Smart Cities Mission in India: A Study

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Abstract

Cities are engines of growth for the economy of every nation including India. According to Census2011, nearly 31% of India's population lives in urban areas and contributes 63% of India's GDP. By 2030, it is expected that growing urbanization will lead to 40% of population in Urban areas and roughly 75% of India's GDP. Cities thus, need to develop comprehensively to accommodate the migrating population. This requires development of physical, institutional, social and economic infrastructure. To set in motion the virtuous cycle of growth, development of 'Smart Cities' is a way out. A 'Smart City' is conceptualization of an idea that varies from country to country and from region to region. For India, the picture of a 'Smart City' is a building that stands tall and firm on its pillars of institutional, physical, social and economic infrastructural developments. Long term goals can lead this concept by adding layers of 'smartness'.

National Smart Cities Mission is an urban renewal and retrofitting programme by the Government of India with the mission to develop Smart Cities across the country, making them citizen friendly and sustainable. The Union Ministry of Urban Development initiated the mission in collaboration with State Governments of various cities in 2015.It planned to include 100 cities with the deadline of completion of projects between 2019-2023.As of July 2024, 7202 projects out of a total 8018 tendered projects have been completed, utilizing ₹ 144,530 crores out of the total tendered amount of ₹164,163 crores.

This paper is an attempt to study the concept of 'Smart City', the challenges of urbanization, the Smart Cities Mission of Government of India- its implementation, results so far and the future that lies ahead. The analysis of data available would be used to structure a course of action indicative of the aim of Viksit Bharat @2047.

Keywords: Urbanization, Infrastructure, Smart City, Smart Cities Mission, Sustainable Development

Introduction

An economic study that revolves around the developing world inherently discusses the notion of dualism. The structure of economic set ups that accommodates for two contradictory forces coexisting within the framework captures the essence of dualism. The rural-urban divide is a part of this concept. The nature of forces in the developing world makes the divide distinct and prominent such that rural and urban dichotomy is evident. Then various push and pull factors work beautifully to summarize the movement of resources including human resources from rural to urban areas termed as Internal Migration. This explains the phenomenon of urbanization. Urban areas are characterized by features and facilities lucrative to the potential migrants. As cities come up and grow in the process of economic development, they start facing challenges. This rests on the basic problem of economics: limited resources. Thus, in cities, the pressure of population on land, infrastructure, and environment is massive and civic agencies are grappling with problems like clean air, mobility, sanitation, water, public safety, etc. Hence there is a need for developing a sustainable solution.

Cities are engines of growth for the economy of every nation, including India. Nearly 31% of India's current population lives in urban areas and contributes 63% of India's GDP (Census 2011). With increasing urbanization, urban areas are expected to house 40% of India's population and contribute 75% of India's GDP by 2030. This requires comprehensive development of physical, institutional, social and economic infrastructure. It is a city where there is a significant and extensive improvement in the physical, social, and economic infrastructure. Smart cities are needed to bring in growth and development in a country.

Smart cities are needed for the development of the quality of life of people in the cities. If the quality of life of the people is improved in cities, then naturally the city will attract more people and thereby more investments. To provide for the aspirations and needs of the citizens, urban planners ideally aim at developing the entire urban eco-system, which is represented by the four pillars of comprehensive development — institutional, physical, social and economic infrastructure. This can be a long-term goal and cities can work towards developing such comprehensive infrastructure incrementally, adding on layers of 'smartness'.

The conceptualisation of Smart City varies from city to city and country to country, depending on the level of development, willingness to change and reform, resources and aspirations of the city residents.

The Smart Cities Mission was launched in India on June 25, 2015, with the key objective of promoting cities to provide core infrastructure, clean and sustainable environment and give a decent quality of life to their citizens through the application of 'smart solutions'. Government of India launched the 100 smart cities mission in 2015.The objectives were:

- To integrate city functions, utilize scarce resources more efficiently, and improve the quality of life of citizens.
- To improve safety and security
- To improve the efficiencies of municipal services.
- The use of Information and Communications Technology (ICT) is at the core of enhancing the city's liveability, workability, and sustainability.

The Ministry of Urban Development had identified 24 key areas that cities must address in their 'smart cities' plan. Of these 24 key areas, 3 are directly related to water and 7 are indirectly related to water – Smart-metre management, leakage identification, preventive maintenance, and water quality modelling. Smart Cities Mission is one of the mechanisms that will help operationalize the nationwide implementation of the Sustainable Development Goals (SDG) priorities like poverty alleviation, employment, and other basic services. The 2030 Agenda for Sustainable Development, adopted by all United Nations Member States in 2015, provides a shared blueprint for peace and prosperity for people and the planet, now and into the future. At its heart are the 17 Sustainable Development Goals (SDGs), which are an urgent call for action by all countries - developed and developing - in a global partnership. They recognize that ending poverty and other deprivations must go hand-in-hand with strategies that improve health and education, reduce inequality, and spur economic growth – all while tackling climate change and working to preserve our oceans and forests.

