

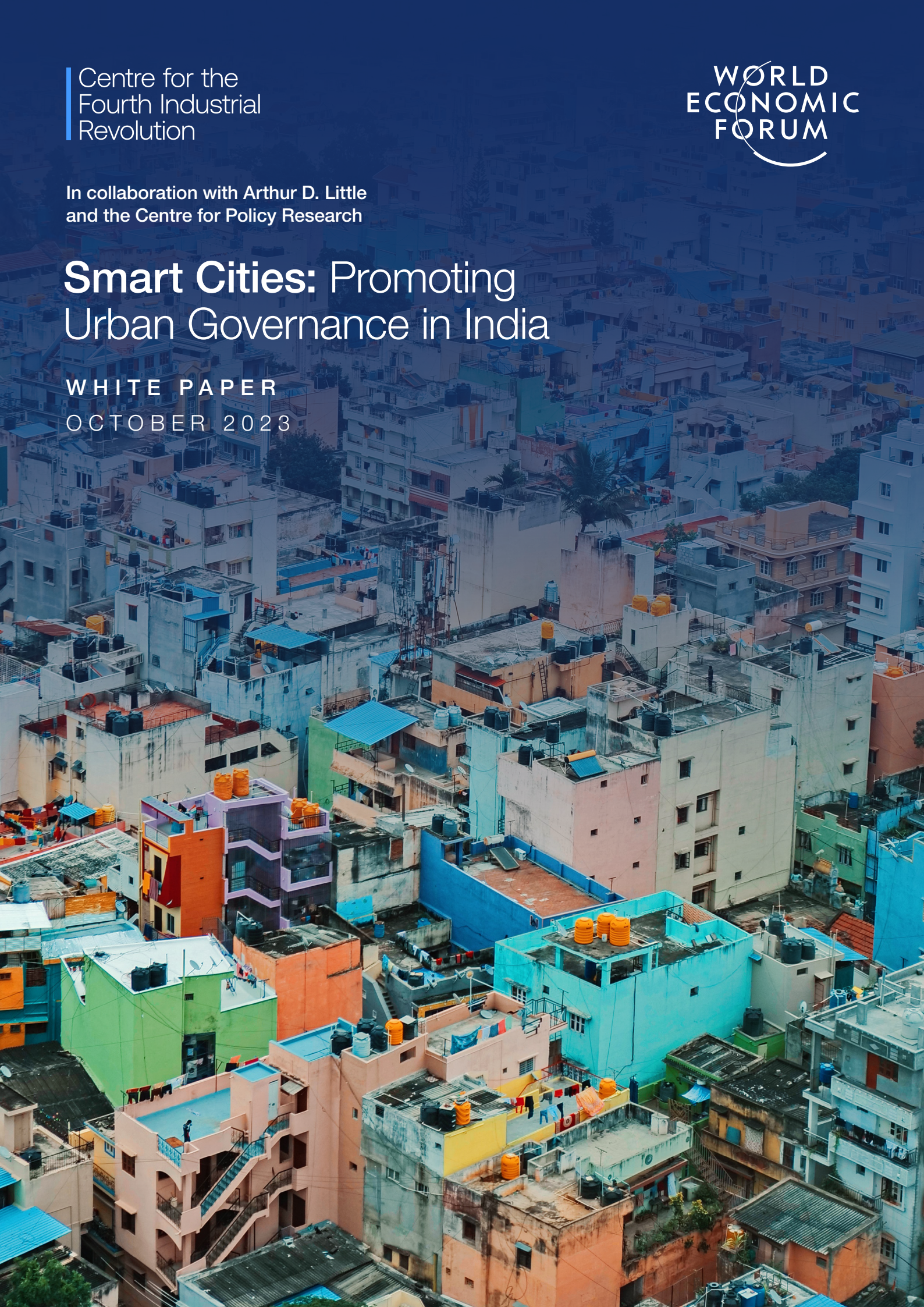
Centre for the
Fourth Industrial
Revolution

WORLD
ECONOMIC
FORUM

In collaboration with Arthur D. Little
and the Centre for Policy Research

Smart Cities: Promoting Urban Governance in India

WHITE PAPER
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Preface



Jeff Merritt
Head, Urban Transformation,
World Economic Forum

As the Head of Urban Transformation at the World Economic Forum, it is my pleasure to introduce this publication, which explores the evolution of smart cities through the lens of technology governance. In an increasingly interconnected world, where cities are the engines of economic growth and innovation, technology plays a critical role in our shared pursuit of more sustainable and inclusive urban communities.

Smart cities offer hope for a more responsive and adaptive urban environment with improved quality of life, increased efficiency and enhanced public engagement. However, the realization of these aspirations require a thoughtful and holistic approach that considers the complex interplay between technology, governance and societal needs. This publication aims to shed light on the multifaceted nature of this transformation and the global takeaways it offers.

Strong technology governance is the cornerstone of smart city development. It encompasses the principles, policies and frameworks that guide the

responsible and ethical deployment of technology in urban contexts. By effectively managing data privacy, cybersecurity, interoperability, financial sustainability and public engagement, among other areas, cities can help ensure that technology serves as a tool for collective progress rather than a source of division or inequality.

Through the pages of this publication, you will encounter diverse case studies, best practices and expert insights with valuable lessons and inspiration for others embarking on their own smart city journeys.

