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IMPACT ON REVENUE ENHANCEMENT OF ULBS/ SPV THROUGH IMPLEMENTATION OF VARIOUS SMART CITIES PROJECT (COMPETITIVE AND COOPERATIVE FEDERALISM)

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Impact on Revenue Enhancement of ULBs/ SPV through Implementation of Various Smart Cities Project (Competitive and Cooperative Federalism)

Authors
Project Lead: Ajaya Kumar Sahu (Fellow)
Senior Advisor: Bornali Bhandari (Professor)
Research Team: Nishika Pal (Research Analyst)
Kenneth Rudy Gomes (Research Associate)

Secretarial support
Poonam Dhawan

Technical support
Praveen Sachdeva

Data Support from Ministry Team, Smart Cities Mission
Joint Secretary and Mission Director: Roopa Mishra
Directors: Sanjay Gupta, Manoj Kumar Sharvar
Deputy Secretary: Sanjay Kumar Mishra
Under Secretaries: Sabak Lal Prasad, Priyaranjan Verma, Yogesh Kumar

Smart Cities Mission Management Unit (SCMMU)
Vikash Chandra, Dinesh Harode, Rupesh Chopra, Vishnu Pandey, Chaitanya Singh, Siddharth Barpanda, Amit Sharma, Dipyaman Sinha, Rashi Mathur Mayank Saravagi, Ishita Singh, Jaipal Daksh

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Ajaya Kumar Sahu
Fellow

List of Abbreviations

ABD	Area- Based Development
ADB	Asian Development Bank
ANPR	Automatic Number Plate Recognition
ATCS	Adaptive Traffic Control System
CCTV	Closed-Circuit Television
e-Challan	Electronic Challan
EWS	Economically Weaker Section
FAR	Floor Area Ratio
GDP	Gross Domestic Product
GGU	Georgia Global Utilities
GIFT-City	Gujarat International Financial Tec-City
GRIHA	Green Rating for Integrated Habitat Assessment
GST	Goods and Services Tax
HIG	High-Income Group
HPEC	High Powered Expert Committee
ICCC	Integrated Command and Control Centre
ICRIER	Indian Council for Research on International Economic Relations
ICT	Information and Communication Technology
ISCDL	Indore Smart City Development Limited
ISWM	Intelligent Solid Waste Management
IT	Information Technology
ITCS	Integrated Traffic Control System
ITS	Intelligent Transportation System
JSC	Joint Stock Company
JUDCO	Jharkhand Urban Development Corporation
JUMPI	Jaypee University of Management and Technology
KIIs	Key Informant Interviews
L&T	Larsen & Toubro
LBFL	Local Bodies Finance List
LED	Light-Emitting Diodes

LIG	Low-Income Group
MC	Municipal Corporation
MIG	Middle-Income Group
MoHUA	Ministry of Housing and Urban Affairs
MPUDCL	Madhya Pradesh Urban Development Company Limited
NACER	National Council of Applied Economic Research
NFSSM	National Faecal Sludge and Septage Management Alliance
NITI	National Institution for Transforming India
PBS	Public Bike Sharing
PPP	Public- Private Partnership
PSOD	Private Sector Operations Department
RBI	Reserve Bank of India
REESI	Relevance, Effectiveness, Efficiency, Sustainability and Impact
RITTS	Regional Integrated Traffic and Transport System
RLVD	Red Light Violation Detection
SAAR	Smart Cities & Academia towards Action & Research
SDGs	Sustainable Development Goals
SCM	Smart City Mission
SMC	Surat Municipal Corporation
SPV	Special Purpose Vehicle
SSCDL	Surat Smart City Development Limited
STP	Sewage Treatment Plant
SVD	Speed Violation Detection
ULBs	Urban Local Bodies
UN	United Nations
WASH	Water, Sanitation and Hygiene

Executive Summary

A 'Smart City' is one which is liveable, sustainable and has a thriving economy offering multiple opportunities to its people to pursue their diverse interests. This is synonymous with the concept of United Nations' Sustainable Development Goals (SDGs). The UN's formulation of 17 SDGs are: no poverty; zero hunger; good health and well-being; quality education; gender equality; clean water and sanitation; affordable and clean energy; decent work and economic growth; industry, innovation and infrastructure; reduced inequalities; sustainable cities and communities; responsible consumption and production; climate action; life below water; life on land; peace; justice, and strong institutions. It calls for a partnership to achieve these goals.

What is at the forefront of the smart city development project is acquiring the required funds to carry out the development process. As it is a joint efforts of the Central government, State governments and the Urban Local Bodies (ULBs), contribution is made by all the three entities which cover all the three tiers of governance in the country. As the tax revenue sources of ULBs are limited, there is a need for exploring other non-tax revenue sources like user charges, public- private Partnership (PPP) initiatives, issuance of municipal bonds to carry out city development etc. The basic objectives of the study is to assess how smart city projects have enhanced the revenue generating capacity of ULBs.

The present study on "Impact on Revenue Enhancement of ULBs/ SPV through Implementation of various Smart Cities Projects (Competitive and Cooperative Federalism)" was carried out through three case studies-- Area- based Development (ABD) in Ranchi; Retrofitting and Redevelopment Initiative in Indore (Chhappan market); and e-Challan Collection Project in Surat—through ugh ICCC and ICT. The study also analysed the relevant data available for all the smart cities.

Whether smart city projects will be carried out only on the basis of "grants" from the Central and state governments or there could be revenue sustainability with the projects contributing to revenue generation for future development is at the heart of the discussion. Given that traditional sources of revenue like taxes, user charges, etc. are not enough, smart cities will have to resort to non-conventional sources as mentioned above. However, this has hardly been explored by most of the smart cities as they continue to rely on grants/ transfers from the Centre and state concerned. This puts a question mark on the financial sustainability and financial autonomy of smart cities.

Another big challenge is proper coordination among all stake holders. As smart city projects have wider impact, they also need coordination among multiple stake holders to achieve the desired objectives. This was evident when our team visited Ranchi. On the contrary, Surat was a different case where s proper coordination among all stake holders was found.

A welcome finding from Indore was a clear division of tapping revenue potential among all the three entities. While the Municipal Corporation (MC) and the Madhya Pradesh Urban Development Company Limited (MPUDCL) are taking care of traditional revenue sources like property tax, user charges, Indore Smart City Development Limited (ISCDL) is taking care of non-conventional revenue sources. Indore is the first smart city to raise carbon credit and raise money through PPP and issuance of bonds. One big thing is that they mapped revenue generation potential in every project they had undertaken.

Surat is the best example of proper coordination among all the stakeholders which helps avoid time and cost overruns. There is a proper town planning scheme in Surat Municipal Corporation (SMC) which ropes in all stakeholders to get things done. The SMC takes care of land acquisition for smart city projects. Monthly review meetings are held for every project and milestones fixed for all works. But since various stakeholders contribute to the efforts and revenue is collected by one, there is need for a transparent revenue- sharing model.

Ranchi is a good example of Greenfield development of an area with all modern amenities, which also has something for every strand of the population.

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1. Introduction

1.1 Background & Motivation

As India urbanises with urban population rising faster than the rural areas, it requires all round development of physical, institutional, social and economic infrastructure in urban areas. It is estimated that India's urban population share will reach 40 per cent by 2030 (United Nations Population Division, World Urbanization Prospects, 2018 Revision[1]), meaning more people will migrate from rural areas to make a living in the cities. The rapidly growing urban population and significant migration from small towns and villages towards the big cities have contributed to the deterioration of the quality of life in urban spaces, caused by environmental degradation, lack of pure drinking water, traffic congestion and overcrowding of health and education services. All these have put a question mark on the sustainability of the haphazard urban development. There is need to provide core infrastructure to the expanding population with special focus on clean and sustainable environment and ensuring a decent quality of life to the citizens. Smart cities projects are an initiative in this direction through joint efforts of the Central government, state governments and Urban Local Bodies (ULBs).

1.2 Objectives and Scope

The primary objective of the study is to evaluate the revenue generating impact of smart city mission project interventions in the three cities, namely, Ranchi, Indore and Surat. This is to ascertain how smart city projects can avoid their sole dependence on the "grants" from the Central and state governments and attain revenue sustainability with the projects itself generating funds for future developmental works. It delves into how the smart city interventions have helped Urban Local Bodies (ULBs) raise funds through alternative means like public- private partnership (PPP) initiatives and issuance of municipal bonds in the three selected cities. Similar initiatives by the remaining smart cities will be analysed by using the secondary data available. Also, apart from the revenue- generating aspect of smart city interventions, another issue is formal employment generation which ensures social safety nets like pensions, health benefits, and unemployment benefits to workers. Besides, the

[1] https://data.worldbank.org/indicator/SP.URB.TOTL.IN.ZS

interventions may improve the working conditions of those already engaged. Another aspect of the smart city project is environmental sustainability and thus promotion of green growth. Overall, the interventions would improve the lives of people through better health and education infrastructure, access to drinking water, traffic infrastructure reducing road congestion and travel time, sewage systems and a better justice system through transparent administration due to the use of ICT.

2. Literature Review

'Smart City Mission' website defines 'smart city' as one which is liveable, sustainable and has a thriving economy offering multiple opportunities to its people to pursue their diverse interests. This is aligned with the Sustainable Development Goals (SDGs) concept of the United Nations. [2]. The UN has formulated 17 SDGs which are crucial for betterment of mankind. These include no poverty; zero hunger; good health and well-being; quality education; gender equality; clean water and sanitation; affordable and clean energy; decent work and economic growth; industry, innovation and infrastructure; reduced inequalities; sustainable cities and communities; responsible consumption and production; climate action; peace; justice; and strong institutions.

At the heart of the smart city development project is acquiring the required funds to carry out the development process. As it is a joint effort of the Central government, state governments and Urban Local Bodies (ULBs), contribution is made by all the three entities covering all the three tiers of governance in the country. There is a clear division of jurisdiction of revenue collections (tax revenue) among all the three tiers of government. However, GST implementation had adversely affected the ULBs by taking away critical sources of tax revenue like octroi, local body tax, entry tax and advertisement tax from them without providing any compensation[3]. This concern has been raised by many and there has been a proposal to allocating a percentage of GST proceedings to ULBs[4]. Similar arguments have been put forward by the High Powered Expert Committee (HPEC) in 2011 which recommended a 'Local Bodies Finance List' (LBFL) along the lines of the Union and State Lists in the Constitution[5]. Thus, there is a need of exploring other non-tax revenue sources of ULBs like revenue coming from user charges, public- private partnership (PPP) initiatives and issuance of municipal bonds to carry out city development. How the smart city projects have enhanced the revenue generating capacity of ULBs is one of the basic objectives of the study.

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[2] United Nations (2015). "Sustainable Development Goals". Department of Economic and Social Affairs. https://sdgs.un.org/goals

[3] ICRIER (2019): "Finances of Municipal Corporations in Metropolitan Cities of India", A Study Prepared for the Fifteenth Finance Commission.

[4] N K Singh's address, Chairman 15th Finance Commission, at the inaugural session of *The Indian Express Thinc* series 'Our Cities'. https://indianexpress.com/article/india/local-bodies-can-be-allocated-a-portion-of-gst-collections-says-n-k-singh-9064131/

[5] HPEC (2011): "Report on the Indian Urban Infrastructure and Services," High Powered Expert Committee, Ministry of Urban Development, Government of India

The RBI report on Municipal Finances had recommended that, as an alternative source of revenue, municipal corporations should raise funds from capital market[6]. However, in India, raising of funds by ULBs through the bond markets has been quite limited[7].

Another welcome development could be growing share of capital expenditure in the budget of ULBs as this would lead to creation of assets and thus providing a constant source of revenue to them through collection of user charges and more private investment, fuelled by the capital expenditure. However, studies have shown that the capacity of ULBs making capital expenditure has been limited and a significant proportion of the expenditure in the urban sector is incurred by state government departments, and not by ULBs[8].

