderly, Poor and Physically Challenged with regard to Basic Urban Infrastructure Services.</td>
<td>This chapter also discusses the Special requirements of Women, Children, Elderly, Poor and Physically Challenged with regard to Urban Infrastructure Services.</td>
</tr>
<tr>
<td>To device a Methodology of Research, Research Questions and Hypothesis.</td>
<td>Chapter – 4 Discusses the Overall Research Design, Method and Techniques available and those used for Research.</td>
</tr>
<tr>
<td>To find out the present level of Urban Infrastructure with respect to Standards or the Benchmarks.</td>
<td>Chapter 5 – Empirical Analysis of present Urban Infrastructure with reference to Benchmarks and identify gaps are discussed.</td>
</tr>
<tr>
<td>To find out the reasons for the poor state of Urban Finance of ULBs.</td>
<td>Chapter – 6 Urban Finance – Conventional and Non-conventional methods of Urban Finance and the Innovative means of Urban Finance are discussed.</td>
</tr>
<tr>
<td>To suggest the strategies for Urban Infrastructure. Role of Central</td>
<td>Chapter – 7 Findings, Conclusion and Policy Implication.</td>
</tr>
</tbody>
</table>
4.5 Research Hypotheses

There is a change in the Urban Infrastructure Services delivery with investment. This indicates that all the gaps in Urban Infrastructure Services and can be quantified and meet with. The following corresponding statistical hypothesis developed on the basis of research objectives:

H 1. Local Governments are financially weak to perform the duties mandated.

H 2. Urban Infrastructure is inadequate and there exist wide gap from the Benchmark made.

H 3. Urban Infrastructure is a bigger challenge in the smaller town.

H 4. The cities differ with respect to Urban Infrastructure. Some of the biggest cities are providing poor Urban Infrastructure and some of the small cities are providing good Urban Infrastructure.

H 5. The Urban Local Bodies which have less NRW (Non-Revenue Water / Water Wastage) are the ones which are providing better and efficient Urban Infrastructure.

4.6 Research Methodology

The present study is based upon the OGD data i.e. Open Government Data. The annual budgets of Indore Municipal Corporations are collected with view to study the amount incurred on the basic Urban Infrastructure Services and the Cost Recovery therein. Research Question and Statistical Tools used and source of information are described as follows:
<table>
<thead>
<tr>
<th>No.</th>
<th>Research Questions/ Issues</th>
<th>Information</th>
<th>Methodology/ Tools</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>What is the importance of Urban studies?</td>
<td>1. Is Urbanization link with Economic Growth? 2. Does Urbanization generate Employment? 3. Does Urbanization is related to Health and Rural Development?</td>
<td>Open Government Data (OGD) i.e. Data on Urban Infrastructure is predominantly Government control and hence it is beyond the comprehension and capacity of an individual to gather ULB data, hence the secondary data is used.</td>
</tr>
<tr>
<td>2</td>
<td>What are the Urban Infrastructure Services required?</td>
<td>How is the urban life of India compared to the International Service Standards</td>
<td>Benchmarks survey by SLB 1. Identify a minimum set of standard, performance for the Water and Sanitation sector that are commonly used. 2. Understood and used by all stakeholders across the country. 3. Define a common minimum framework for monitoring and reporting on these indicators and; 4. Setout guidelines on how to operationalize this framework in a planned manner.</td>
</tr>
<tr>
<td>3</td>
<td>What is the history of providing these?</td>
<td>What is the history of Urban Governance Mechanism</td>
<td>Literature and Government Journal, Gazettes</td>
</tr>
<tr>
<td>4</td>
<td>What are the International Benchmarks/acceptable Urban Infrastructure Service Standard?</td>
<td>International Benchmarks establish and accepted by the Service Level Benchmarking</td>
<td>Benchmarks surveyed by MoUD Service Level Benchmarking (SLB) Status Report 2010-11</td>
</tr>
<tr>
<td>5</td>
<td>What are the services being provided by the ULB in the present context?</td>
<td>The detailed urban survey by Service Level Benchmarking done by MoUD</td>
<td>32 Cities of the country and 109 Urban Local Bodies of Madhya Pradesh</td>
</tr>
<tr>
<td>6</td>
<td>What are the Gaps in</td>
<td>Analysis done by the</td>
<td>The Gaps with respect to</td>
</tr>
<tr>
<td>provision of the services?</td>
<td>Researcher</td>
<td>the Basic Infrastructure Services have been statistically analyzed and presented.</td>
<td></td>
</tr>
<tr>
<td>---------------------------</td>
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<td>----------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>What are the Financial Requirements to meet the Gaps?</td>
<td>Analysis done by researcher based on the HPEC recommendations</td>
<td>Based on the Per-Capita Investment Cost (PCIC) and Per-Capita Operation and Maintenance Cost (PCOM)</td>
<td></td>
</tr>
<tr>
<td>From where is the Finance going to come from?</td>
<td>The study and recommendation of HPEC study groups, RBI, Academicians and Planning Commission recommendations</td>
<td>The researcher has studied the various recommendations and suggested alternative methods of Urban Finance as well as the need to improve the present finance base as well as creation of Municipal Finance List.</td>
<td></td>
</tr>
<tr>
<td>How can the Urban Local Bodies be strengthened and sustainable?</td>
<td>The close study of 74th Constitutional Amendment Act and the lacuna left behind in implementing it in spirit</td>
<td>The detail provisions of the CAA have been studied.</td>
<td></td>
</tr>
<tr>
<td>How assessable are the existing Urban Infrastructure Service available to the Urban Poor?</td>
<td>There are differences in the availability of Urban Infrastructures to the Urban Poor</td>
<td>The Infrastructure needs specially that of Water, Sewerage and Urban Transport have been studied with respect to the special requirements of Urban Poor.</td>
<td></td>
</tr>
<tr>
<td>Is Urban Infrastructure Service Gender neutral?</td>
<td>Do the Women suffer more because of lack of Water and Sanitation?</td>
<td>The Urban Infrastructure affects the Women most specially that of Water, Sewerage, Urban Transport and Open Spaces. They have been studied in detail.</td>
<td></td>
</tr>
<tr>
<td>Is Urban Infrastructure Service Children friendly? Does it cater to the needs of the Elderly?</td>
<td>Assessing the mismanagement of Open Spaces and lack of Play Spaces</td>
<td>Lack of Play Spaces arising due to mismanagement of Open Spaces is against the Constitutional right of Children to Play.</td>
<td></td>
</tr>
<tr>
<td>What are the Policy Implications and Recommendations?</td>
<td>A change in mind set. Urban centers to be treated as engines of Economic</td>
<td>A change in mind set of policy makers is required. Integrated Development</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>What are the key policy interventions that are required at the Central Government, State Government and Urban Local Government level?</td>
<td>The specific role to be performed by the Central Government, State Government and the Urban Local Bodies</td>
<td>The specific role to be performed by the people in general in terms of demand for Basic Infrastructure, Central Government, State Government and Urban Local Bodies has been discussed in detail.</td>
</tr>
</tbody>
</table>