It is my sincere hope that this publication will serve as a catalyst for dialogue, collaboration and innovation. Together, we can unlock the immense potential of technology and create urban spaces that are not only smart, but also sustainable, inclusive and resilient. The path ahead is challenging, but with a shared vision and a commitment to strong technology governance, we can pave the way for a brighter future for our cities and their residents.

Foreword



Mukta Naik
Fellow, Centre for Policy
Research



Brajesh Singh
Associate Director, Arthur D.
Little, India and South Asia

Urban areas are projected to house 40% of India's population and cities, and as “engines of growth” will contribute 75% towards the country's GDP by 2030.¹ This economic transformation is closely linked to the cohesive development of physical, institutional, social and economic infrastructure aligned with the UN Sustainable Development Goals and ongoing digital transformations.

These imperatives have led to the emergence of “smart” city initiatives, which are a step towards making cities more conducive to development and tackling urban challenges through increasing efficiency of urban operations, services and quality of life through ICT and digital reforms. However, tapping into cities' potential demands radical changes in how urban environments are studied, governed and organized.

In this context, the launch of the Smart Cities Mission (SCM) by the Government of India in 2015 was a bold step towards boosting urban economic growth by attracting global investments and incorporating technological innovations while also improving the quality of life for all urban residents.

Upon completing 8 years, this report highlights the SCM's impacts on the governance ecosystems of cities, drawing on policy-focused research at the Centre for Policy Research, New Delhi, and the global expertise of consultants at Arthur D. Little.

Through case studies, the report highlights three features of the SCM that have greatly enhanced the ability of participating cities to govern: allowing cities the choice to interpret “smartness” in contextually relevant ways; enabling flexible governance mechanisms through institutional innovation; and improving coordination through data-driven and technology infrastructure.

Viewed through an urban governance lens, the SCM's contributions have reinvigorated efforts around localized capacity enhancement, citizen-responsiveness planning and financial viability of urban rejuvenation interventions.

Executive summary

Long-term strategies are needed to sustain the Smart Cities Mission's early imprints on city governance ecosystems.

Intended to foster sustainable and inclusive urban development, inter alia, through digital transformation and innovation, the Smart Cities Mission (SCM) has also influenced city governance ecosystems. This is manifested in at least three ways.

First, while schemes like the Pradhan Mantri Awas Yojana for housing, or the Swachh Bharat Mission-Urban for sanitation and Atal Mission for Rejuvenation and Urban Transformation for water have focused on key sectors, the SCM offers cities the choice to create their own project portfolio. This reflects a recognition of local complexities and the need for cities to respond to residents' demands and expectations. Myriad challenges ranging from water quality monitoring to heritage redevelopment were identified, ensuring the city's stakeholders' best interest.

Second, to infuse more capacity in local governments and top-down planning, the SCM introduced a new institution, the Special Purpose Vehicle (SPV). The SPV's corporate structure – together with mechanisms that bring together government decision-makers and local stakeholders – plans, approves, release funds, implements and manages SCM development projects. Involvement of civil society and elected representatives has varied by city.

Third, by supporting the creation of integrated command and control systems capable of collecting, managing and analysing large volumes of data, the SCM has encouraged cities towards data-driven governance, a system for deploying resources appropriately and improving interdepartmental and inter-agency coordination.

Given their varying sizes, capacities and contexts, cities have leveraged this opportunity in their own unique ways. Notably, this has happened across scales, with small and medium-sized cities also starting to make small, but significant changes.

While metropolitan cities have more complex project portfolios, small and mid-sized cities have made strategic choices. For example, Indore has focused extensively on creating a self-sustainable ecosystem driven by numerous green solutions, while Srinagar is implementing an ambitious revamp of its city core to boost tourism and trade. Among other projects, Surat is augmenting its public transportation system, Moradabad is modernizing its traditional brass industry and Satna is creating an entrepreneurial ecosystem.

Successful solutions are already being replicated across cities. For example, Indore is mentoring many cities towards developing green solutions and Coimbatore is inspiring several non-SCM cities to explore rejuvenation of water bodies.

While the final year of the SCM will focus on completing projects, cementing early gains will require dialogue on the value of SPVs, the financial sustainability of interventions and continually improving local capacities to plan, coordinate and manage sophisticated urban interventions in order for India to continue to make smart investments in the future-readiness of its cities.

Introduction

In addition to ongoing efforts to modernize cities, the Smart City Mission's imprint on urban governance ecosystems is likely to have lasting impacts.

India's growth ambitions rest significantly on the ability of cities to perform their role as engines of economic growth; hence, urban governance has emerged as an important policy matter. The Smart Cities Mission (SCM) is integral to a set of large-scale, ambitious federal programmes aimed to rejuvenate and modernize Indian cities.

With one year left of the SCM, what has been its impact? Is there something beyond project outcomes, something that will outlast the mission and impact city governance ecosystems?

India's urban governance context

India's Constitution places the responsibility of urban governance with provincial (state) governments. While they initially were only legislative creations, the 73rd and 74th Constitutional Amendment Acts in 1992 conferred constitutional status on rural and urban local bodies, respectively.

The 74th Constitutional Amendment Acts (74th CAA) ensured regular elections to urban local bodies (ULBs) and indicated various functions that could be transferred to them by the provinces, but did not mandate it – leading to variations across states and ULBs on their functional domain.