In India, consolidated data on local government finances are not available. For this reason, the RBI was not publishing report on municipal finances till November 2022 when it released its maiden report on it. A joint study by the NITI Aayog and the Asian Development Bank (ADB) had reiterated the need for proper management of municipal finances, given the fact that though cities in India occupy just 3 per cent of the nation's land, their contribution to gross domestic product (GDP) is a huge 60 per cent[9]. The study had selected twelve cities from seven states as case studies to analyse their growth bottlenecks and identify frameworks for growth-enabling urban governance and planning. The study reiterated coordination among all implementing agencies within the city administration, involvement of private sectors (PPP) and state-city coordination[10]

3. National/ International Case Studies

As echoed in the Smart City Mission website and documented by existing literature, smart cities utilise digital technology and leverage Information and Communications Technology (ICT) to the fullest extent possible to shape the urban landscape into a dynamic, ever-adapting system in which demands for all types of services/resources are met on a real time basis. Some of the case studies, depicting how the smart elements in the cities have brought in significant development in the intervention areas, are given below.

3.1 Area-Based Development: Greenfield Development:

By building on large, untouched, and unbroken pieces of land which had hitherto remained unutilised, greenfield developments offer the opportunity to making the area liveable with all modern amenities and creating prospects for sustainable development. Gujarat International Financial Tec-City (GIFT City), between Ahmedabad and Gandhinagar, is an ambitious smart

[6] RBI (2022): "Report on Municipal Finances," Reserve Bank of India, Mumbai

[7] Mehta, Meera, Dinesh Mehta, Dhruv Bhavsar, Upasana Yadav and Jaiswal Jigisha (2020): "Strengthening Finances of Municipal Governments," prepared as Input to the Report by NFSSM Alliance on Municipal Strengthening for Improved Urban Services, mimeo.

[8] ibid

[9] NITI Aayog and ADB (2022): "Cities as Engines of Growth: TA-9508: Strengthening the States for Broad Based Urban Development-Executive Summary," May. https://www.niti.gov.in/sites/default/files/2022-05/Mod_CEOG_Executive_Summary_18052022.pdf

[10] ibid

city greenfield development project[11]. Started in 2008, it was designed to revolutionise India's investing market and becoming a prominent global financial hub, comparable to international financial zones. With its streamlined regulations and a range of tax and other benefits, it provides an attractive ecosystem that appeals to both domestic and international investors. The world-class infrastructure development which includes office spaces, residential complexes, automated garbage disposal system and recreational facilities is the best example of public-private partnership (PPP) projects. The development has led to growing business opportunities and thus increased employment generation. Also, it has improved the city administration's revenue- generation capacities.

Source: Financial Express (https://www.financialexpress.com/market/why-gujarat-international-finance-tec-city-needs-relaxed-listing-norms-3600573/)

3.2 Area-Based Development: Redevelopment

East Kidwai Nagar, in the South-central Delhi, is an example of a redevelopment scheme implemented under the SCM. This is also an example of lack of holistic planning, leading to challenges coming in the way of the success of smart city projects. The mixed-use development plan, built over 86 acres, includes 4700 apartments, 102,000 square metres of office space, a commercial centre, and a secondary school, all powered by a rooftop solar network which allows the entire development to be carbon-neutral. There is also a central green space and close proximity to public transit system. However, lack of holistic planning had led to chaos in the neighbourhood areas. It was seen that the development

[11] GIFT City website. https://www.giftgujarat.in/

added to traffic congestion in the nearby Ring Road and Aurobindo Marg. Besides, there was the question of meeting the growing water demand due to the development.[12]

Source: Smart City Mission website (https://smartcities.gov.in/about-scm)

3.3 Raising Money Through Bond Market: Georgia Green Bond Project

This is about Georgia Global Utilities JSC (GGU), a company in the Asian country of Georgia, needing capital during the COVID 19 pandemic. They raised money through issuing green bonds to fund their water supply project. The main challenge was limited market for green bonds in Asia and the Pacific because of unfamiliarity and inexperience among potential issuers and investors. However, with the help of the Private Sector Operations Department (PSOD) of the ADB, GGU was able to raise green bonds for its water supply project. In this way, GGU could issue first green bonds in the country. In the developed countries, green bonds have proven to be a popular, innovative financial instrument for investments in environmental or climate-benefiting projects. They are noted for offering investors transparency and accountability[13]. Also, as an anchor investor, ADB brought credibility to the bond and through this, GGU could attract local and international investors.

4. Preliminary Observations from Available Project Data for all the Cities under Smart City Mission (SCM)

As has been discussed in the SCM website, Smart Cities Mission was launched on 25 June, 2015 with the primary objective "to promote sustainable and inclusive cities that provide core infrastructure and give a decent quality of life to its citizens, a clean and sustainable environment and application of 'Smart' Solutions. The focus is on sustainable and inclusive development and the idea is to look at compact areas, a replicable model which will act like a lighthouse to other aspiring cities. The Smart Cities Mission is meant to set examples that can be replicated both within and outside the Smart City, catalysing the creation of similar

[12] Risha Chitlangia and Richa Banka (2018): " East Kidwai Nagar project: An example of how not to plan" , Hindustan Times, New Delhi . December 3. https://www.hindustantimes.com/delhi-news/dec03-e-kidwai-nagar-project/story-EumLF2cd63lZmd0e17nmhI.html

[13] ADB (2023): "Uniquely urban case studies in innovative urban development". February

Smart Cities in various regions and parts of the country"[14]. The strategic components of the Smart Cities Mission are city improvement (retrofitting), city renewal (redevelopment) and city extension (greenfield development) plus a pan-city initiative in which smart solutions are applied to cover larger parts of the city[15].

Six broad fundamental principles on which the concept of Smart Cities is based can be conceptualised as follows:

Source: Smart Cities Mission website(https://smartcities.gov.in/about-the-mission)

Some of the core infrastructure elements in a Smart City would include adequate water supply; assured electricity supply; sanitation, including solid waste management; efficient urban mobility and public transport; affordable housing, especially for the poor; robust IT connectivity and digitalization; good governance, especially e-Governance and citizen participation; sustainable environment; safety and security of citizens, particularly women, children and the elderly; health; and education. This bears importance given that urban population is rising faster with large scale migration from rural areas. This has made urban infrastructure unsustainable, leading to crises like water and electricity scarcity, pollution, traffic congestion, breakdown of healthcare system, increased security threat particularly involving women, and the like. This requires smart solutions with extensive use of digitisation and ICT. This enhances transparency in governance and thus minimises leakages. It also makes delivery of services faster and smoother.

As mentioned in the website, 99 cities were chosen to be taken up as beneficiaries under the SCM projects (20 cities added in Round 1 in January 2016, followed by 13 added in fast track round in May 2016; 27 cities added in round 2 in September 2016; 30 cities added in round 3 in June 2017; and 9 cities added in round 4 in January 2018). Of these 99 cities, data with regard to types of projects, costs, revenues and expenditure under various heads are available for 94 cities. Some basic information about the cities are given below.

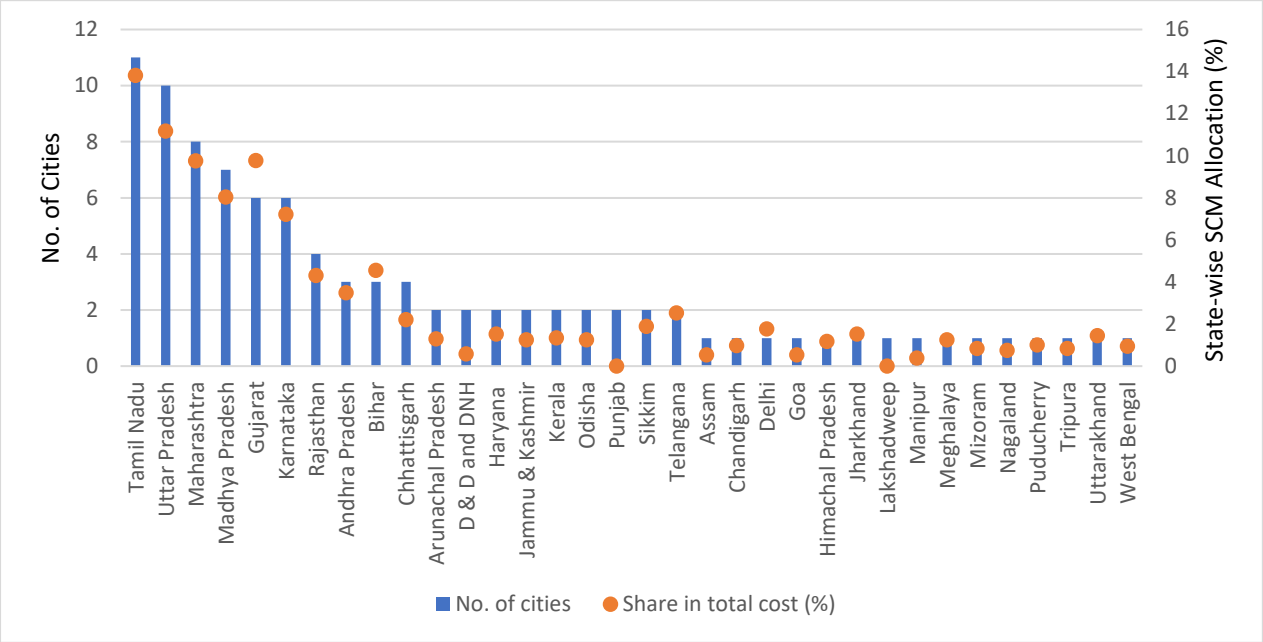
State wise presence of Smart Cities across phases, number of projects and cost are given in Figure 1 and Appendix Table 1.

As can be seen from the table that states where majority of the Smart City projects are under operation in terms of number of cities and cost of projects are Tamil Nadu (11 cities, 13.8 per cent cost), Uttar Pradesh (10 cities, 11.2 per cent cost), Maharashtra (8 cities, 9.8 per cent cost) and Gujarat (6 cities, 9.8 per cent cost).

[14] Smart Cities Mission website. https://mohua.gov.in/cms/smart-cities.php#:~:text=Selection%20Process&text=In%20January%202016%2C%20based%20on,round%20(Annexure%2DII).&text=In%20Round%202%2C%2063%20potential,2016%20(Annexure%2DIII).