The aim of this paper is to understand the concept of Smart City in the context of India, to understand the Smart Cities Mission and its implementation in India and to analyse the data available on this. The study primarily aims to put forth the future of this mission with a deeper understanding of its implementation since 2015, the challenges of the Mission and the way forward.

Review of literature

A lot of information on the idea and conceptualisation of Smart Cities and the Smart Cities Mission is available via the Government of India through the Ministry of Urban Development. An entire website and a concrete document in the form of Smart City Guidelines is available to thoroughly understand the idea and its implementation. The strategy, process of selection, funds, monitoring and convergence with other Government schemes is laid out in detail. The Guidelines discuss the challenges too. The Open Government Data platform provides all data to substantiate government claims. Apart from this, lots of research work on Smart Cities has been carried out both in India and Abroad.

Historically migration from rural to urban areas and, therefore the process of redefining the boundaries of the rural-urban fringe for expanding city regions played a key role in defining a city's population. In today's world, natural increase is expected to make a larger contribution to urban population growth than internal migration in many regions. This transformation of cities has been a major aspect, if not a driver, of economic development and they present the case of cities as focal points of economic growth. On an average, urban residents have better access to education and health-care as well as other basic services such as clean water, sanitation and transportation than rural populations do. Cities are also the major centres of consumption of resources. Currently, urban areas roughly occupy 3 percent of the planet's surface and, consume 75 percent of the global primary energy; they emit between 50 and 60 percent of the world's total greenhouse gases (UN 2015). For urbanisation to continue to offer important opportunities for economic and social development, it needs to be well managed. However, the speed and scale of urbanisation in developing regions challenge the capacity of governments to adequately plan and meet the needs of the growing number of urban dwellers. As cities grow, managing them becomes more complex and their populations become more diverse. Developing countries will need to adjust to this process much faster than developed countries did in the past (UN 2011). This, along with increasing levels of aspiration of the urban communities for a better quality of life and services, has forced city stakeholders to consider change in the management models of resources and infrastructure for cities and respond with innovative practices and scalable solutions [1].

Academic literature has a more holistic but general view about the main Smart Cities' components, while industrial and governmental literature has a more practical and short-term approach. The latter mainly concentrates on urban sectors that can be directly affected by urban authorities, such as transportation, energy, and buildings. Combining the keywords for all three domains results in several common components: services, transportation, people, governance, energy, and buildings. The keyword analysis of different notions of main stakeholders shows that academic literature presents a holistic and general point of view with four main groups: people, companies/industries, government, and university, while industrial literature has a more detailed and practical approach by adding NGOs, investors, planners and developers, contractors, etc. A Smart City framework is based on priority areas which are specific to the city's context. Any model can focus on one or more of these priority areas depending upon the agenda of the programme under which it is proposed or initiated. The priority areas can be categorised into Political, Economic, Technology and Environment based on the Abridged version of PESTLE analysis which is widely used as a tool to understand the new project business landscape.[1]

The establishment of the Smart City as a new city planning and development paradigm has been fast in both theory and practice. Data from recent studies suggest that the number of cities working on strategies and projects for smart city development is growing rapidly.[2]

In the 1990s, the rise of digital and the internet in urban areas began publishing the smart city concept.

However, the research was done on smart city previously, but the first work was published in 1994. During the 2000s, and especially 2010, this work grew exponentially with some success. When IBM, Cisco, other multinational ICT companies, and international bodies such as the European Commission and OECD began to express interest, the European Union designated smart cities as an international body. These organizations were paying particular attention to the smart city as one of the important areas of development. Another similar concept is Digital City, but the main difference between digital cities and smart cities is the emphasis on ICT and the smart city is an extension and development of the digital city, relying on various tools and material procedures and working to improve people's living conditions and comfort. But in countries with advanced economic and scientific development, the existence of smart cities is more powerful. In addition, the size of the city also plays an important role in realizing a smart city. As cities grow larger, smart city solutions need to address environmental impacts, but they may also share data, knowledge, and electronic services. Finally, the concept of smart cities is now widespread on different continents in theoretical research and empirical implementation. Also, improving citizens' quality of life is considered one of the major goals of urban areas.[3]

There are some critical factors that are crucial for understanding and developing smart cities. These factors have been used to design a framework that gives a more holistic view of the smart city initiative. The six pillars or factors are: (1) Social, (2) Management, (3) Economy, (4) Legal, (5) Technology and (6) Sustainability.[4]

In the approach to the Smart Cities Mission in India, the objective is to promote 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, create a replicable model which will act like a light house to other aspiring cities 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, and health and education.[5]

Analysis

With this background and the Smart Cities Mission already in action in India, we delve deeper into the mission and study its implementation till 2023 and analyse the Data available on this.