Some large cities, such as Mumbai, provide a range of services comparable to global metropolises, while others like Bengaluru have more limited powers. No city in India determines its land use, which is a function controlled by the provincial government. While many provide diverse services, some smaller cities do little more than solid waste management.

The SCM's 100 smart cities represent a diversity of governance scenarios. Their experiences and outcomes are not just a measure of how cities can be modernized through digital and context-appropriate interventions, but equally a repository of lessons for altering city governance ecosystems.

Scope for national schemes to impact governance

While the federal government cannot directly intervene in municipal affairs, it has since the Jawaharlal Nehru National Urban Renewal Mission (JNNURM) in 2005 initiated various forms of federal financial support to cities, especially for urban infrastructure, housing and, recently, livelihoods. This includes the Atal Mission for Rejuvenation and Urban Transformation (AMRUT), Pradhan Manti Awas Yojana or Housing for All (PMAY/HfA) and the National Urban Livelihoods Mission (NULM).

The SCM is distinctive in that it focuses not just on project implementation, but also on changing processes – in particular, by allowing cities to propose the initiatives to be taken up under the mission within a budgetary envelope and by routing all finance and action through an institutional innovation, the Special Purpose Vehicle (SPV), which is a corporate body owned jointly by the province and the city.

Launched in June 2015, the SCM aims to help cities provide a decent quality of life to its citizens through, inter alia, the application of “smart” solutions to improve urban infrastructure and services delivery. State governments² propose which cities are to be taken up, along with proposals that need to clear a vetting process before being selected as one of 100 smart cities. Such a process has enabled most Indian states to participate in the mission, and direct resources to small, medium and large-sized cities (see Figures 1 and 2).

The implementing institutions of the SCM – Special Purpose Vehicles (SPVs) at the city level – were incorporated under the Companies Act 2013. Typically, the ULB and the province are equal shareholders in the SPV, which has senior representatives from both on their boards of directors along with a representative from the federal government. All funds from the SCM are routed through the SPV. The SPVs can also raise funds in other ways (e.g. user fees, debt, etc.).

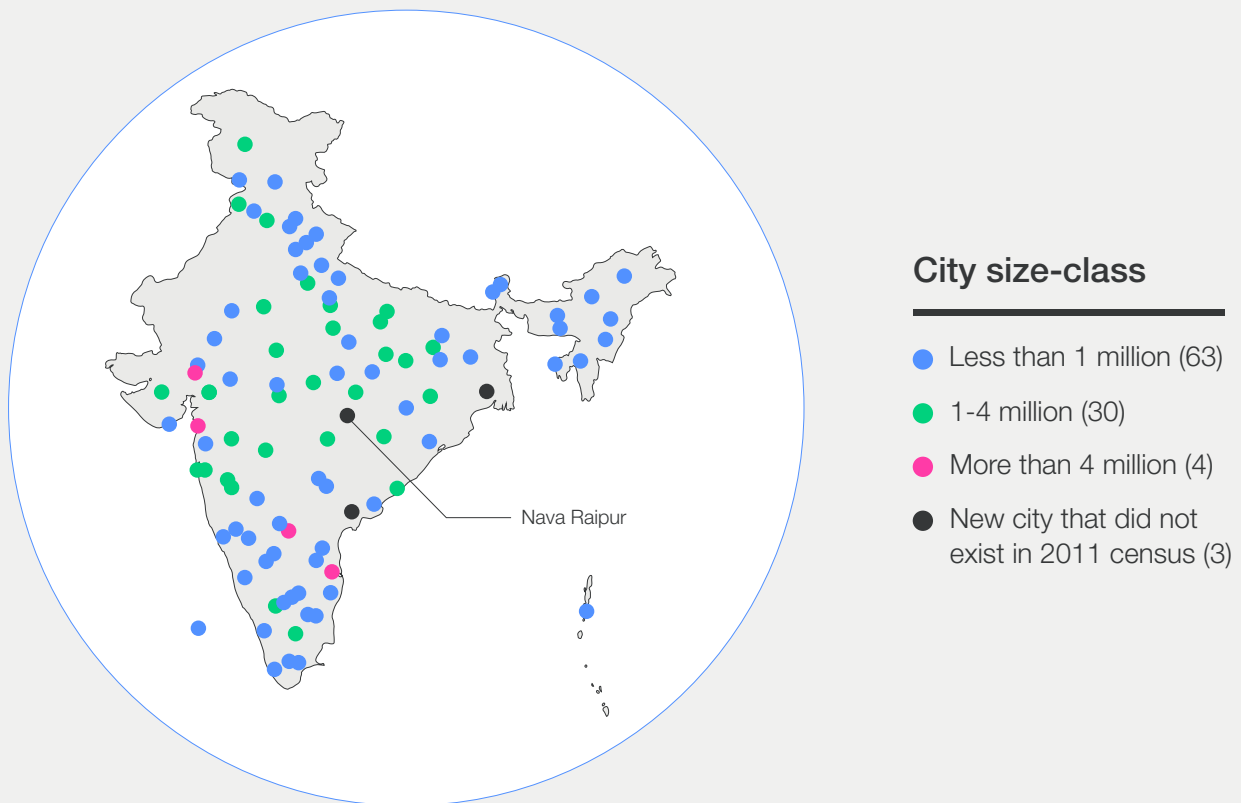
As on 30 June 2023, the Government of India has released ₹38,581 crore (\$4.76 billion) and State Governments/Union Territories (UTs) have released their matching share of ₹34,411 crore (\$4.16 billion), amounting to a total release of ₹72,992 crore (around \$9 billion of an expected \$12 billion), of which 90% has been utilized.