[15] Op cit

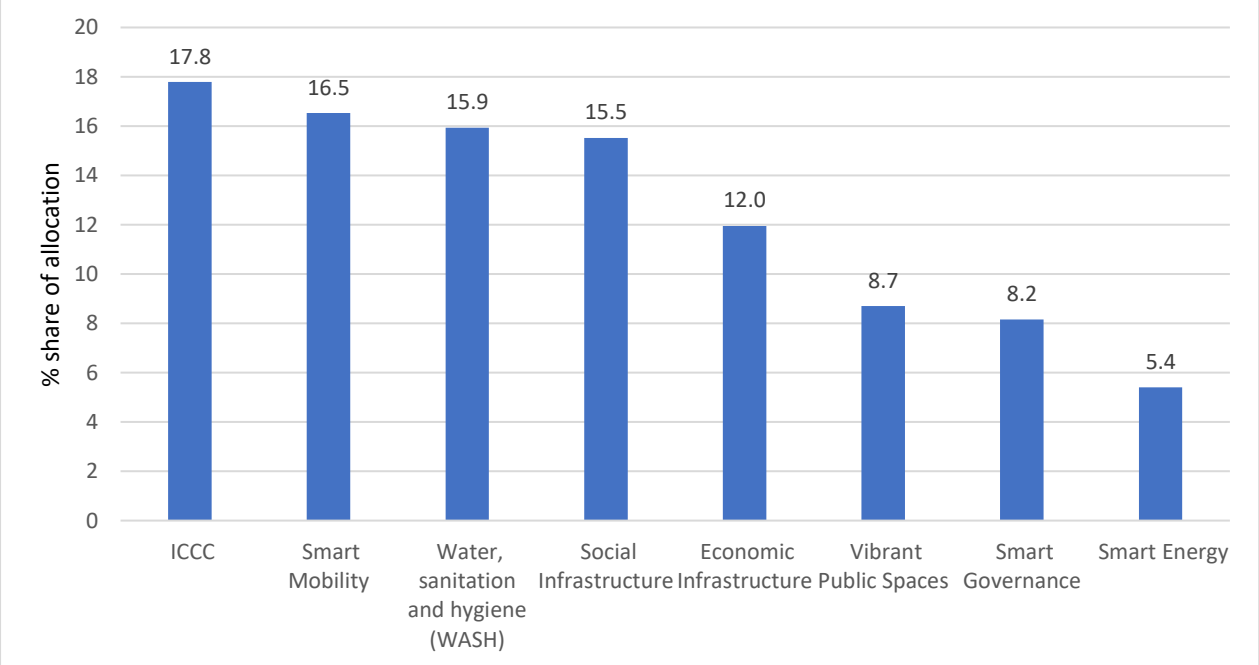
Figure 1: State-wise No. of Smart Cities and SCM Cost Allocation



Source: MoHUA

Looking at the allocations under various categories of projects, it is seen that overall, allocation is maximum under Integrated Command and Control Centers (ICCC) (17.8 per cent) (Figure 2 and Appendix Table 2). Digitisation and ICT being at the forefront of Smart City initiatives, this is obvious. Other allocations were to projects under smart mobility (16.5 per cent), water, sanitation and hygiene (WASH) (15.9 per cent) and social infrastructure (15.5 per cent).

Figure 2: Cost Allocation by Type of Assets



Source: MoHUA

5. Objectives and Methodology

Impact of the interventions will stem from the type of interventions and given that the three selected cities have three different types of interventions, with different stakeholders getting impacted, case study- based approach will be followed to study the broad impact of the interventions in the selected cities. There will be a qualitative analysis of the contribution of the selected smart city interventions on the broad parameters mentioned above.

The smart city initiatives, no matter what type, will have far reaching impacts encompassing all areas of development and all sections of the society.

The study has the following objectives:

Contribution of the selected smart city interventions would be studied on these broad parameters, namely, revenue enhancement, employment generation, environmental sustainability and better quality of life.

The study would explore the following objectives in the specific context of the nature of intervention:

1. Why was this intervention needed? What was the area like (in case of Area- based Development (ABD) initiatives in Ranchi and Indore)? What was the environment like (in case of city-wide development through innovative application of ICT in Surat).
2. To understand the nature of interventions and diversified domains the intervention has impacted, like infrastructure (communication and transportation, sewage, water, education system, health system, clean drinking water) and environmental sustainability like green energy and efficient utilisation of energy.
3. To understand how the intervention has impacted the general public, industry and governance (improving accountability), both directly and indirectly. Indirect impact may include impact on SDG goals, employment generation and other avenues of revenue generation that may have come up due to the direct interventions.
4. To understand how the intervention has improved revenue generation. It could be through increase in taxes by expansion in economic activities and formalisation of economic activities; user charges through creation of marketable assets; reduction in leakages by use of ICT; and improved buoyancy of tax collections.
5. To understand how the intervention has impacted other Sustainable Development Goals, created employment, improved buoyancy of and generated other sources of revenue for the local government, if any.

To study these objectives, the following research framework would be adopted:

1. Relevance: Why was this intervention needed?
2. Coherence: Why the particular location was selected?
3. Effectiveness: The extent to which the intervention achieved, or is expected to achieve, its objectives
4. Efficiency: Judicious use of resources, completion on time, (time and cost overruns)
5. Impact: Social, environmental, economic. Spillovers

6. Sustainability: Environmental and financial

This framework is extracted from the internationally accepted and NITI Aayog adopted REESI framework for impact evaluation analysis (Relevance, Efficiency, Effectiveness, Impact, and Sustainability)[16].

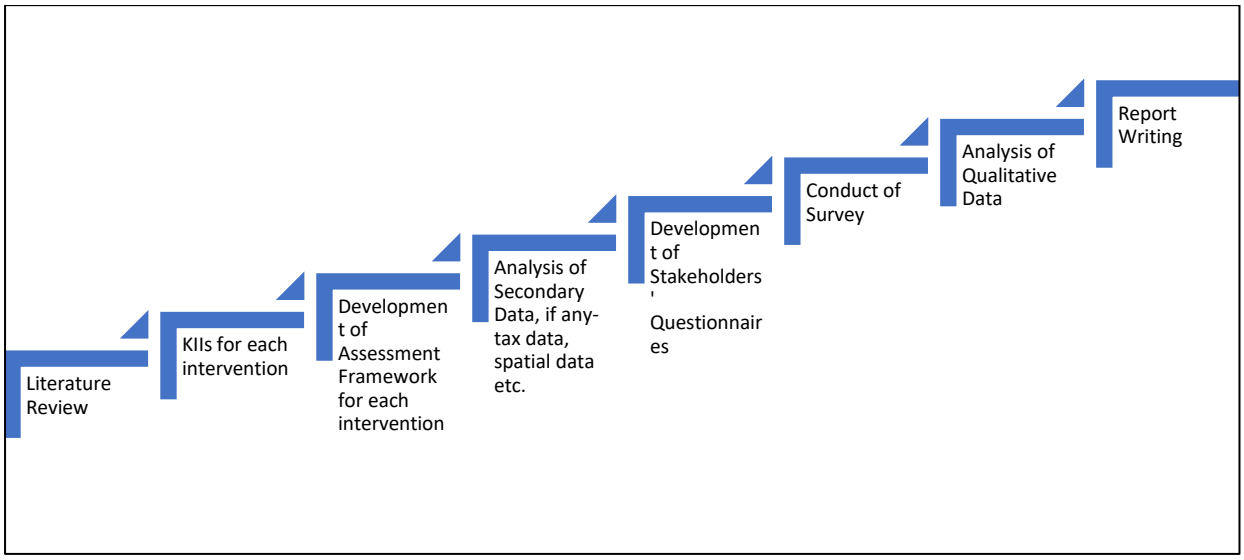
The following steps will be implemented to get the desired objectives:

1. Literature Review: A short literature review for each type of intervention will be carried out.
2. Key Informant Interviews (KIIs): Since the impacts are varied and spread across multiple groups, the first step would be an online interaction with the key informants. This will help us understand the project status, impacts of the developments and the various groups of people and areas that have benefitted from the interventions.
3. Assessment Frameworks: KIIs will help us develop appropriate assessment frameworks for each intervention.
4. Secondary Data Analysis: First, a secondary analysis of data for each of the cities with regard to the Smart City Mission (SCM) initiatives. Sources like Smart City Mission, Government of India and the respective Smart city websites will be explored.
5. Questionnaire Development: Based on KIIs and secondary data analysis, we will design appropriate questionnaires for all stakeholders in each intervention.
6. Primary Survey: This will be followed by a primary survey through visits to each of the three cities to meet all the stakeholders who might have been impacted by the interventions. Focus group discussions and/or structured interviews will be carried out with stakeholders for each intervention. The impact could be revenue generation for the government, income enhancement of citizens and other organisations through creation of employment and avenues, betterment of living standards through improved infrastructure and better environmental consequences.

   The research approach is mentioned below (Figure 3).

[16] NITI Aayog (2019). "RFPs for Evaluation of Umbrella CSS under 10 Sectors- Pre-Proposal Conference", DMEO, 20 May. https://dmeo.gov.in/sites/default/files/2019-09/Pre-Bid-Conference-for-UCCS-Evaluation-converted.pdf

Figure 3: Research Approach



Source: NCAER Conceptualisation.

6. Impact Assessment Inferences

As discussed earlier, smart city interventions would be studied on four broad parameters, namely, revenue enhancement, employment generation, environmental sustainability and better quality of life.

On revenue enhancement, parameters like grants vs own revenue sources; exploring non-traditional revenue generation sources like public-private partnership, bonds issuances; and continuous flow of revenue in terms of user charges proceeds from asset creation; will be analysed. Another factor worth analysing is the capital expenditure as a share of total expenditure in budgets of ULBs budget, as this would open doors for asset creation and thus a future revenue source either in the form of asset monetisation or user charges collection.

Generation of quality employment is an important aspect of facilitating development. Employment generation can come through smart city projects creating jobs or through smart city interventions creating conducive environment for business development in the cities.

Environmental sustainability is important as it leads to sustainable development. Haphazard development in urban areas due to excessive population growth leads to traffic congestion, scarcity of water and electricity, water and air pollution, and the like. Smart city elements like green energy generation, better sewage system and better controlled traffic through the use of ICT support development without compromising on environmental standards.

Smart city interventions can promote better quality of life through better traffic systems, better health and educational infrastructure, reduced pollution and access to clean air, access to recreational facilities, and better safety through ICT use leading to good governance and thus reduced corruption and leakages. Women safety is paramount here.

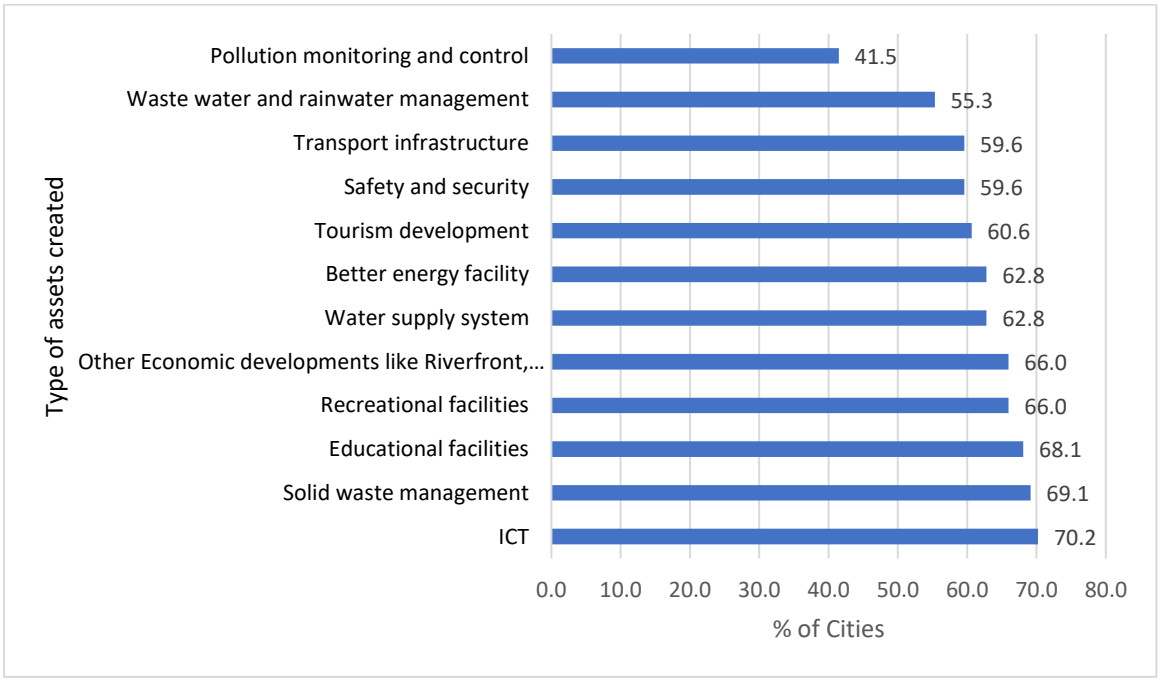
6.1 National Level Theme Based Impact Assessment

The present section deals with how the smart cities have taken up the issues discussed above and how they have fared in achieving the desired results. Data provided by the Smart City Mission, Ministry of Housing and Urban Affairs (MoHUA), with regard to 94 of the 99 smart cities would form the basis of the appraisal.