Open Government Data (OGD) is a philosophy and increasingly a set of policies that encourages transparency, accountability and value creation by making government data accessible and available to all. OGD has a progressive stratum. It has made great strides in recent years and can make far more in the coming years. Open Data has been acknowledged worldwide as the key enabler for achieving the UN Sustainable Goals. India has made significant progress in open data and accessibility in the last few years, compared to the previous decades Smart. In 2015, the Smart Cities Mission (SCM) was launched in India. The objective of the mission was to promote liveability, economic-ability and sustainability in cities with application of 'smart solutions. Under the mission, 100 Smart Cities were selected in India.

The mission has led to the development of an open data portal, smartcities.data.gov.in, where all the 100 Smart Cities can share their datasets in one common platform. As of September 2021, the portal has classified the catalogue into 25 sectors, and provides 75 templates (as a format for standardization, to be used by cities). The portal allows the cities to exchange valuable data, which can then be used by all

involved in the smart city ecosystem. The foundation pillars of Data Smart Cities are People, Process and Platform. They are envisioned to support the creation of an open data culture, leading to greater data exchange for open innovation and co-creation. As of September 2021, there are 3,203 catalogues, 3,827 resources and 242 APIs available on the Smart Cities Open Data Portal with 443,776 views and 82,097 downloads.

The Mission details can be explained via some diagrammatic analysis.

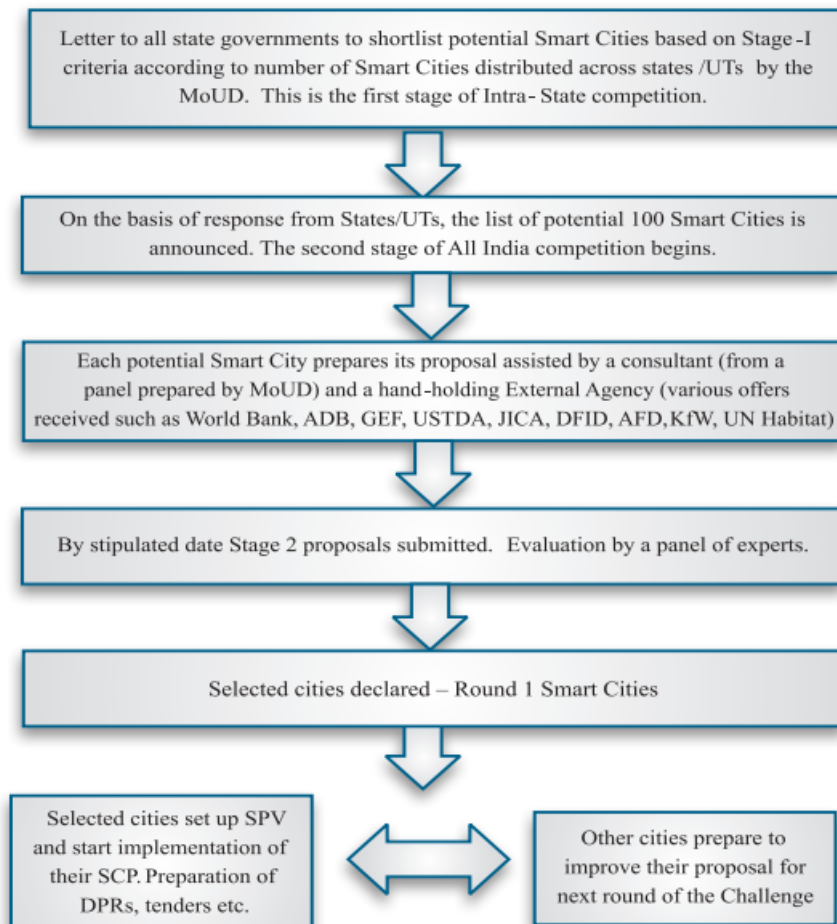**Expenditure on Smart Cities Mission in India in the time period 2016-2023 is depicted here:**