The actual work being undertaken by SPVs is more than that financed by the SCM alone. Taking all projects into account, work orders worth ₹1.80 lakh crore (\$22 billion) have been issued for 7,973 projects, of which 5,858 projects (73%) have been completed.

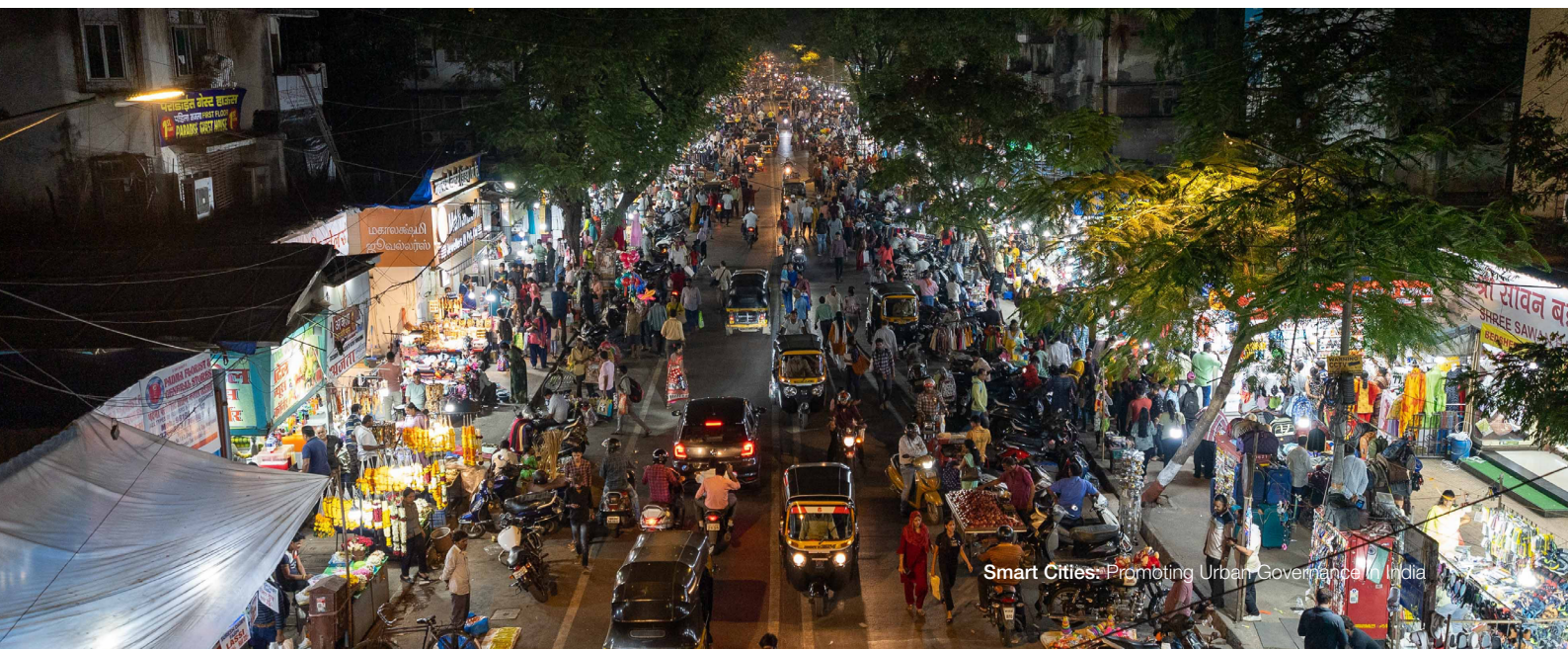
The mission is scheduled to end in June 2024.

The number of projects taken up by cities varies considerably. Five cities have less than 20 projects while six have more than 200. Similarly, the total spend on projects varies from less than ₹500 crore (\$60 million) for three cities to more than ₹3,000 crore (\$365 million) for 13 cities. It is also not the case that this variance is related to city size, as Figure 2 shows. These facts testify to a high degree of mission customization by the provinces and/or the selected cities.