6.1.1 Asset creation through Smart City interventions

Asset creation can lead to benefits like future revenue generation, better education and health services, better transportation system, better water supply and sewage system, better ICT usage in governance, better energy availability and better recreational facilities. Out of the 94 cities for which data were available, 62 cities had created recreational facilities (66.0 per cent), 64 created educational facilities (68.1 per cent), 57 invested on tourism development (60.6 per cent), 59 invested on better water supply system (62.8 per cent), 65 invested on solid waste management (69.1 per cent), 52 on waste water and rainwater management (55.3 per cent), 59 on better energy facility (62.8 per cent), 66 on ICT (70.2 per cent), 56 on safety and security (59.6 per cent), 56 on transportation (59.6 per cent), 62 on other economic developments like riverfront, market development (66.0 per cent), and 39 had invested on projects for pollution monitoring and control (41.5 per cent). Given this, it can be said that the broad objectives of Smart City Mission have been adhered to by the smart cities. This is given in Figure 4. State wise number of real estate projects under various categories is given in Appendix Table 3.

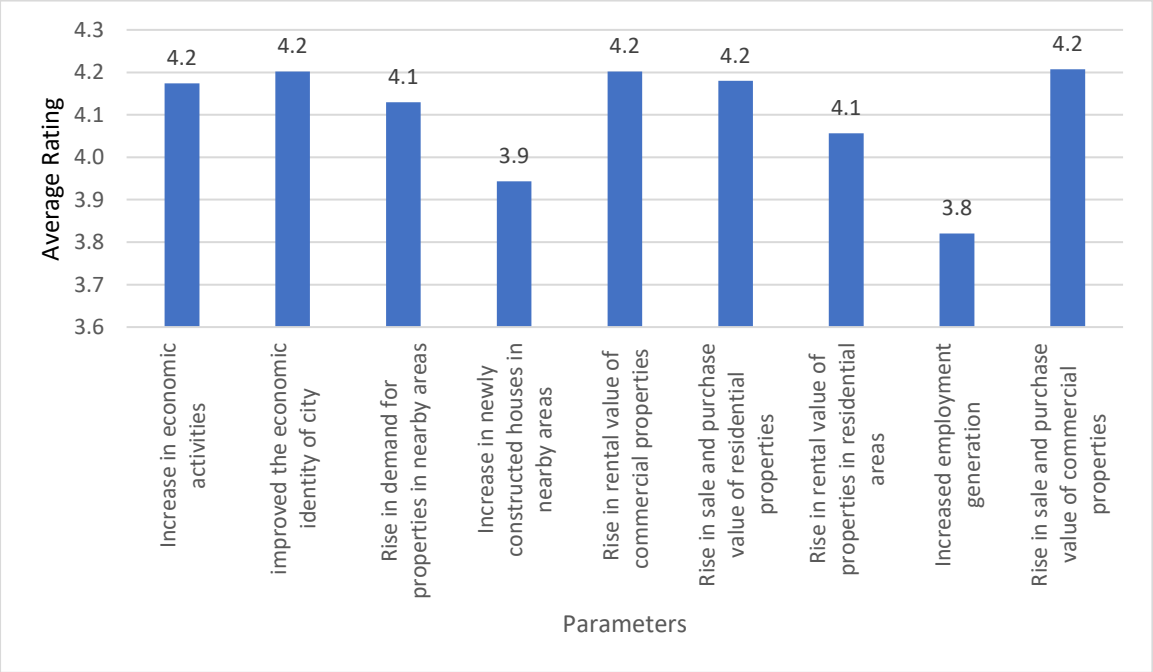
Figure 4: Smart City Projects Across Type of Assets Created



Source: MoHUA

Cities were asked about the various impacts of Area-Based Development (ABD) initiatives carried out through the SCM projects. They were asked about impact on rise in economic activities, employment, rental value of residential properties, sale/purchase value of residential properties, rental value of commercial properties, sale/purchase value of commercial properties and newly constructed houses near the ABD site. They were asked if access to basic amenities positively impacted the demand for properties near ABD areas, and if ABD based development improved the economic identity of the city. They were asked to rate the above statements with 1 being 'strongly disagree' to 5 being 'strongly agree'. Their perceptions about the impact of smart city interventions across various aspects are given in Figure 5.

Figure 5: Impact of Area Based Development (ABD) initiatives carried out Through the SCM Projects



Source: MoHUA

The findings across states are given in Appendix Table 4:

Overall, cities on an average agree with all the above mentioned propositions about the impact of ABD in their cities. However, there are state- level variations. On the average, it seems the ABD through smart city development has improved various economic variables like rise in economic activities, employment, rental value of residential properties, sale/purchase value of residential properties, rental value of commercial properties, sale/purchase value of commercial properties, newly constructed houses near the ABD site, demand for properties nearby ABD area, and improvement in the economic identity of the city.

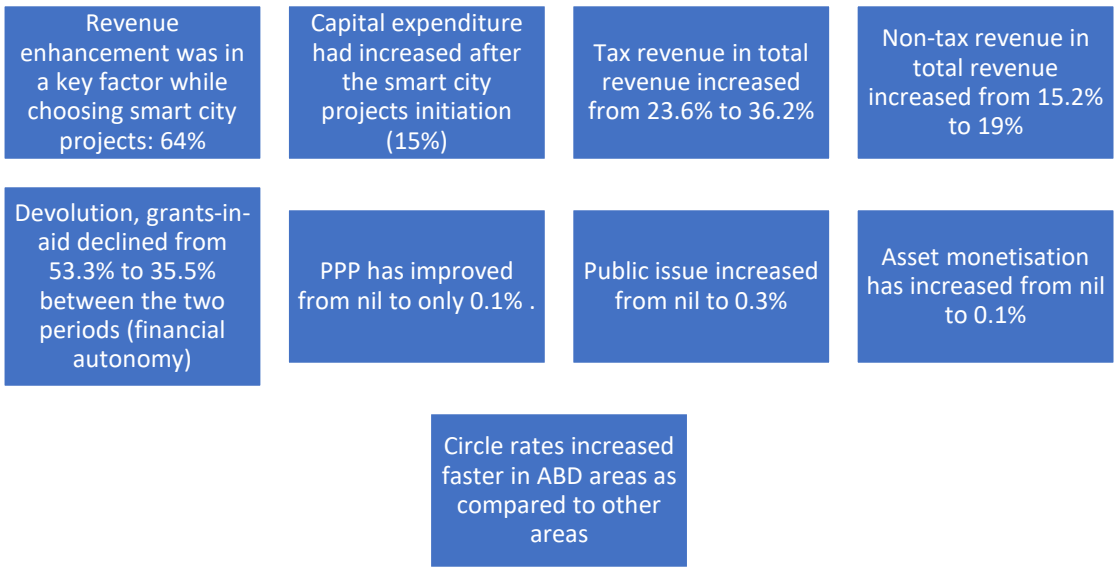
6.1.2 Revenue enhancement impact of Smart City projects

Smart city projects can boost revenue of ULBs in a number of ways, as discussed above. Asset creation through the smart city projects can become a continuous source of revenue for ULBs by collection of user charges on the assets created. The existing revenue sources can be streamlined through digitising and updating the revenue collection mechanism, as it would reduce leakages and prevent delay in revenue collection. Apart from the revenue enhancement impact, what is of essence is enabling ULBs to explore alternative revenue generation mechanisms like PPP, bond issuance, carbon credit, etc. Also, increase in share of own sources of revenue over share of grants/ transfers will bring in revenue sustainability.

- Cities were asked whether revenue enhancement factor was kept in mind while selecting projects under SCM and 61 of 94 cities answered in the affirmative-, that's about 64 per cent cities had revenue enhancement in mind while choosing projects under the Smart City Project. This includes cities like Pune, Surat, Indore, Gwalior, Chandigarh and Bhopal.
- Similarly, for 15 cities (around 16 per cent) revenue enhancement was not a factor while choosing projects. This includes Bangalore, Thane, Agra and Bilaspur.
- Regarding share of capital expenditure in total expenditure of ULBs before and after smart city projects were started, information is available for 34 cities. Of these 34 cities, 14 cities had increase in share of capital expenditure after initiation of smart city projects (2022-23 vs 2015-16). These cities were Bareilly, Bhopal, Indore, Kakinada, Solapur, Thane, Pimpri Chinchwad, Ajmer, Ranchi, Shivamogga, Thanjavur, Thoothukudi, Raipur and Jaipur.
- Regarding the share of income of ULBs from various sources, share of tax revenue increased from 23.6 per cent in 2015-16 to 36.2 per cent in 2022-23.
- Share of non-tax revenue in total revenue increased from 15.2 per cent to 19 per cent per cent between the two periods.
- Share of assignment, devolution, grants-in-aid on the other hand declined from 53.3 per cent to 35.5 per cent between the two periods. Thus, reliance on outside sources declined after the SCM projects were launched, indicating an improvement in financial autonomy.
- Share of PPP has improved from nil in 2015-16 to only 0.1 per cent in 2022-23. In Indore, the figure is as high as 5.9 per cent in 2022-23.
- Share of sources like public issue and asset monetisation increased from nil in both 2015-16 and 2022-23 to 0.3 per cent and 0.1 per cent respectively. In Indore, share of public issue has been 15 per cent in 2022-23. Cities like Bilaspur (44.1 per cent) and Jaipur (7.5 per cent) had raised money through asset monetisation in 2022-23.
- Another addition to revenue of ULBs can be achieved through rise in circle rates and increase in stamp duties in case of property transactions. Among the cities for which information is available, circle rates had increased faster in ABD areas as compared to other areas between 2015-16 and 2022-23 in Agartala (700 per cent vs 67 per cent), Srinagar (230 per cent vs 44 per cent), Gwalior (90 per cent vs 57 per cent), Pune (35 per cent vs 11 per cent), Thane (77 per cent vs 49 per cent), and Lucknow (100 per cent vs 54 per cent).

Findings are summed up in Figure 6.

Figure 6: Revenue Enhancement Impact of Smart City Projects (2015-16 vs 2022-23)



Source: **MoHUA**

6.1.3 City Economy Benefitted through Retrofitting/ Redevelopment Projects

- Of the cities for which data are available, 59 cities had initiated retrofitting projects through SCM fundings. Of them, 21 had initiated commercial projects, 18 institutional/ office space projects and 6 residential projects.
- Of the cities for which data are available, 57 cities had initiated redevelopment projects through SCM fundings. Of them, 17 had initiated commercial projects, 15 institutional/ office space projects and 3 residential projects.
- Cities were asked t if economic activities (real estate, commercial, tourism etc.) had increased in the area after completion of retrofitting/redevelopment projects. They were asked to answer between 1 and 5, 1 being 'strongly agree' and 5 being 'strongly agree'. Overall, the score was 4.3, which means they quite agree with the statement.
- Similarly, cities were whether private investment in the area got a boost from the retrofitting/redevelopment projects and the overall score was 4.2, which means they quite agree with the statement.
- Cities were asked if revenue from land/ property sale/ purchase registration had increased due to retrofitting/redevelopment projects. The overall score was 3.9, which means their thought was between 'agree and neutral'.
- Cities were asked if lease/rental/contract gains of the municipality concerned increased due to retrofitting/redevelopment projects. The overall score was 4, which means they agree with the statement.

- Cities were asked if retrofitted/redeveloped site can run as a self-sustaining model and generate revenue for its operations. The overall score was 3.7, which means their thought was between 'agree and neutral'.