Open Data Sets
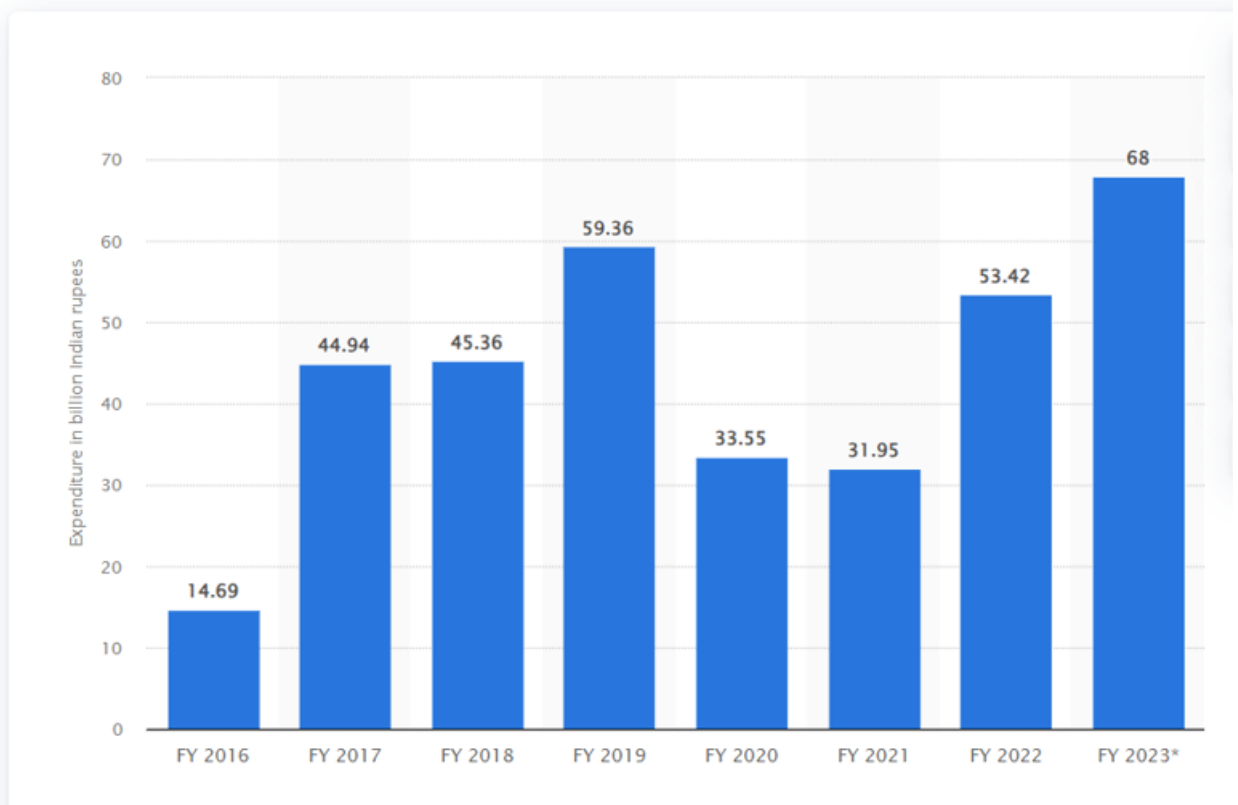
100	3,571	5,363	242	817,196	178,149
Cities	Catalogs	Resources	APIs	Views	Downloads
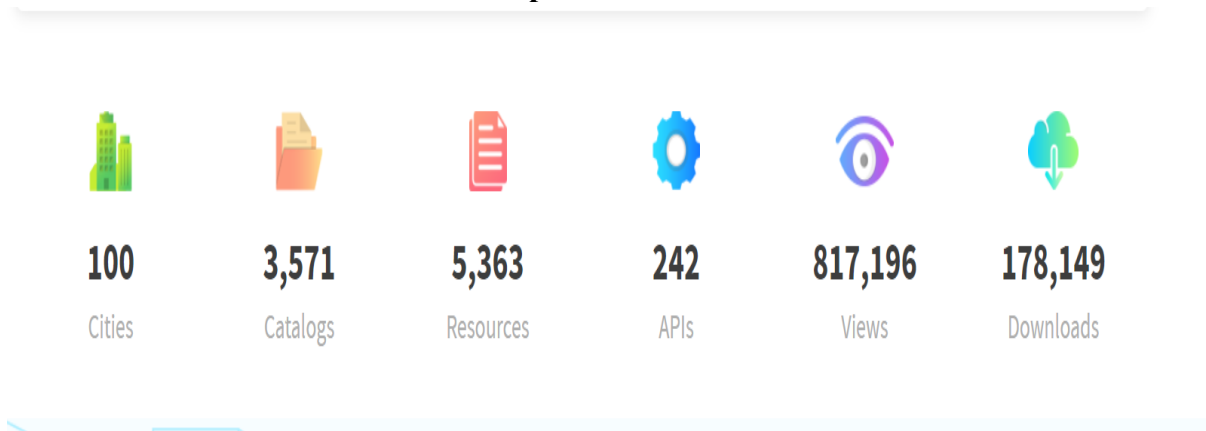
An illustrative list of Smart Solutions is given below:

Different steps in the selection of Smart Cities are given below.

When the Mission started, The implementation of the Mission at the City level was to be done by a Special Purpose Vehicle (SPV) created for the purpose. The SPV would plan, appraise, approve, release funds, implement, manage, operate, monitor and evaluate the Smart City development projects. Each Smart City would have a SPV which will be headed by a full time CEO and have nominees of Central Government, State Government and Urban Local Bodies (ULB) on its Board. The States/ULBs would ensure that, a dedicated and substantial revenue stream is made available to the SPV so as to make it self-sustainable and could evolve its own credit worthiness for raising additional resources from the market and Government contribution for Smart City is used only to create infrastructure that has public benefit outcomes. The execution of projects may be done through joint ventures, subsidiaries, public-private partnership (PPP), turnkey contracts, etc.