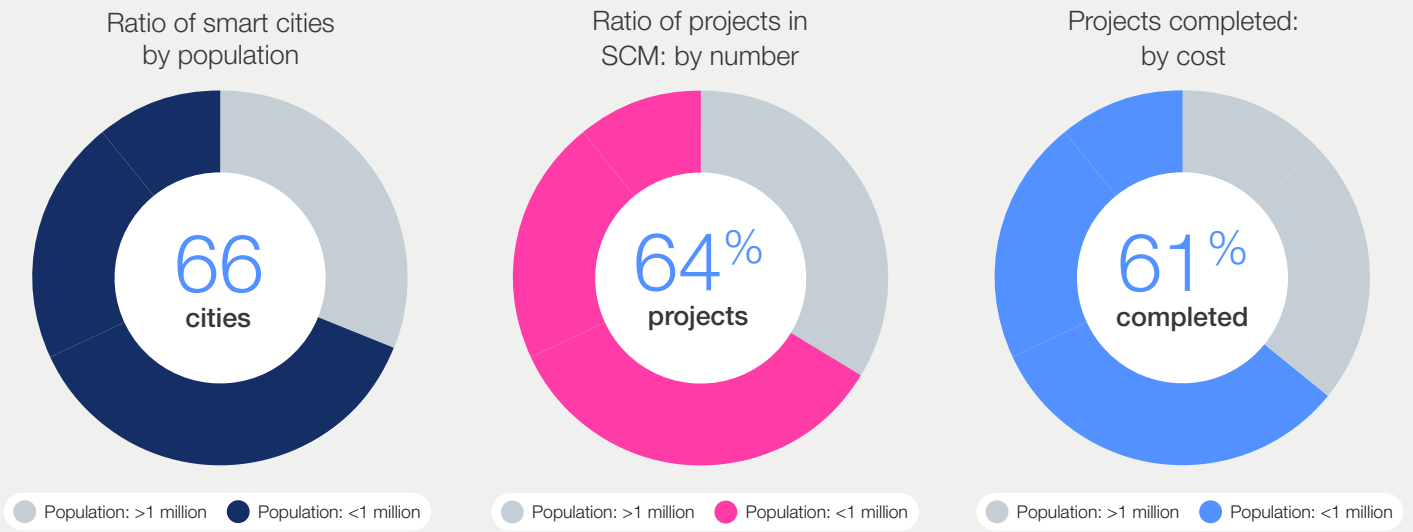
FIGURE 1 Smart cities locations and size



Source: Centre for Policy Research



Institutional experimentation may pay dividends (SPVs case in point)



→ 66 smaller cities contribute 64% of total projects, performing as well as bigger cities

Source: Smart Cities Mission



Key areas of change

Through new institutional design and technologies, the Smart Cities Mission has enabled cities with the choice, flexibility and coordination capabilities to select and implement relatively sophisticated urban projects.

The Smart Cities Mission is distinct from other urban initiatives of India's federal government, which have largely been implemented through such existing institutions as the water utility, or in the case of sanitation and housing often by directly supporting the household. By contrast, the SCM has allowed each participating city to choose a

portfolio of projects across multiple sectors as part of its plan, created a more flexible implementation instrument (i.e. the SPV), and encouraged data-driven governance and enhanced interdepartmental coordination through Integrated Command and Control Centres (ICCCs).

2.1 Choice to define scope

Not universally defined, smart cities have been conceptualized in diverse ways worldwide, with varying levels of development, political leadership, resources and aspirations of city residents. Acknowledging this diversity, the SCM was designed to accommodate variations in data, technological interventions and practices across Indian cities.³

The SCM has offered choice direction of 100 smart cities by necessitating that candidate cities make specific types of interventions.⁴ For example, area-based development involves retrofitting, redeveloping and extending a specific defined area where cities could decide whether to develop core areas, a peripheral zone, or a new city. The SCM makes no stringent demands.

Cities could also choose projects under the pan city development mode, which envisages, inter alia, the application of solutions involving technology, information and data to improve the city's infrastructure and services. Setting up an intelligent traffic management system to improve traffic congestion and controlling traffic violations and using GPS and radio frequency identification (RFID) technologies to digitalize and thus improve the efficiency of solid waste management are popular examples of pan city developments under the SCM.

The SCM has promoted the selection of diverse projects encompassing built infrastructure, technology-assisted systems improvements and sectoral innovations. In the area of innovation,

for example, cities have shown variation in interpretation and implementation, making choices appropriate to size, socio-economic context and existing governance capacities.

In Pasighat, a small city, smart innovations have meant installing public Wi-Fi while in Bhubaneswar, an adaptive traffic signal control system at signalized intersections was installed by leveraging the Composite Signal Control Strategy (CoSiCoSt), a technology that can synchronize traffic signals based on data from sensors embedded in roads. In Gangtok, where street parking is not permitted in order to manage congestion on hill roads, a multi-level car park was chosen as its largest SCM project.