6.2 City Visits and Primary Assessment

To meet the stakeholders associated with smart city interventions and those who were impacted by them, we visited three cities, namely, Ranchi, Surat and Indore. The timeline of the visits were as follows:

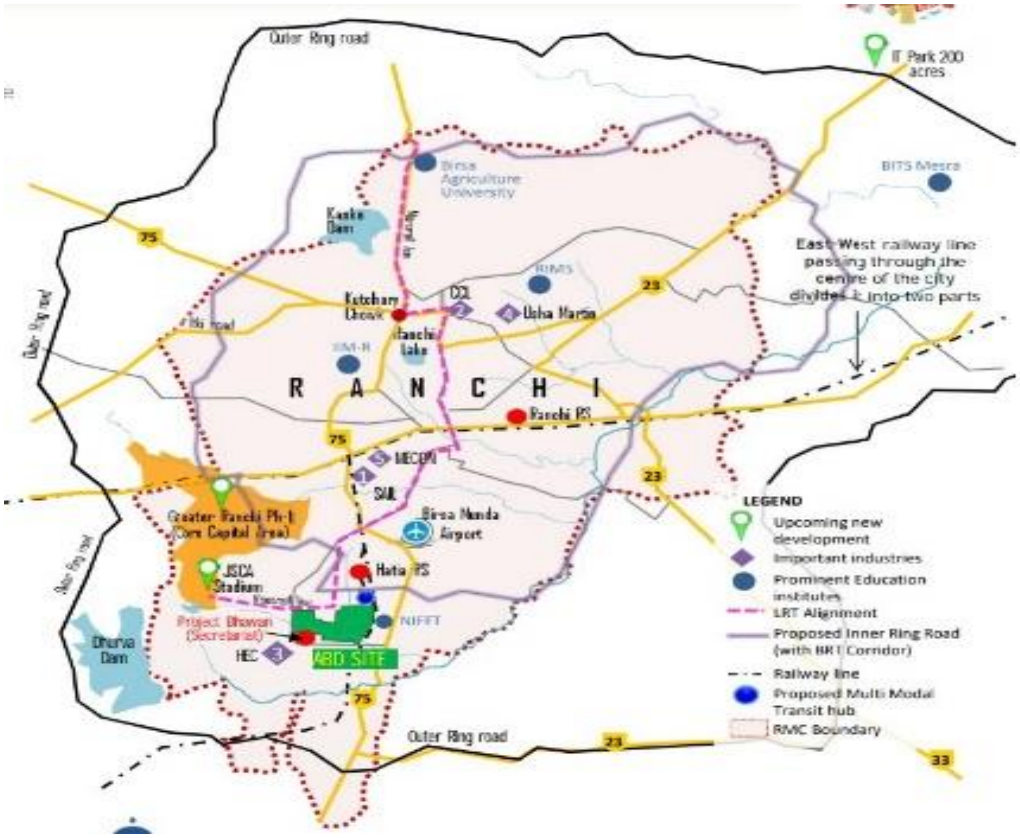
Ranchi – 27 March 2024 to 29 March 2024

Surat – 2 April 2024 to 4 April 2024

Indore – 5 April 2024 to 7 April 2024

6.2.1 City visits and Primary Assessment–Ranchi

Area based Development (ABD) in Ranchi: The smart city area- based development intervention was a greenfield project on 656 acres of land developed at Dhurwa in Ranchi. Through the ABD, there were development of 13 projects worth ₹ 940 crore with focus on education along with provision of basic amenities like drinking water, sanitation, sewage and solid waste management in an integrated way to address the challenges of urban infrastructure issues posed by Ranchi's rapidly growing urban population[17].



[17] Smart City Mission website.

1. Relevance

The smart city proposal elucidated on the city's potential to be a knowledge-based hub attracting best think tanks from all over the country and enhancing the education and research capacities of its human capital. The vision statement calls for "Ranchi to be a hub for education – for both formal and non-formal sector, by reinforcing its good educational institutes in preparation for welcoming knowledge-based industries". It also envisions the opportunities to develop the city into an eco-tourism hub, tribal tourism development centre, herbal medicine and food processing hub, and promote its existing mineral-based industries and enthusiasm for sports.

Major challenges identified were inadequate higher / technical education facilities; poor urban planning, road infrastructure and public transport system; lack of specialised medical facilities; poor road and rail connectivity; security for women; and absence of a sewerage system. Also, the existing areas were quite congested and there was a need to decongest these areas by developing a smart city with all smart elements which will be beneficial to people of all socio-economic backgrounds.

Furthermore, the proposal aims to develop an efficiently-managed traffic and transportation system-based city aided by Information & Communication Technology (ICT) in all aspects to reduce the travel time of commuters and incidents of traffic violations to make Ranchi a safe city for pedestrians and commuters.

The smart city development is carried out in two components:

- Area-based Development – Ranchi has undertaken a greenfield, transit-oriented area-based development on 656 acres of land in Dhurwa area. It includes a complete overhaul of the hitherto undeveloped area with construction of various facilities under major heads such as residential, institutional commercial, public/semi-public, mixed use and open-space/green cover.
- Pan-city Development – This development is concerned with bettering facilities in the city overall. In Ranchi, the major projects are the development of the Regional Integrated Traffic and Transport System (RITTS) aiming to integrate all the present and upcoming solutions, such as public transport management, parking and fare management, corridor management (traffic) and others, under one umbrella through Information Communication Technology (ICT).

2. Coherence

Dhurwa is at the heart of the city with easy access to all prominent establishments and thus the smart city intervention will have far reaching impact on all areas of development and all sections of the society in terms of revenue generation, employment generation and quality of life. The area is surrounded by a mixture of residential buildings, IT industries and government offices. While selecting the area for greenfield development under Smart City Project, various modes of citizen engagement were undertaken such as talk shows, structured questionnaires, print media, radio jingles, social media, MyGov portal polls, ward level polling, pamphlets and more. In the MyGov and talk show polling results, a majority of the public votes accrued to the greenfield development in Dhurwa area for area-based development.

3. Effectiveness

The Smart City SPV is responsible for the planning and development of the project area. The development of various facilities are as listed below:

i. Residential – 600 dwelling units for all income households – HIG, MIG, EWS/LIG

ii. Commercial – 5-star hotel, 3-star hotel and restaurants

iii. Institutional – schools; law, fashion and business colleges and skill development training institutes, hospital development, Jharkhand handicraft development and sports complex

iv. Public/Semi-Public – parks dedicated for seniors, urban civic tower, JUMPI campus

v. Mixed Use

vi. Auxiliary Infrastructure/Utilities – roads, street lights, bus lanes, overhead wires, underground facilities for water, power lines, 2 underground clean water reservoirs, solar energy, 1 gas-insulated power plant, power generation and transmission infrastructure, water and sewage treatment plant and riverfront development

The modus operandi of the SPV is as follows:

i. Integrated Township Programme which provides all basic amenities to all

ii. Smart and sustainable due to use of renewable energy, water conservation and restoration efforts

iii. Transit-oriented development with the aim to enhance last mile connectivity and reduce the need to walk 400 meters.

iv. The SPV is also responsible for the operation and maintenance of the ICCC from where all the traffic surveillance system is managed.

As of now, a majority of the auxiliary infrastructure has been developed and all plots have been put up for auction. The auction is being conducted online (https://eauction.rsccl.in/), promoting an efficient and transparent process to apply for plots under various heads (institutional, commercial, residential and others), each having a distinct eligibility criterion. Apart from the state-of-the-art infrastructure and smart solutions made available in the area, various ways of attracting investors have also been devised. A very significant benefit is that environmental clearance/forest clearances have been taken by the officials and investors will not need to spend their resources to acquire the same. Moreover, the pricing for institutional plots is fixed at 50 per cent of base price and institutions, and institutions which secure a high spot in global university rankings, would be allotted 25 acres at the price of 1 rupee each. Incentives are being given in the form of reduced FARs (floor area ratio) for use of renewable energy in buildings. Signature projects such as the urban civic tower and JUMPI campus will also be able to attract investors.

4. Efficiency

Since the selection of Ranchi, in the fast-track round of the mission, in May 2016, most of the infrastructure has been developed and is being maintained by the various developers, which includes L&T Construction and Shapoorji Pallonji. The remaining bit is regarding auctioning of plots, which is underway currently. As per Smart City officials, the main reason behind delays has been Covid-19 and the consequent lockdown across the country. They also claimed that

there have been no cost overruns, attributing this feat to good planning and implementation of projects.

However, the project manager of Shapoorji Paloonji had contrary views in this aspect. We were informed that there were various issues with planning and implementation itself. For instance, they were allotted land for the development of a convention centre, with the capacity to accommodate 5000 people, which was dropped mid-way during construction and led to loss of resources. Currently, Shapoorji Paloonji is in charge of constructing the urban civic tower, which is 70 per cent completed, but they are still not sure from where the water will be supplied to the tower as also the drainage. While water pipes have been laid, connectors have not been fixed. Similarly, the road connecting to the urban civic tower is at a considerable height which has made the entry/exit to the tower difficult. Moreover, they were told that the soil, which had to be dug for construction, comprised 40 per cent rock and 60 per cent sand but later it turned out to be more than 60 per cent rock. This meant that to dig the ground, blasting of rocks was required, which resulted in more time and higher costs.

The project manager of L&T construction mentioned that they will be responsible for the maintenance of the infrastructure, developed by them, for the next 5 years after which the responsibility will be shifted to the smart city. L&T project managers, praised the Union government's zeal and active participation in bringing about development which is oriented towards harnessing new and efficient technologies and initiatives, but did not have the same impression about the state government which they found to be rather lackadaisical and not very participative in the projects, resulting in poor project management and monitoring.

While the project managers made their discontentment apparent regarding these issues, they were extremely pleased and satisfied with the timely release of finances for these projects, which were governed by Jharkhand Urban Development Corporation (JUDCO).

5. Impact

The smart city mission is estimated to benefit 1.50 lakh people-- 80,000 household members and 70,000 floating population. Overall, the smart city mission seems to be well received by the people, who anticipate positive effects of the developments, both direct and indirect, in the surrounding areas. For instance, businesses such as shops owners, petrol pumps stations anticipate being open for longer hours in the night catering to a larger population in the area, which would generate higher revenue and could also lead to more employment opportunities.

The implementation of the ICCC and e-challan system have been a major hit while 24/7 surveillance of roads for traffic and transport management led to reduction in traffic violations, congestion and improved flow of traffic. The ICCC system also facilitates one-to-one immediate correspondence via call between ICCC operators and traffic police personnel, with the use of telephones placed at various traffic check-points, for quick resolution of issues such as accidents, disbanding gatherings and women safety concerns among others. A significant reduction in traffic violations such as over speeding, rash driving and not wearing helmets have been observed. Al-based Automatic Number Plate Recognition (ANPR) cameras, Red Light Violation Detection (RLVD) system, Speed Violation Detection (SVD), integrated e-Challan and Adaptive Traffic Control System (ATCS) have been deployed to manage all the components of the traffic management and its regulation in the city.

Some concerns have been raised by traffic policemen which involve the efficacy of issuing challans even with the e-challan system. It was observed that many people have challans issued against them but were not aware of it. This was true because issued challans were sent to violators on residence address via post or on registered mobile phones but these were not received by them due to various factors such as change in mobile number, purchase and registration of vehicles done by someone other than the violators and change in address among others. This has frequently led to people having multiple challans unknowingly leading to a high challan burden.

Some traffic policemen have mentioned that as more and more areas and roads are covered by CCTV surveillance, the less will be the need to deploy traffic policemen. But this remains partly true since some roads in Ranchi do not have a proper traffic light system and traffic policemen are required to direct traffic to avoid jams.

Finally, an important boon of CCTV surveillance and smart street lighting is safety of women. For improved visibility on streets, smart sensor-based street lighting, using solar energy, along 20.74 km of road network has been implemented in ABD area of Ranchi Smart City. Currently more than 1400 street lights along roads are installed in the ABD area. The city has also successfully adopted Public Bike Sharing (PBS) which enhanced the mobility pattern in the city through last mile connectivity.

Many women have particularly pointed to the enhanced safety in the city. Moreover, people were also uninformed about some facilities such as the call system for immediate correspondence between traffic check point phones and ICCC. It is crucial to make people aware of the facilities and amenities being developed in their area and city.