The SPV would be a limited company incorporated under the Companies Act, 2013 at the city-level, in which the State/UT and the ULB would be the promoters having 50:50 equity shareholding. The private sector or financial institutions could be considered for taking equity stake in the SPV, provided the shareholding pattern of 50:50 of the State/UT and the ULB is maintained and the State/UT and the ULB together have majority shareholding and control of the SPV.

The idea of convergence of the Smart Cities Mission with other Governement schemes was also visualised. Many of the sectoral schemes of the Government converge in this goal, although the path is different. There is a strong complementarity between the Atal Mission for Rejuvenation and Urban Transformation (AMRUT) and Smart Cities Mission in achieving urban transformation. While AMRUT follows a project-based approach, the Smart Cities Mission follows an area-based strategy. Similarly, great benefit can be derived by seeking convergence of other Central and State Government Programs/Schemes with the Smart Cities Mission. At the planning stage itself it was highlighted that cities must seek convergence in the SCP with AMRUT, Swachh Bharat Mission (SBM), National Heritage City Development and Augmentation Yojana (HRIDAY), Digital India, Skill development, Housing for All, construction of Museums funded by the Culture Department and other programs connected to social infrastructure such as Health, Education and Culture.

This is the first time, a MoUD programme used the 'Challenge' or competition method to select cities for funding and used a strategy of area-based development. This captures the spirit of 'competitive and cooperative federalism'. States and ULBs would play a key supportive role in the development of Smart Cities. Smart leadership and vision at this level and ability to act decisively would be important factors determining the success of the Mission. Understanding the concepts of retrofitting, redevelopment and greenfield development by the policy makers, implementers and other stakeholders at different levels would require capacity assistance. Major investments in time and resources would have to be made during the planning phase prior to participation in the Challenge. The Smart Cities Mission required smart people who would actively participate in governance and reforms. Citizen involvement was much more than a ceremonial participation in governance. Smart people would involve themselves in the definition of the Smart City, decisions on deploying Smart Solutions, implementing reforms, doing more with less and oversight during implementing and designing post-project structures in order to make the Smart City developments sustainable. The participation of smart people would be enabled by SPV through increasing use of ICT, especially mobile-based tools.

Conclusion

A closer look at the data presented by the Ministry of Housing and Urban Affairs reveals that the ground
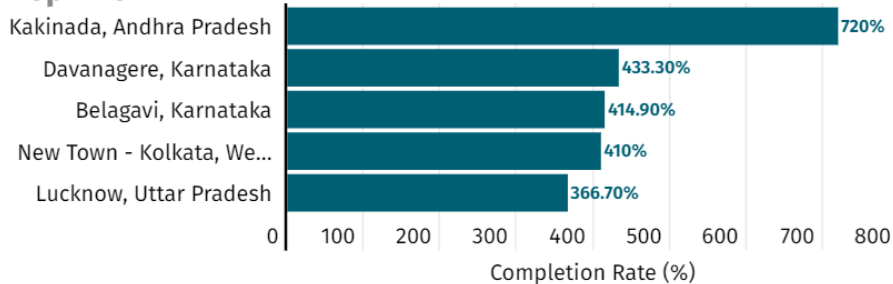
realities vary significantly across cities.

The report of the Parliamentary Standing Committee on Housing and Urban Affairs, tabled in the Parliament in March 2023, said the total number of completed projects--68% of planned projects is 'misleading', as this includes excess projects completed by 33 cities. Sixty six of the 100 'Smart Cities' are yet to meet their physical targets eight years after the flagship scheme of the Narendra Modi government was first launched, while one city completed exactly the number of projects planned.

The ministry issued a clarification that, as of May 17, 2023, there were 7,847 projects for which orders were issued of which 5,732 have been completed--a revised progress rate of 73%.
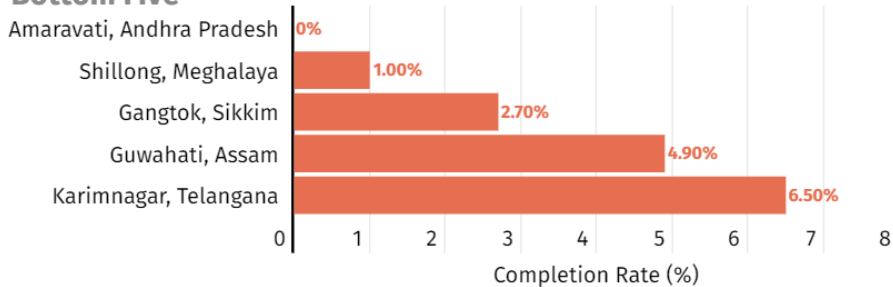
Of the 34 cities which completed their targets, 17 saw a completion rate of more than 200%--that is, they had completed at least double the number of projects originally planned. Seventeen others saw a completion rate between 100% and 200%. Kakinada in Andhra Pradesh recorded the highest rate--it completed 72 projects against the 10 that were originally planned. Aligarh recorded a 100% rate, completing all its 32 planned projects.