### 4.7 Date Source and Description

The present study is based on Secondary Data. The data sources are from Open Government Data (OGD). The list of the few sources is as follows:

1. Census Data Publication
2. Central Statistical Organization
3. National Sample Survey of India (NSSI)
4. Government Publication
5. ULB Publication
6. National Urban Publication (NUP)
7. Planning Commission Publication
8. RBI Publication
9. State Planning Commission Publication
10. State Government, State Urban Development Resources
4.8 Expected Research Outcome

The present research is expected to contribute to the area of Basic Urban Infrastructure Services. Since Urban Development and Urban Infrastructure Development are too vast fields, the present research aims to touch upon almost all the fields. It serves to act as a canvass to the entire Urban Infrastructure from the point of view of Urban Local Body suggesting the need or sectors specific researches in almost all the fields. This research provides the use of OGD, Service Level Benchmarking conducted and high-powered studies like HPEC recommendations to be used by the ULB's to assess their financial requirements.

The provision of Urban Infrastructure Service to the level of Service Benchmarking is indeed a big task, given the backlog and the increasing Urban Population. This is a very big challenge as well as a big opportunity if planned well. This is the central theme of the research. The researcher has examined the Urban Infrastructure Service Gaps, the role of ULB's in providing these Infrastructures, the problem and gaps that they are facing. The expected outcomes of this study can be categorized as below:

1. **Urban Local Governments**: Their present status, problems and their role in Urban Infrastructure Services. To show that present work of the Urban Local Bodies are constricted to Water, Solid Waste Management and Cleanliness grossly neglecting other 18 functions.

2. **Gaps**: Urban Infrastructure Gaps with respect to Basic Urban Services as Water, Sewerage, Solid Waste Management, Drainage, Road, Urban Transport, Urban Transport Infrastructure and Street Light.

3. **Finance**: Having identified the gaps, strategies to meet the Urban Infrastructure with the Benchmark set. The Researcher, based upon the HPEC estimates and gaps with respect to the Benchmarks, calculated the finance required to meet the basic Urban Infrastructure Services based on the PCIC and PCOM (Per-Capita Investment Cost and Per-Capita Operation and Maintenance Cost).


5. **Focus**: The need to focus on Urbanization as engines of Economic Development and show the synergy between Urban Infrastructure,
Urbanization, Economic Development and Human Development Index (Health, Education and Per-Capita Income).