6. Sustainability

As per Jharkhand Smart Cities Land and Other Fixed Assets (Utilisation, Allotment and Disposal) Rules, 2019, there is a provision of 10 per cent solar power to be generated for all the developers / builders / agency in Ranchi Smart City – ABD Zone. It is intended to gradually increase solar power generation through schemes such as Solar Park Scheme, VGF Schemes, Grid Connected Solar Rooftop Scheme etc.

Since the area-based development is greenfield in nature with the smart city SPV acting as the administrative and governing authority, smart city officials are very sure of revenue-generating potential of such development. In this setting, revenue generation is separate from municipal corporation revenues.

The total expenditure done by the SPV amounted to Rs 1,500 crore – Rs 711 crore for the land and Rs 800 crore on the infrastructure development-- which have been financed by grants received, amounting to Rs 980 crore, from the Centre and the state government. They are confident of amassing the amount to repay the Rs 711 crore, and even in excess, from the auctioning of land plots. Additionally, all plots, other than residential, will be on leasehold for a maximum period of 99 years. Land monetisation, sub-leasing of property, property tax levied in the area and charges on advertisement on property are also ways of generating revenues. In FY 2021-22 & FY 2022-23, the SPV earned Rs 424.9 crore from land sale and Rs 5.09 crore from rent. It is anticipated that as commercial and residential properties are developed and rented/sold, revenue generation of the SPV will increase by 30 per cent. The land and property prices are also expected to increase by 40 per cent.

Currently, it is mandatory to construct buildings with GRIHA 2-star rating in Ranchi Smart City - ABD Zone. Additionally, there is a provision for incentives in the form of additional Floor Area Ratio (FAR) for buildings, achieving GRIHA rating of 3 stars and above. In the coming years, it is envisaged to mandate higher levels of GRIHA rating in all buildings. It will increase revenue generation through balanced development by ensuring compact development.

Also, the e-challan infrastructure has reduced the room for bribes and evasion of challans, with 4,000 challans being issued in the city on average. While currently the challan collection is going to the department of transport, conversations are taking place regarding sharing of these collections since the ICCC infrastructure, which facilitates the e-challan system, is operated and maintained by the smart city SPV.

The area-based development had paid close attention to environmental sustainability, with 37 per cent of the area being covered by open space & green area parks, playgrounds, and recreational spaces in order to enhance the quality of life of citizens, reduce the urban heat effects in areas and generally, promote eco- balance. While some people did mention tree felling for road construction, officials are working towards environment-conscious development such as use of renewable energy, making parks and planting tress which run parallel to roads on both sides and special efforts for riverfront development and water restoration and conservation. To ensure safe disposal of wastewater generated in ABD area of Ranchi Smart City, 16MLD Sewage Treatment Plant (STP) along with 14.44km sewerage network are being developed. Thirty per cent of the recycled water will be utilized for non-potable uses in buildings and the remaining recycled water for landscaping and rejuvenation of rivers.

6.2.2 City visits and Primary Assessment–Indore

Retrofitting and Redevelopment initiative in Indore (Chhappan Market): The intervention was development of a traditional market into a developed market with all modern amenities like façade development of all shops, LED lightings, designer pavement space, plantation and greenery, a dedicated parking space and development of an open air theatre. The approximate cost was approximately Rs 4 crore. This will attract more customers to the market and thus will also create additional employment opportunities and generate additional revenue through user fee collection, betterment fees, land revenue, etc.

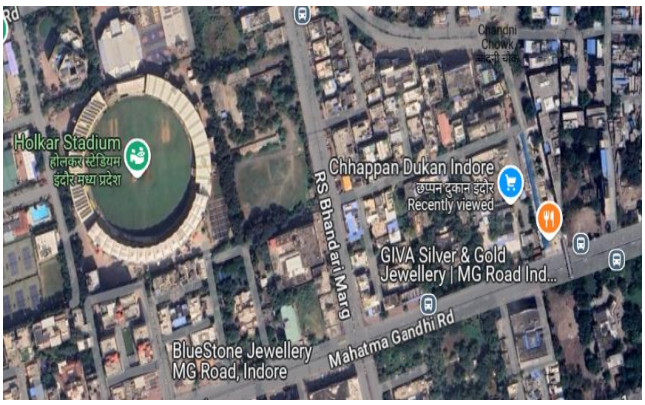
This intervention is a part of the larger endeavour which aims to integrate digital technology, knowledge and assets, to become more responsive to citizens, improve city services, and make the city more liveable. The initiative would cover transport and mobility, solid waste management, heritage and history, health infrastructure and IT initiative. The ABD initiative would combine retrofitting with redevelopment to improve the core of the city[18].

The smart city development is carried out in two components:

- Area-based Development – This includes retrofitting and redevelopment projects.

[18] Indore Smart City Mission website.

- Pan-city Development – This development is concerned with bettering facilities in the city overall. In Indore, the major projects are the Integrated Command Control Centre System (ICCC), Intelligent Transportation System (ITS), and Intelligent Solid Waste Management (ISWM)



1. Relevance

The need of development of the Chhappan Market arose as the popular hang-out place was running into multiple issues like congestion, bad lighting, no parking place, and no recreational facilities. For this it had become unsafe, particularly for women. Due to this families and women had stopped coming to the place. When we talked to some shopkeepers and visitors, we came to know that people were bringing their vehicles right in front of the shops, causing inconvenience and also posing security threats.

2. Coherence

Chhappan Market has always been a popular hangout spot for Indore residents and an attraction for tourists because it is located very near to tourist places like Rajwada Palace, Lal Bagh Palace, Zoological Garden and many more attractions. This is Indore's famous food street. All the shops at Chhappan Market are more than 40 years old and had developed a name for themselves and were unwilling to relocate to a different place. People from all walks of life, like students, office goers, housewives, retired people, visit the place. After the redevelopment of the market, it has also become a tourist attraction.

3. Effectiveness

The purpose of the Smart Cities Mission is to drive economic growth and improve the quality of life of people by enabling local area development and harnessing technology, especially technology that leads to smart outcomes. Area-based development will transform existing areas (retrofit and redevelop), including slums, into better planned ones, thereby improving liveability of the whole city.

The vision of Indore Smart City was "Imagining Indore to Inherit, Innovate, Include, Incubate and Invest" for "an ideal world-class smart commercial metropolis that thrives on investment opportunities, incubating business and ideas, rich inheritance and inclusive development"[19]. Keeping in mind this vision, Chhappan Market was converted into a non-conventional structure. It created a well-planned ecofriendly space for the people. Whoever visits Indore,

[19] Op cit

they definitely visit Chhappan Market due to the attraction of the place and mouth-watering food. The smart city initiative streamlined the food system for mandatory licensing and registering food businesses, redevelopment of food streets, promotion of healthier food options, and addressing the issue of food waste. Redeveloping the area gave the opportunity to the government and businesses at the location to grow financially.

4. Efficiency

The construction and renovation work were completed on time in 53 days (as against 56 days earmarked for it) as informed by a Smart City official. They put up a countdown timer at the site for 56 days. Minimal number of trees cut during the process. The structures of the shops were not changed, while only the area outside was renovated. The thrust of the project was gaining the trust of shopkeepers and visitors. All were taken on board while carrying out the work.

5. Impact: Social, environmental, economic, Spillovers

The redevelopment of the market had wide- ranging impact. First, the footfalls had increased five-fold, thus creating additional business opportunities for the shops. With better lighting, better parking place, and better recreational facilities, there has been increased footfalls of women and families. With installation of CCTV cameras, thefts have also come down. There is now a separate organized parking space for two-wheelers, though not much space for four-wheelers to park. There was a multi-level car parking in plan, the officials said. Number of tourists has gone up in and around the area as compared to the locals. It has become a 'SELFIE POINT' for the people as described by some shopkeepers at Chhappan Market. A lot of sitting space under trees makes it an ideal spot for eating, hanging around and casual meetings.

Regarding increase in business, there was a mixed view. Many shopkeepers opined that increase in footfall didn't directly affect the sales of the outlets. For many, the logistics cost had gone up with no increase in business. Land and property prices went up near the area. Also, the markets nearby, which were defunct a few years ago, have started booming due to the spillover effect of the smart city intervention.

6. Sustainability: Environmental, Financial

As discussed above, the current redevelopment plan is a part of the larger endeavour which aims to integrate digital technology and knowledge and assets to become more responsive to citizens, improve city services, and make the city more liveable.

- The bulk of the revenue from Chhappan Market comes from advertisement, user charges from assets created like toilets and parking, betterment charges amounting to 5 per cent of the ceiling rate collected from each shop, and maintenance. The maintenance agency takes care of maintenance and it collects charges from shops.
- The Indore Smart City Development Corporation Limited (ISCDL) is co-owned by the Indore Municipal Corporation and Madhya Pradesh Urban Development Company Limited (MPUDCL) with both owning 50 per cent stake. As reported by the officials of ISCDL, they have generated well-maintained sources of revenue and a few are still in progress, acting as a consultancy in various govt. projects and charging fees for the services, rental income, asset monetization etc.

- ISCDL has resorted to non-conventional sources of revenue like land monetisation, green bond, carbon credit, and through PPP. Carbon Credit Developer & Supplier EKI Energy Services Ltd. is headquartered in Indore.

6.2.3 City visits and Primary Assessment–Surat

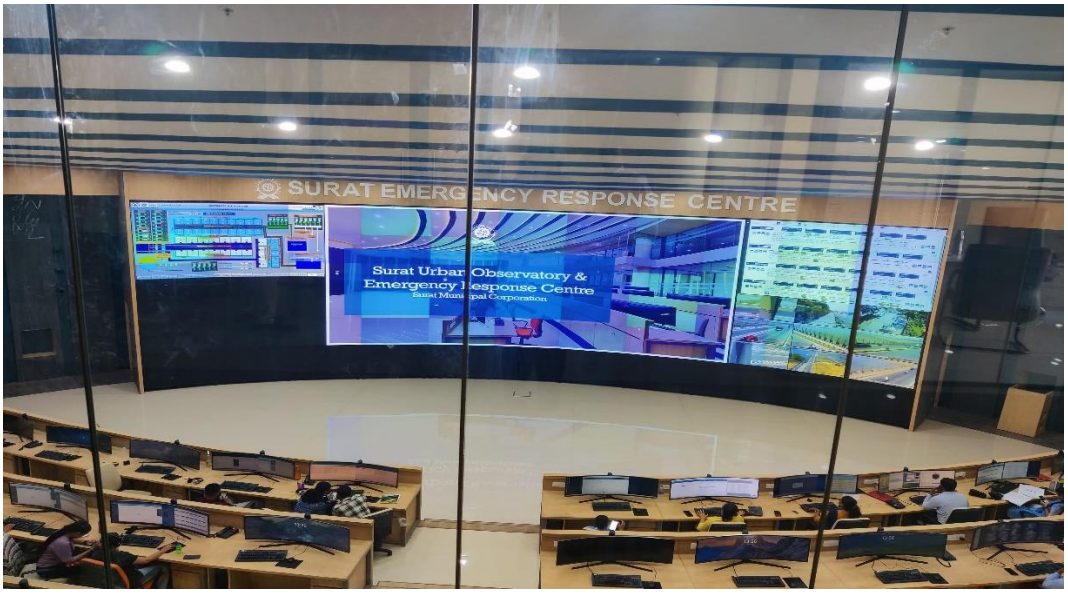
e-Challan collection project in Surat trough the established ICCC and use of ICT: The use of technology for traffic enforcement and regulation has been carried out through the Smart City Mission initiative. The department has implemented the integrated "e-Challan" project to fully automate the enforcement of traffic fines throughout Surat city by deploying CCTV cameras, mobile applications and the website. This is a good example of e-governance which has advantages like transparency, accountability, reduction in leakages, and thus leading to additional revenue generation. This also reduces pollution by facilitating smooth traffic movement and less traffic jams.

e-Challan collection project in Surat is a part of the Integrated Traffic Control System (ITCS) which is managed by the Integrated Command and Control Centers (ICCC). ICCC is controlled by the Surat Smart City Development Limited (SSCDL), a Special Purpose Vehicle (SPV) under the Surat Municipal Corporation.