Top 5 & Bottom 5 Cities By Performance On Smart City Projects

Top Five

City	Completion Rate (%)
Kakinada, Andhra Pradesh	720%
Davanagere, Karnataka	433.30%
Belagavi, Karnataka	414.90%
New Town - Kolkata, We...	410%
Lucknow, Uttar Pradesh	366.70%

Bottom Five

City	Completion Rate (%)
Amaravati, Andhra Pradesh	0%
Shillong, Meghalaya	1.00%
Gangtok, Sikkim	2.70%
Guwahati, Assam	4.90%
Karimnagar, Telangana	6.50%

Note: Completion Rate is projects completed as percentage of projects planned
Sources: 18th Report of Standing Committee on Housing and Urban Affairs (2022-23)

The data showed 22 cities to have completed less than 25% of the projects and 19 other cities completed 25-50% of the projects. Of the 66 cities which are yet to see results, 25 cities completed more than half the projects originally planned. Urban experts caution against reading too much into the figures of completion. "Completing more projects than planned indicates projects outside the ambit of SCM would also have been included in the whole thing, indicating resource mis-allocation. The projects have to be very specific and not everything can be resolved by using technology or smart solutions," an expert has revealed.

Performing & Non-Performing Cities

Note: Completion Rate is projects completed as percentage of projects planned
Sources: 18th Report of Standing Committee on Housing and Urban Affairs (2022-23)

Of the total pledged financial support, Rs 37,410.43 crore had already been provided by the Union government as of March 2023, government data show, of which 88.4% (Rs 33,074.4 crore) has been utilised by the states.

Eleven states reported a fund utilisation rate of more than 90% of the Union government funds, with the highest being reported by Jharkhand (98.7%), followed by Rajasthan (95%) and Karnataka (93.7%). Assam and Mizoram reported the lowest utilisation rate at 70% and 68%, respectively.

Amongst the Union territories, Lakshadweep reported the lowest fund utilisation with only 24% of the funds being utilised, as against Delhi and Jammu and Kashmir which reported more than 80% use of the funds disbursed by the Union government.

Despite the utilisation of Union government funds, work on smart cities has not been able to progress due to multiple roadblocks. While the Ministry of Housing and Urban Affairs pointed to disruption owing to Covid-19, multisectoral projects and land issues as the reasons for the delays, experts have pointed to lack of timely availability of funds, differences in states' priorities and bureaucratic delays as additional reasons.

There is an irony that many of our cities don't have enough capital to meet their infrastructure and service delivery requirements on the one hand. But on the other hand, they are left with unspent funds at the end of the year. Also, long-drawn timelines to conceive projects, obtain vendors, and to execute works in a time-bound manner are challenges that remain, as the Mission gets extended to meet the targets.

Funds have never been a constraint for smart cities. The SPVs can change the projects when they do not seem relevant to the needs of the cities; they have been given everything, delays are very common in any infrastructure projects, the stakeholder coordination is one of the important factors. However, the progress should not be defined only by project completion rate or funds' usage and several other factors are at play such as transfers, political priorities and a more detailed lens was needed to look at the progress of the programme. States' contribution to Smart Cities Mission has been lesser than the Central Government. While states have been able to utilise most of the Union government funds, they have not matched the Union government's share of funds. The states' cumulative contribution to the SCM, between the years

2015 to 2022, was Rs 32,149.14 crore against the Union government's contribution of Rs 36,561.16 crore--a deficit of Rs 4,481.82 crore.

Barring Assam, all states in the northeast reported a significantly low contribution of the state governments, impacting the progress of the Mission. Odisha, Kerala, Jharkhand and Haryana reported zero deficit.

Experts attribute the slow progress of work and lesser contribution by their state governments, in smart cities in the northeast to lower levels of industrialisation, a difference in priorities and the structure of their economy, given the topography.

Amongst the UTs, which are centrally administered, Jammu and Kashmir (including Ladakh) and Puducherry saw a significant difference between the funds provided by the Union government and the contributions made by the local administration.

While the trends in expenditure by the smart cities and the associated state support suggest more room for improvement, experts feel the Mission should be assessed on other parameters.

The scheme ideally ought to be assessed on the outcomes of the proposals made originally. We need to compare the goals and targets laid out in the smart city proposals submitted by cities with what was achieved against them, and at what cost. Each city has different needs and capabilities and thus cannot be evaluated on a single set of parameters.

Smart solutions are fine but who is benefiting from it should also be assessed. Technical interventions have to be practical as well. In addition, there should be an assessment made if the powers of a Smart City SPV to implement are overlapping those of the local municipal body.