6. Small Towns and Peri-Urban Areas: To show the special need of Small Towns and Peri-Urban Areas.


### 4.9 Statistical Tools Used

A multitude of different statistical tools is available, some of them simple, some complicated and often very specific for certain purposes. In analytical work, the most important common operation is the comparison of data, or sets of data, to quantify accuracy (bias) and precision. Fortunately, with a few simple convenient statistical tools, like the "T-test, the "F-test" and Regression Analysis, most of the information needed in regular laboratory work can be obtained. Some of the basic tools, statistical tools used in present study are discussed below in brief:

4.9.1. **Mean**: The Arithmetic Mean, more commonly known as “the average,” is the sum of a list of numbers divided by the number of items on the list. The mean is useful in determining the overall trend of a data set or providing a rapid snapshot of data. Another advantage of the mean is that it’s very easy and quick to calculate.

4.9.2. **Standard Deviation**: The Standard Deviation, often represented with the Greek letter sigma, is the measure of a spread of data around the Mean. A High Standard Deviation signifies that data is spread more widely from the Mean, where a Low Standard Deviation signals that more data align with the Mean. In a portfolio of data analysis methods, the Standard Deviation is useful for quickly determining dispersion of data points.

4.9.3. **Regression**: In statistical modeling, Regression Analysis is a statistical process for estimating the relationships among variables. It includes many techniques for modeling and analyzing several variables, when the focus is on the relationship between a dependent variable and one or more independent variables (or 'predictors'). The case of one explanatory variable is called Simple Linear Regression.

4.9.4. **Hypothesis Testing**: Also commonly called t-testing, Hypothesis Testing assesses if a certain premise is actually true for your data set or population. In data analysis and statistics, we consider the result of a
hypothesis test statistically significant, if the results couldn't have happened by random chance. Hypothesis tests are used in everything from science and research to business and economic.

4.9.5. Correlation: In statistics, dependence is any statistical relationship between two random variables or two sets of data. Correlation refers to any of a broad class of statistical relationships involving dependence, though it most in common usage often refers to the extent to which two variables have a linear relationship with each other. Correlations are useful because they can indicate a predictive relationship that can be exploited in practice.

4.10 Limitations of the Study

Urban Development is a very vast field. The present research totally excludes the Social Infrastructure viz. Schools, Hospitals and Employment. It confined to the areas of basic Physical Urban Infrastructure namely that of Water, Sewerage, Solid Waste Management, Drainage, Road, Urban Transport, Urban Transport Infrastructure and Street Light. It also excludes the housing requirement of the Urban Sector. Even after such important exclusions, the area is vast and requires specifically sector-wise research. The present study is presented with a purpose to establish the importance of Urbanization as a whole. The present study is done with All India, Madhya Pradesh, Madhya Pradesh ULB’s and Indore perspective.

4.11 Scope of Further Research

It is not possible for a single researcher to touch each and every area of Urban Development because of the lack of time, space and resources. I have tried to focus on the importance of Urbanization as in engine of good life, fast economic growth and overall inclusive development.

Urbanization is both an opportunity and a challenge, if not planned and addressed properly. Urbanization is also a great economic opportunity in engine of economic growth and a precursor to rural growth. Urbanization is a sector that has long being neglected with regard to the priorities and focus of the Government. I have try to show the synchronicity of urban growth to rural growth but this area needs further research so that Central, State and Regional level to accord more acceptance of the idea. The study has been conducted with secondary data of Open Government Data pertaining to the 8 urban sectors namely Water, Sewerage, Drainage, Solid Waste Management, Road, Urban Transport, Urban Transport Infrastructure and Street Lighting. There are a lot of
variations and local regional factors which might affect the conclusions. The entire report might have an inherent bias in favour of ULBs as I have faced the problems myself and have my own upbringing to look towards Government for solution. Some important areas as Socio-Economic Cultural, Human and Climatic conditions have not been included.

The present study is too broad and small sectors of Urban Development needs rigorous research. The main aim of the researcher was to focus and to highlight the urban field as a whole. Broad suggestions have been made to Government which needs more research. But I have cleverly not taken any suggestions which are not made by competent authorities.

Each Urban Infrastructure sector as Water, Sewerage, Solid Waste Management, Drainage, Road, Urban Transport, Urban Transport Infrastructure and Street Light needs further subject specific study. Subsequently each sector divided into sub-sectors / sub-indicators, each of which needs further study and research. Each sector with multiple studies will give a multi-dimensional, multi-pronged analysis of each sector and a better understanding of the sector shall need to better decision making.

**Chapter Summary:**

We have discussed Research Methodology and data needed to empirically test the conceptual framework developed. We have also discussed the purpose and the tools use to prove our objectives and hypothesis.