ITCS offers modern amenities like Traffic Surveillance Cameras, Emergency Call Box System, Speed Violation Detection System, Automatic e-Challan generation, and Speed control signboards. . It improves journey time reliability, increases operational efficiency, improves road safety, increases traffic signal efficiency to receive real time information and improves citizens' services.

e-Challan collection project in Surat is a joint effort of ITCS and Surat Police who look after the last mile of challan collection. Traffic violations with proofs are shared with Surat Police by ITCS on a real time basis and the Surat Police issues and collects challans based on this.

When we visited Surat, the merger of the e-Challan collection system with ICCC managed ITCS had not happened and the city was using the 'one nation one challan' system.



1. Relevance: Why was this intervention needed?

In a city like Surat, proper management of traffic and the challan system was very much required. This has environmental aspect (reduce traffic congestion by proper traffic management), revenue aspect (traffic challan collection being made digitized and automated reduces chances of leakages) and public convenience and safety (less mishaps on roads, safety through online vehicle tracking). This would also reduce travel time and thus save productive time of people. Also, some people, particularly women who were not coming out, could go for work.

2. Coherence: Why the location was selected?

Since it is a pan-city project, this does not apply here. However, inclusion of more and more areas under ITCS will expand the scope of business in the city and thus reduce congestion in the busy market places.

3. **Effectiveness**: The extent to which the intervention achieved, or is expected to achieve, its objectives

The vision of Surat Smart City was smart utilisation of the city's potential for enhancing quality of life for the citizens by providing equal access to best quality physical and social infrastructure and mobility through leveraging state-of- the- art technology, making Surat a futuristic global city with focus on enhancing economy, protecting ecology and preserving the identity and culture of the city.

With all existing systems integrated with ICCC, decision- making by the administration will be faster. With better surveillance systems and online vehicle tracking, people have developed faith in public transport and hence its use has increased in the city. In the earlier road surveillance system, only speeding and red light jumps were captured and acts like talking while driving and not wearing seat belts were to be captured manually, adding to work of the police personnel. While we talked to the traffic police, they said the new development will make their work much easier. Also, it would be transparent and leakage- free. Online vehicle tracking is expected to reduce vehicle theft and road rage cases. to a significant extent. Better traffic management will reduce environmental pollution and reduce travel time.

4. Efficiency: Judicious use of resources, Completion on time, (Time and cost overruns)

There is a proper town planning scheme in place at Surat Municipal Corporation (SMC) where all stakeholders are roped in to get things done. The SMC takes care of land acquisition for the smart city projects and the city looks after its implementation. Every month, there is a review meeting for every project and milestones are decided and all work towards achieving those milestones. This has helped avoid time and cost overruns.

5. Impact: Social, environmental, economic. Spillovers

While the smart city intervention has improved citizens' trust in the system, safety has improved through real time tracking, better traffic management. Public revenue has increased through digitisation and automation by increasing transparency and reducing leakages, pollution has declined through better traffic management which has also improved businesses in far- flung areas.

6. Sustainability: Environmental, Financial

As discussed above, the current pan-city plan is a part of the larger endeavour which aims to integrate digital technology and knowledge and assets to become more responsive to citizens, improve city services, and make the city more liveable.

- Once the e-Challan collection project in Surat will be in operation with integration of ITCS with police's e-Challan system, the Smart City Mission and police will work out a revenue-sharing model. They revealed that 20 per cent of challan proceeds will be shared with ICCC by police.
- The Surat Smart City Mission has developed Asia's largest bio-diversity park, where 70 per cent of the physical work has been completed. It has led to the adjoining areas seeing a huge jump in prices and so circle rates were increased many-fold. The agreement is that 80 per cent of stamp duty will be shared with the smart city.
- The smart city has also successfully issues bonds and entered into PPP, adding to its revenues.
- Environmental sustainability is ensured by better traffic management and solid waste management.

7. Study Outcome and Conclusions

The present study on "Impact on Revenue Enhancement of ULBs/ SPV Through Implementation of Various Smart Cities Project (Competitive and Cooperative Federalism)" was carried out through three case studies, namely, Area- based Development (ABD) in Ranchi, Retrofitting and Redevelopment Initiative in Indore (Chhappan Market), and e-Challan Collection Project in Surat through ICCC and use of ICT. The first two interventions are area-based development with the one in Ranchi being an example of greenfield development and Indore being an example of a brown-field retrofitting and redevelopment initiative. The Surat intervention falls under city-wide development through innovative application of ICT. The study also analysed the relevant data available for all the smart cities.

7.1 Critical Challenges

A rapidly growing urban population and significant migration from small towns and villages towards the cities have contributed to the deterioration of quality of life in urban spaces caused by environmental degradation, lack of pure drinking water, traffic congestion, overcrowded health and education services, and the like. Thus there has been a need to providing core infrastructure to the expanding population with special focus on clean and sustainable environment and giving a decent quality of life to citizens.

What lies at the heart of the smart city development project is funds to carry out the planned development works. As it is a joint effort of the central government, state governments and Urban Local Bodies (ULBs), contribution is made by all the three entities, covering the three tiers of governance.

There is a clear division of jurisdiction of revenue collections (tax revenue) among all the three tiers of government. However, GST implementation had adversely affected the ULBs as it took

away critical sources of tax revenue like octroi, local body tax, entry tax and advertisement tax without providing any compensation[20].

Whether smart city projects will be carried out only on the basis of "grants" from central and state governments or there would be revenue sustainability to the mission with the projects contributing to revenue generation for future developments is the critical issue. Given that traditional sources of revenue like taxes, user charges, etc. are not enough, smart cities will have to resort to non-conventional sources like PPP, raising money through public issue (bonds, green bonds) and asset monetisation. However, this has hardly been explored by most of the smart cities as they continue to rely on grants/ transfers from the Centre and state government concerned. This puts a question mark on the financial sustainability and financial autonomy of smart cities. The question is if the Smart City Mission (SCM) project is closed, how will the good initiatives taken up by the smart cities continue.

Another big challenge is proper coordination among all the stakeholders. As smart city projects have wider impact, they also need coordination among multiple stakeholders for successful completion. This came to light when we visited Ranchi as part of a case study. On the contrary, Surat was a different case where there is proper coordination among all stakeholders.

7.2 Replicable Best Practices

- Indore: The Indore Smart City Development Corporation Limited (ISCDL) is co-owned by Indore Municipal Corporation (MC) and Madhya Pradesh Urban Development Company Limited (MPUDCL) with both owning 50 per cent stake. As reported by officials of ISCDL, they have generated well-maintained sources of revenue. There is clear division of tapping revenue potential among all the three entities. While the MC and MPUDCL are taking care of traditional revenue sources like property tax, user charges, etc., ISCDL is taking care of non-conventional revenue sources where it has expertise. Indore is the first smart city to raise carbon credit as they have raised money through PPP and bond issuance. Another important feature is that they have foreseen revenue generation aspect in every project they had undertaken. The project "*katchra to kanchan*" is a best example of how solid waste management can be taken as a source of green energy generation.
- Surat: Surat is a best example of proper coordination among all the stakeholders which helps avoid time and cost overruns. There is a proper town planning scheme in place at Surat Municipal Corporation (SMC) where all stake holders are roped in to get things done. SMC takes care of land acquisition for the smart city projects and the smart city looks after implementation. Every month, review meeting is held for every project to decide the milestones and all work towards achieving them. However, since various stakeholders contribute to an effort and revenue is collected by one, there is a need of a transparent revenue-sharing model. For example, Surat Police can optimise its revenue by using the ICCC developed by the smart city. The former will share 25 per cent of revenue from e-Challan collection with the smart city. Also, since property prices and circle rates increased manifold due to the Bio-diversity Park developed by

[20] ICRIER (2019): "Finances of Municipal Corporations in Metropolitan Cities of India", A Study Prepared for the Fifteenth Finance Commission.

the smart city, the agreement was that 80 per cent of stamp duties collected in those areas would be shared with the smart city.

- Ranchi: Ranchi is a best example of carrying out large scale greenfield smart city initiatives in a self-sustained manner. Ranchi SCM was confident of amassing the amount to repay the Rs 711 crore they had received from the Centre and States in the form of grants from the auctioning of land plots. Additionally, all plots, other than residential, will be on leasehold for a maximum period of 99 years. Land monetisation, sub-leasing of property, property tax levied in the area and charges on advertisement on property are also ways of generating revenues. In FY 2021-22 & FY 2022-23, the SPV earned Rs 424.9 crore from land sale and Rs 5.09 crore from rent. It is anticipated that as commercial and residential properties are developed and rented/sold, revenue generation of the SPV will increase by 30 per cent. The land and property prices are also expected to increase by 40 per cent. They had also provisioned for 10 per cent of electricity needs in the ABD zone to be met through solar power generation, thus contributing to environmental sustainability.

7.3 Recommendations and Policy Directives

Based on the three case studies and analysis of data for all the smart cities, the following recommendations can be given which will make smart city projects more successful:

- Since smart city projects involve multiple stakeholders for implementation and they affect multiple groups, what is of essence is consulting each and every stake holder who is involved in implementation or those who are impacted by the initiatives. Consultations will lead to timely completion of smart cities projects and it will have maximum benefits accruing to the people.
- Smart cities should always thrive for financial autonomy and financial sustainability. They should try to minimise reliance on grants from the Centre and states. They should look for ways where the developed projects will self-generate revenues.
- They should try exploring non-conventional revenue sources like PPP, bonds, asset monetisation etc. Bonds are better way of raising funds as they enhance the business acceptability of smart cities and this opens the door for other revenue sources.

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Appendix Tables

Appendix Table 1. State wise presence of smart cities across phases, number of projects and cost (costs in Rs crore)

State	No. of cities	Phase 1		Phase 2		Phase 3		Phase 4		All		Share in total cost
		No. of projects	Cost	No. of projects	Cost	No. of projects	Cost	No. of projects	Cost	No. of projects	Cost	
Andhra Pradesh	3	1	940.0	2	1193.9					3	2133.9	3.5
Arunachal Pradesh	2					1	511.5	1	279.5	2	791.0	1.3
Assam	1	1	328.0							1	328.0	0.5
Bihar	3			1	930.0	1	930.0	1	926.0	3	2786.0	4.6
Chandigarh	1			1	597.0					1	597.0	1.0
Chhattisgarh	3			1	396.1	2	953.7			3	1349.9	2.2
Dadra & Nagar Haveli and Daman & Diu	2							2	356.6	2	356.6	0.6
Delhi	1	118	1082.2							118	1082.2	1.8
Goa	1			1	327.6					1	327.6	0.5
Gujarat	6	2	3335.3	1	1177.6	2	1462.6			5	5975.5	9.8
Haryana	2	1	930.0	1	0.0					2	930.0	1.5
Himachal Pradesh	1					1	718.6			1	718.6	1.2
Jammu & Kashmir	2					2	765.7			2	765.7	1.3
Jharkhand	1			1	934.5					1	934.5	1.5
Karnataka	6	2	1214.5	3	2271.9	1	924.8			6	4411.3	7.2
Kerala	2	1	821.0			1	0.0			2	821.0	1.3
Lakshadweep	1							1		1		0.0
Madhya Pradesh	7	3	2599.5	2	1265.8	2	1050.9			7	4916.2	8.0
Maharashtra	8	2	1916.0	5	3680.0	1	373.9			8	5969.9	9.8
Manipur	1	1	234.7							1	234.7	0.4
Meghalaya	1							1	766.8	1	766.8	1.3

Appendix Table 1. State wise presence of smart cities across phases, number of projects and cost (costs in Rs crore)