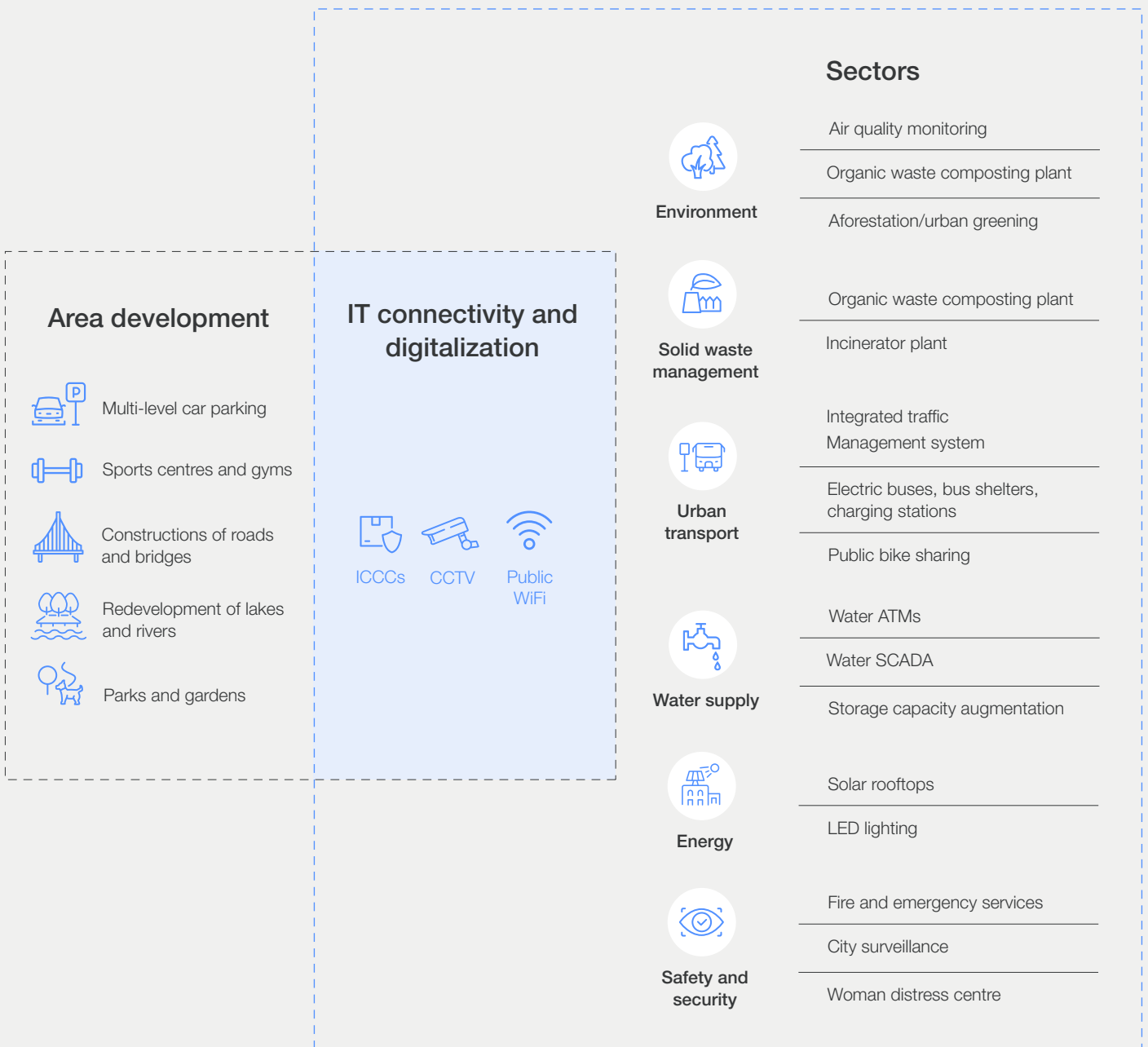
Cities have also demonstrated the diversity of project choices across sectors, such as water supply, housing, urban transport and solid waste management, and even within each sector. Within the solid waste management sector, for example, cities have chosen projects as varied as sanitary vending machines and incinerators, battery-powered litter pickers, smart toilets, and GPS machine installation on vehicles. In the energy sector, cities have chosen projects such as LED street lighting and solar rooftops.

Thus, smart cities have used the mission's open-endedness to select and implement projects that are responsive to local needs, often resulting in successful solutions to complex urban issues, as this report will demonstrate through cases.

Most ULBs in India have not historically been part of decision-making processes when it comes to major urban development projects, and consequently many were not intensively involved in the design of SCM plans and implementation of projects. While this allowed SPVs to hasten implementation, they did suffer from the lack of effective consultation with elected representatives. The SCM tried to address this complexity by implementing direct consultation processes and broader civic engagement initiatives.

In retrospect, a richer engagement with the elected representatives may have led to better-informed choices and enhanced the ability of elected representatives to engage with the complexity of urban development processes. Such engagements could also have built a broader consensus on the continuance of institutional innovations brought about by the SPV under the SCM.