Challenges and Policy suggestions

Even though the smart city mission has initiated cleaner production practice in India but its long-term sustainability raises questions. The documentation for smart cities does not give any clear definition regarding corruption. The current model focuses on collaborative decision-making processes and includes multiple stakeholders in the process of fostering cooperation in smart city growth and sustainable industrial practices implementation. The decentralized decision-making system is definitely a step ahead of the previous centralized top-down initiatives. Indian citizens need to choose leaders with clear vision, direction, and forward-looking orientation. The much-needed discussion of effective management of funds and efficient disbursement of funds and the key players responsible for these activities is not evident and clear in the information available. While India is booming, posting the world's highest 9 percent economic growth, the poverty rate figures seem troubling. Also, those in the poverty-stricken Indian population have limited access to basic sanitation, electricity and water facilities, which underlines the persistence of this systemic issue. In view of the country's rising poverty rates, many have criticized the initiative of the Government of India on smart city growth. However, due to the benefits associated with improving living standards and quality of life in India, the initiation and implementation of cleaner production practices has received a lot of approval. An ongoing problem is finding reliable sources of funding to promote smart city growth and those promoting sustainable production initiatives. There is a great need for attention to detail and consideration to secure sustainable long-term support from reputable public private partnerships, and consistent processes are required. The credentials, training and expertise required or anticipated by individuals belonging to Special Purpose Vehicles (SPVs) are not outlined in the current literature or in publicly available government reports. Even, in government reports, the creation of contingency plans to handle unforeseen project delays and other systemic issues related to lack of funding,

availability of resources and international cooperation did not receive much attention. The successful formulation of policies relating to sustainable manufacturing practices and smart cities needs to be taken very carefully. Building greater awareness among people of initiatives, for example, is a crucial step forward. Then the emphasis must be on identifying potential human capital through the evaluation of skills. The criteria and specifications for implementing cleaner manufacturing initiatives can vary based on the proposed smart city's geographical location. For the long-term sustainability and performance of smart cities and sustainable construction practices, tailored training programs for the holistic development of human resources are therefore mandatory. Although these development programs have facilitated constructive dialog between people, there appears to be less room for sufficient inclusion of voices of citizens. Quality online discussion forums involving different stakeholders and face-to-face focus group discussions involving central government officials, state governments, companies, and citizen action groups would be useful in promoting collective creativity in the public sector. Frequent interaction with various actors by government officials and the proposed SPVs would encourage smart governance and networked governance activities. Nevertheless, care must be taken in creating sustainable manufacturing practices and smart cities to include the marginalized voices of people from low socioeconomic backgrounds and lower educational levels. The incorporation of these social programs points to the government's strong dedication to fostering corporate citizenship. The physical differences found in the Indian context relate to poor infrastructure and technical incoherence. The Digital India initiative of the Government of India focuses primarily on increasing the country's digital supremacy to facilitate optic fibre networks, sensor systems, urban planning, and developments in modern technology. The government's planned policies in the country also put greater emphasis on designing smart solutions to address the issues associated with supporting sustainable growth initiatives effectively. The government's plan for smart city growth is to upgrade infrastructure and attract foreign investment. There is no question that the growth of smart cities and the introduction of sustainable manufacturing practices and policies neglect voicing concerns related to identifying key ethical gaps. Poverty, for example, has been a serious concern in India since independence, yet for many years it has been totally mismanaged. Likewise, it is often ignored certain issues related to the caste system, equity, diversity and inclusion. There is no access to basic facilities and services for the country's poor population, which poses serious ethical questions. However, the cost effectiveness or the exact costs associated with both the growth of smart cities and the introduction of sustainable manufacturing practices are not effectively communicated with stakeholder groups, which poses another serious ethical issue about transparency. Therefore, it is possible to address at least part of the problem by concentrating on creating ethical guidelines and encouraging preventive ethics alongside code of conduct and code of ethics to close the defined gap.

Critical Analysis and the Way forward

Due to the vast differences in size and scope of the mission, the budgets for the top 99 cities range from over INR 500 crore (Kavaratti, Lakshadweep) to over 6000 crores (Chandigarh). The total budget for the 99 cities is INR 2051 crore. An examination of budget trends reveals that budgets are being reduced across successive rounds. Following round one, most budgets became more conservative, with the greatest decrease seen in cities with budgets exceeding INR 4000 crores. Most funds (70%) would come from public sources, followed by corporate and CSR funds. However, as the mission progressed, there was more uncertainty about the sources.

The source of funding for each project was unclear – there was a lack of specific information about the source of funding for individual projects. Only 17 of the top 60 cities identified sources of finance at the project level. Bhubaneswar, for example, topped the SCM list but did not provide specific information about the source of funding for their projects.

According to the study, over 80% of the SCM budget is allocated to area-based development projects that cover only about 7% of the area of the 99 smart cities. As a result, 90% of the city has access to only 20% of the city's SCM budget. Furthermore, it is argued that the majority of ABD projects are chosen in areas that are already well developed and well served, thereby exacerbating the city's existing inequalities

Unlike previous schemes such as JNNURM, which focused on the social welfare of the city, projects under SCM aim to primarily build a financial corpus for the city. Thus, parameters such as real estate development, parking facilities, water metering, and so on are mentioned. For example, over 80% of the SCM budget is dedicated to transportation and energy. Water, sanitation, and energy are all important considerations. New budget categories such as IT governance, culture, and heritage receive a meagre 15% allocation.