State	No. of cities	Phase 1		Phase 2		Phase 3		Phase 4		All		Share in total cost
		No. of projects	Cost	No. of projects	Cost	No. of projects	Cost	No. of projects	Cost	No. of projects	Cost	
Mizoram	1					1	512.0			1	512.0	0.8
Nagaland	1			1	461.0					1	461.0	0.8
Odisha	2			1	768.0					1	768.0	1.3
Puducherry	1					1	617.8			1	617.8	1.0
Punjab	2											0.0
Rajasthan	4	1	527.0	2	2110.3					3	2637.3	4.3
Sikkim	2			1	326.4	1	832.0			2	1158.4	1.9
Tamil Nadu	11	2	1415.8	4	3569.0	3	2699.1	1	776.7	10	8460.7	13.8
Telangana	2			1	777.8	1	775.0			2	1552.8	2.5
Tripura	1			1	512.1					1	512.1	0.8
Uttar Pradesh	10	1	555.2	3	2189.1	2	1760.0	3	2331.4	9	6835.7	11.2
Uttarakhand	1					1	890.0			1	890.0	1.5
West Bengal	1	1	584.5							1	584.5	1.0
Grand Total	94	137	16483.7	33	23488.1	24	15777.7	10	5436.8	204	61186.3	100.0

Source: MoHUA

Appendix Table 2. State wise cost share across Categories (%)

State	ICCC	Water, sanitation and hygiene (WASH)	Smart Mobility	Smart Energy	Vibrant Public Spaces	Economic Infrastructure	Social Infrastructure	Smart Governance
Andhra Pradesh	22.1	0.3	3.5	8.9	5.9	7.1	30.1	22.2
Arunachal Pradesh	20.3	7.3	12.2	0.6	14.0	22.2	13.6	9.7
Assam	10.2	1.3	37.6	5.9	37.1	0.0	7.9	0.0
Bihar	22.7	0.3	14.9	0.2	14.3	0.8	37.6	9.2
Chandigarh	16.8	67.8	13.2	0.1	1.3	0.2	0.2	0.5
Chhattisgarh	36.9	0.7	18.6	1.0	15.9	3.2	5.1	18.7
Dadra & Nagar Haveli and Daman & Diu	10.9	17.1	37.0	13.6	2.1	8.6	0.4	10.3
Delhi	10.3	6.1	7.6	45.8	5.9	2.1	5.0	17.4
Goa	3.0	0.0	41.6	0.0	55.5	0.0	0.0	0.0
Gujarat	11.1	28.5	16.7	4.3	7.1	1.6	22.9	7.7
Haryana	74.2	0.0	0.2	8.6	0.0	16.0	1.0	0.0
Himachal Pradesh	24.6	0.8	22.4	5.2	27.7	15.0	3.1	1.2
Jammu & Kashmir	8.7	0.0	24.3	5.4	12.2	30.5	10.5	8.4
Jharkhand	72.7	27.3	0.0	0.0	0.0	0.0	0.0	0.0
Karnataka	9.3	28.9	20.0	6.1	7.9	11.4	10.6	5.9
Kerala	19.0	0.0	0.0	15.0	6.6	37.7	18.8	2.9
Lakshadweep	23.5	0.0	0.3	0.0	0.0	75.8	0.4	0.0
Madhya Pradesh	10.5	24.8	4.7	5.0	7.3	22.5	10.6	14.6
Maharashtra	21.5	20.4	17.8	5.6	6.9	14.8	7.0	6.1
Manipur	56.5	0.0	0.0	0.0	39.4	0.0	0.0	4.1
Meghalaya	37.0	0.0	16.9	4.7	1.7	24.1	15.6	0.0
Mizoram	35.6	0.6	0.0	7.4	4.5	13.3	38.5	0.2
Nagaland	31.6	0.0	4.3	0.0	0.0	57.1	7.0	0.0
Odisha	38.1	0.0	14.7	0.0	8.2	18.7	0.0	20.2

Appendix Table 2. State wise cost share across Categories (%)

State	ICCC	Water, sanitation and hygiene (WASH)	Smart Mobility	Smart Energy	Vibrant Public Spaces	Economic Infrastructure	Social Infrastructure	Smart Governance
Puducherry	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Punjab	49.1	0.0	41.1	4.6	0.0	0.0	5.2	0.0
Rajasthan	5.0	27.2	8.8	2.0	2.0	25.1	29.7	0.2
Sikkim	18.5	4.3	56.1	2.7	2.4	0.0	16.0	0.0
Tamil Nadu	5.5	15.2	10.7	10.0	21.4	25.5	6.6	5.2
Telangana	9.7	0.4	60.8	0.0	2.1	3.8	23.2	0.0
Tripura	46.1	0.0	36.1	0.0	8.9	8.9	0.0	0.0
Uttar Pradesh	23.2	6.0	15.7	3.8	7.2	12.1	17.6	14.4
Uttarakhand	34.3	8.9	5.7	3.1	19.3	0.0	27.5	1.1
West Bengal	4.4	8.2	54.7	5.5	8.5	11.6	0.9	6.3
Grand Total	17.8	15.9	16.5	5.4	8.7	12.0	15.5	8.2

Source: MoHUA

Appendix Table 3. Number of real estate projects under various categories by States

States	Recreational Facilities	Other Economic developments (Riverfront, Market development, etc.)	Education facilities	Tourism Projects developed	Water Supply	Solid Waste Management	Waste water and rainwater management	Energy	IT Connectivity	Safety and Security	Transportation	Projects for pollution monitoring and control
Andhra Pradesh	17	26	189	9	3	21	13	26	7	2	9	2
Arunachal Pradesh	10	8	5	11	1	2	2	1	1	2	3	1
Assam	1	1	0	3	0	0	1	3	1	1	2	0
Bihar	14	8	27	4	0	1	1	2	2	2	1	2
Chandigarh	0	0	0	0	0	0	0	0	0	0	0	0
Chhattisgarh	83	13	16	2	2	4	11	13	7	3	9	1
Dadra & Nagar Haveli and Daman & Diu	0	2	0	15	2	1	1	1	2	0	2	1
Delhi	8	9	14	8	4	11	2	15	22	1	16	9
Goa	1	0	0	0	0	0	0	0	0	0	0	1
Gujarat	1	1	6	2	15	6	4	2	9	5	7	2
Haryana	5	3	1	2	1	0	4	1	3	1	0	1
Himachal Pradesh	15	18	2	24	1	5	1	3	0	3	63	0
Jammu & Kashmir	8	49	2	47	1	10	1	1	12	5	3	2
Jharkhand	0	0	14	0	1	0	2	0	0	1	1	0
Karnataka	24	23	48	41	18	4	5	28	31	8	30	4
Kerala	25	19	2	24	0	5	0	4	8	2	16	2
Lakshadweep	0	0	0	0	0	0	0	0	0	0	0	0
Madhya Pradesh	39	54	25	58	16	55	14	42	27	8	14	1
Maharashtra	18	11	11	18	9	11	8	9	5	11	13	4
Manipur	1	4	0	0	0	2	0	0	0	1	0	0

Appendix Table 3. Number of real estate projects under various categories by States

States	Recreational Facilities	Other Economic developments (Riverfront, Market development, etc.)	Education facilities	Tourism Projects developed	Water Supply	Solid Waste Management	Waste water and rainwater management	Energy	IT Connectivity	Safety and Security	Transportation	Projects for pollution monitoring and control
Meghalaya	3	3	0	1	0	3	2	2	1	1	2	0
Mizoram	1	1	2	2	0	1	0	4	2	1	0	1
Nagaland	3	0	0	0	0	0	0	0	0	0	2	0
Odisha	5	8	1	1	1	1	1	1	1	0	0	1
Puducherry	1	0	3	3	0	0	0	4	1	0	2	0
Punjab	5	0	1	1	0	0	0	2	3	0	2	0
Rajasthan	22	2	20	49	5	18	11	5	7	5	1	1
Sikkim	0	1	0	0	1	2	1	4	1	1	5	1
Tamil Nadu	23	67	19	32	29	41	6	37	11	2	85	2
Telangana	9	2	8	2	2	7	6	0	2	0	19	0
Tripura	0	1	0	0	0	0	0	0	1	1	0	0
Uttar Pradesh	65	35	50	81	15	27	11	25	18	25	42	17
Uttarakhand	1	0	5	0	2	1	3	1	0	1	1	0
West Bengal	31	0	0	13	10	8	2	17	28	10	37	1
Grand Total	439	369	471	453	139	247	113	253	213	103	387	57

Source: MoHUA

Appendix Table 4. Views of States about the impact of ABD on the following aspects (Average, 1 is strongly disagree, 5 is strongly agree)

States	There is increase in economic activities due to development in ABD area	ABD based development has improved the economic identity of city.	Access to basic amenities has positively impacted the demand for properties nearby ABD area.	There is increase in newly constructed houses nearby ABD.	Rental value of commercial properties increased due to ABD area development.	Sale and purchase value of residential properties increased due to ABD area development.	Rental value of properties in residential areas increased due to ABD area development	Area based development generated employment for the people.	Sale and purchase value of commercial properties increased due to ABD area development.
Andhra Pradesh	4	4	4	4	5	5	5	4	5
Arunachal Pradesh	4	5	4	5	4	4	4	4	4
Assam	4	4	4	4	4	4	4	4	4
Bihar	4	4	4	4	5	5	5	4	5
Chandigarh	3	4	1	1	1	3	3	4	1
Chhattisgarh	4	4	4	4	4	4	4	4	5
Dadra & Nagar Haveli and Daman & Diu	4	4	4	4	4	4	4	4	4
Delhi									
Goa	4	4	3	2	3	3	3	3	3
Gujarat	5	4	5	4	4	5	4	4	4
Haryana	5	5	5	5	5	5	5	5	5
Himachal Pradesh	4	4	4	3	4	3	4	4	3
Jammu & Kashmir	5	5	5	5	5	5	4	5	5
Jharkhand	5	5	5	5	5	5	5	5	5
Karnataka	4	4	5	5	5	5	5	4	5
Kerala	5	5	5	4	5	4	3	5	4
Lakshadweep	4	4	4	4	4	4	4	4	4
Madhya Pradesh	4	4	5	4	5	5	4	4	5
Maharashtra	4	5	5	5	5	4	4	5	5

Appendix Table 4. Views of States about the impact of ABD on the following aspects (Average, 1 is strongly disagree, 5 is strongly agree)

States	There is increase in economic activities due to development in ABD area	ABD based development has improved the economic identity of city.	Access to basic amenities has positively impacted the demand for properties nearby ABD area.	There is increase in newly constructed houses nearby ABD.	Rental value of commercial properties increased due to ABD area development.	Sale and purchase value of residential properties increased due to ABD area development.	Rental value of properties in residential areas increased due to ABD area development	Area based development generated employment for the people.	Sale and purchase value of commercial properties increased due to ABD area development.
Manipur	3	3	3	2	2	2	2	1	2
Meghalaya	4	4	4	4	4	4	4	3	4
Mizoram	2	3	3	5	3	4	3	4	3
Nagaland	4	4	3	4	3	4	4	4	4
Odisha	4	4	5	5	4	5	5	4	5
Puducherry	4	3	3	3	4	4	4	3	4
Punjab	5	5	5	3	5	5	5	5	5
Rajasthan	4	4	4	3	3	3	3	4	3
Sikkim	3	3	3	3	4	4	4	2	4
Tamil Nadu	4	4	4	4	4	4	3	3	4
Telangana	5	5	5	5	5	5	5	4	5
Tripura	4	4	4	4	4	4	4	4	4
Uttar Pradesh	4	4	4	4	4	4	4	4	4
Uttarakhand	4	4	4	5	4	3	3	5	4
West Bengal	4	4	4	5	5	4	4	4	4
Grand Total	4	4	4	4	4	4	4	4	4

Source: MoHUA

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11 Indraprastha Estate, New Delhi 110002. INDIA.
Tel: +91-11-2345 2698, 6120 2698 www.ncaer.org

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