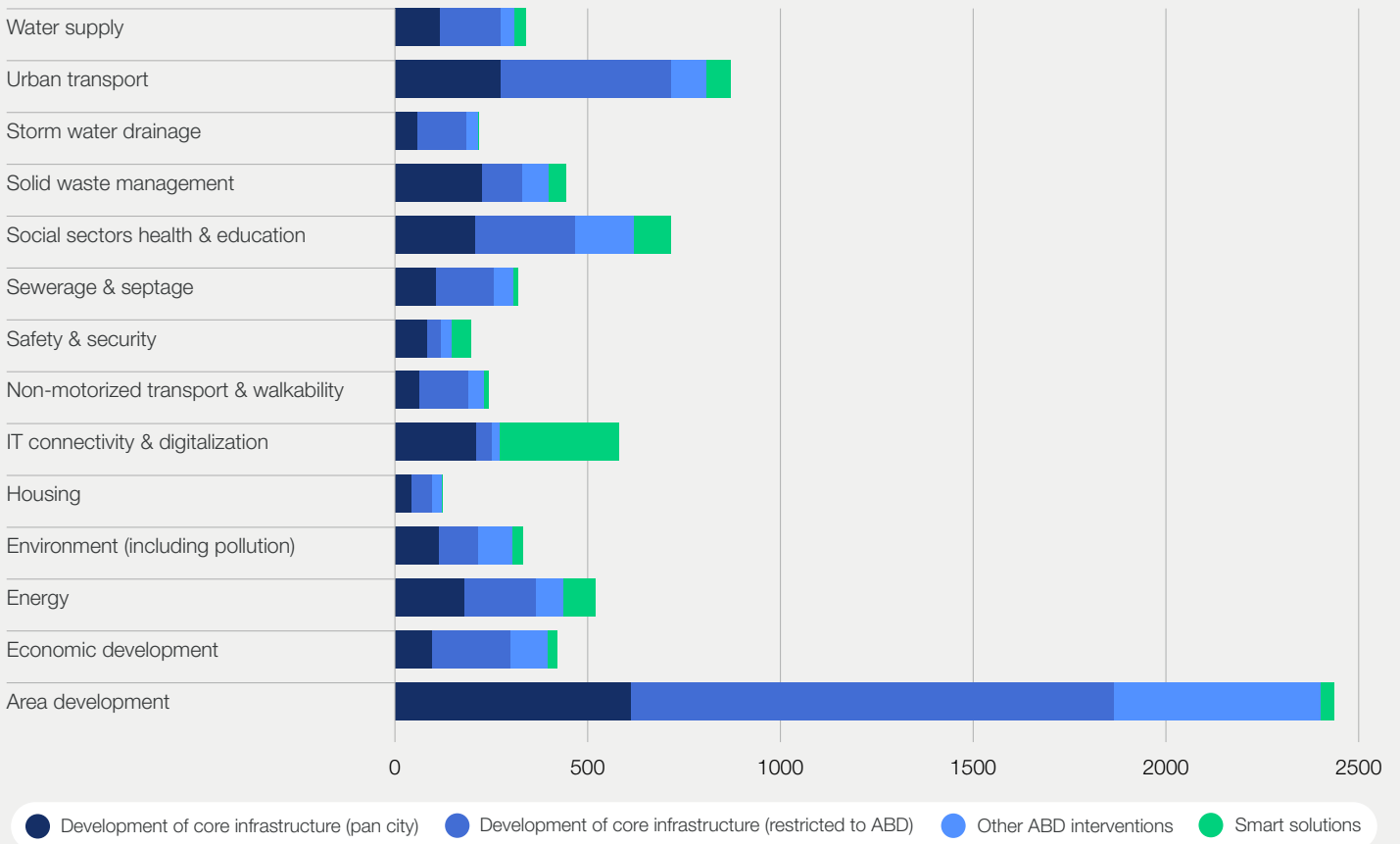
FIGURE 3 Diversity of Smart Cities Mission projects