Under the Companies Act 2013, SCM provided for the establishment of a special public vehicle to manage and oversee the scheme's implementation. However, the precise relationship and hierarchy between SPV Anand local bodies is unknown, which may impede collaboration between the two organisations. Furthermore, SPV members are mostly state government bureaucrats with little political representation. Thus, it appears that the 74th amendment has eroded the decentralisation achieved by entrusting powers to bureaucrats.

Though citizen engagement is an important component of the mission, there is a lack of precise data on the scale of citizen interaction. There was no tangible data on the number of citizen meetings or consultations held by over 65 cities. Digital literacy is a critical issue when it comes to implementing digital feedback and outreach. Given the inequity in access to technological means, digital outreach may result in the ignorance of certain sections of society's opinions. There is a lack of clarity regarding what constitutes participation. Whether or not Twitter likes and shares are counted, no substantive analysis is performed to account for what is being shared and its relevance.

Only 17 of the top 60 cities were able to identify the sources of funding at the project level, even though the top 60 cities have reported all of their projects and the costs of the majority of projects are stated in the project proposals (94%).

Most of our cities lack master plans or city development plans, which are critical to smart city planning and implementation because they encapsulate everything a city needs to improve and provide better opportunities to its citizens. Unfortunately, 70% to 80% of Indian cities do not have one.

When reviewing a smart city strategy, there are several underlying issues to consider. The most important thing is to identify the existing city's weak points that require special attention, such as 100% distribution of water supply and sanitation. It can be difficult to integrate previously isolated legacy systems in order to achieve citywide efficiencies.

Smart City Mission had intended for private funding to account for 21% of the mission's overall costs. Only 15% of the projects currently in development are operating in the public-private partnership (PPP) mode.

The Area Based Development (ABD) model, which indirectly encourages cities to concentrate most of their funding on a small portion of the city, has been the focus of the mission. Thus, it is discovered that the ABD projects for 99 cities only account for 7% of the total area and 80% of the total budget. Such a

strategy fosters inequality within and between cities.

The SCM budget is made up of almost 80% of the five development categories of transportation, energy and ecology, water and sanitization, housing, and economy. Only 15% of the funding is allocated to other categories like IT, governance, culture and heritage, health, and education.

Effective horizontal and vertical coordination between various institutions providing various municipal amenities, as well as effective coordination between central government (MoUD), state government, and local government agencies on various issues related to financing and sharing of best practises and service delivery processes, is required for the successful implementation of smart city solutions.

Building capacity for 100 smart cities is a difficult task, and most ambitious projects are delayed due to a lack of qualified personnel at both the federal and state levels. Only about 5% of the central budget may be allocated to capacity building programmes that focus on training, contextual research, knowledge exchange, and a rich database.

The Way forward: In the 100 cities and towns selected for the Smart Cities Mission, there has in fact been progress on a wide range of smart projects. In particular, the marginalised populations of these cities are benefiting socially and economically from the completed projects. But the study also reveals that some cities are behind in terms of project execution. The COVID-19 pandemic has undoubtedly slowed down progress, but there are also numerous administrative and financial factors to consider. The SPVs established in some cities to carry out the Mission are not operating effectively because of insufficient managerial, technical, and financial capabilities. Data handling, analysis, digitalization levels, fund mobilisation, release, and utilisation deficiencies were noted. As more and more services are incorporated, the effectiveness of Smart City Centres will increase. Convergence with other city initiatives and breaking down departmental silos should be the goals of the mission. To further enhance the urban environment, an enabling environment that considers governance frameworks, policy protocols, the capabilities of urban local bodies, and the nature of citizen-government engagement must be created. The focus of any smart city in the world is on the dependability of utility services, whether they are electricity, water, telephone, or broadband services. The current supply and distribution system does not allow for 24-hour universal access to electricity in smart cities. To reduce the need for electricity, cities must shift to renewable energy sources and focus on green buildings and green transportation. Convergence of other Central and State Government Programs/Schemes with the Smart Cities Mission can yield significant benefits. Cities must seek convergence in the SCP with AMRUT, Swachh Bharat Mission (SBM), National Heritage City Development and Augmentation Yojana (HRIDAY), Digital India, Skill development, Housing for All, Museum construction funded by the Culture Department, and other programmes related to social infrastructure such as Health, Education, and Culture at the planning stage. A smart city would necessitate a smart economy, smart people, smart organisation, smart communication, smart engineering, smart transit, a clean environment, and a clean way of life. Nonetheless, with mass migration causing basic issues such as water shortages and overcrowding, the rate at which these cities are developed will be critical. The Government of India is leading several initiatives to transform 100 cities into smart cities. The government is focusing on encouraging Public-Private Partnership (PPP) for the successful implementation of India's smart city project.

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