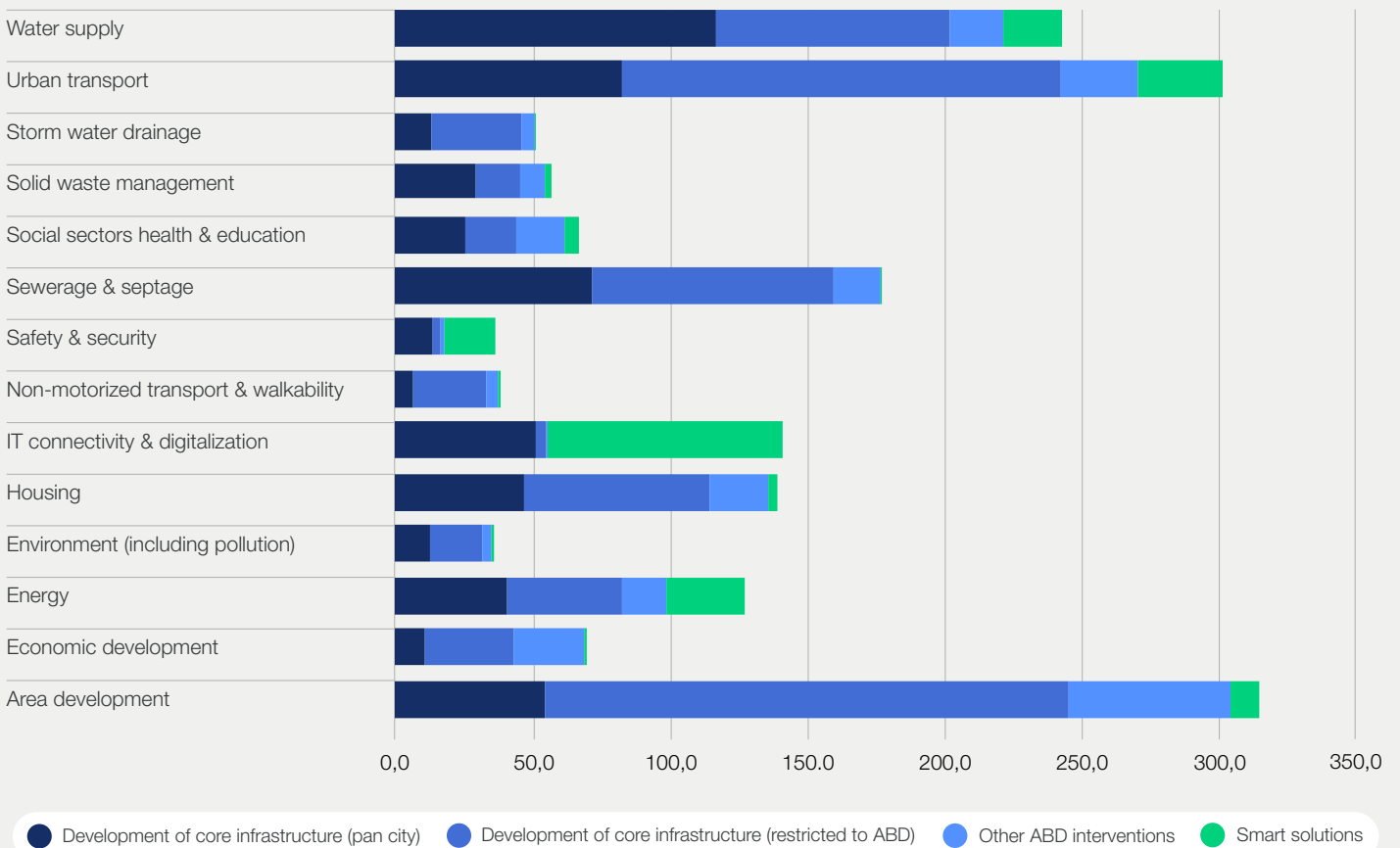
Source: Centre for Policy Research

FIGURE 4 | What cities are implementing

By number of projects



By cost of projects



BOX 1 Choice in responding to emerging needs

The Smart Cities Mission has continued to adapt itself with emerging needs and provided cities with choice on how to respond. For instance, when the COVID-19 pandemic raised global awareness about the importance of open spaces in having active and healthy lifestyles, the SCM launched campaigns such as India Cycles4Change and Streets4People in a challenge format.

Under these campaigns, participating cities are creating cycling and walking infrastructure, healthy streets policies, design guidelines, parking management and pricing plans, enforcement

strategies, human capacities, behavioural change and budgetary provisions.

Similarly, to ensure that the most vulnerable citizens have access to public spaces, especially young children and caregivers, cities are offered the choice to participate in Placemaking Marathons and the Nurturing Neighbourhoods Challenge. Other challenges like Transport4All and EatSmartCities are promoting startups in public transport and improving food hygiene in smart cities, respectively.

Source: Interview with the SCM team

FIGURE 5 SCM campaigns in India (Smart Cities Mission)



The Smart Cities Mission has also created opportunities for India's youth to contribute towards smart urban development and for local governments to harness this talent. The Urban Learning Internship Program (TULIP) and the India Smart Cities Fellowship (ISCF) programme enabled them to work with local governments and gain exposure from real-life learnings in the urban environment.

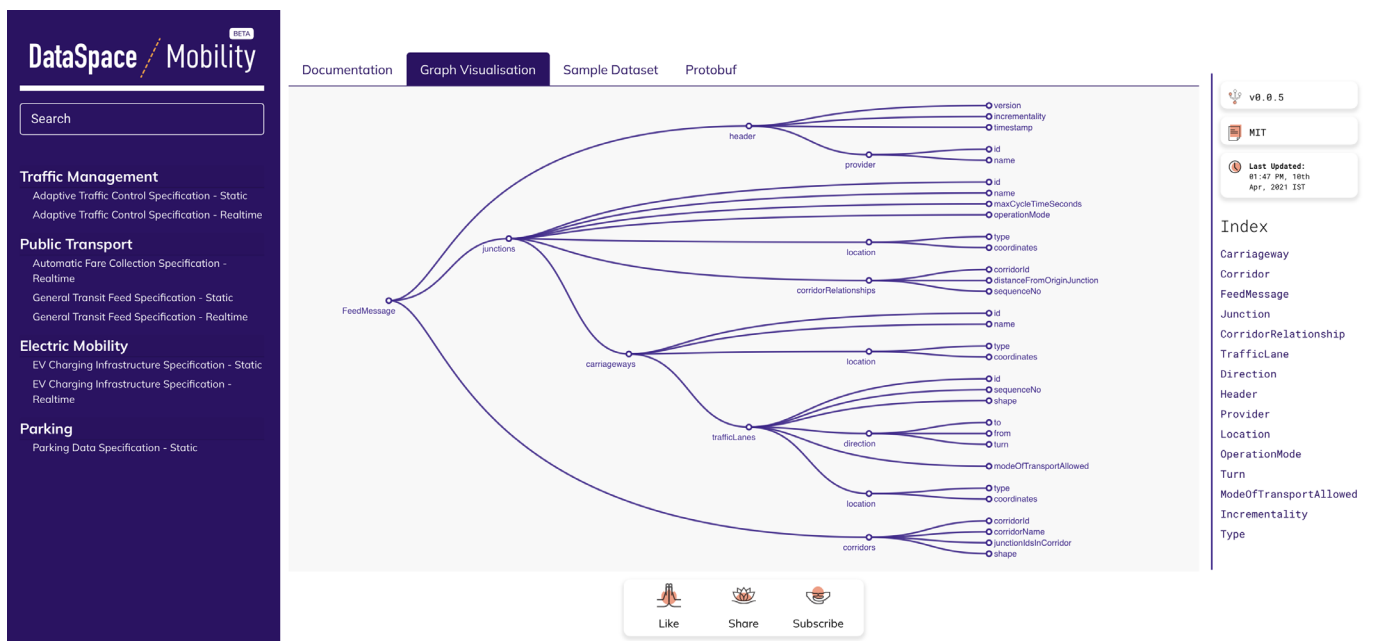
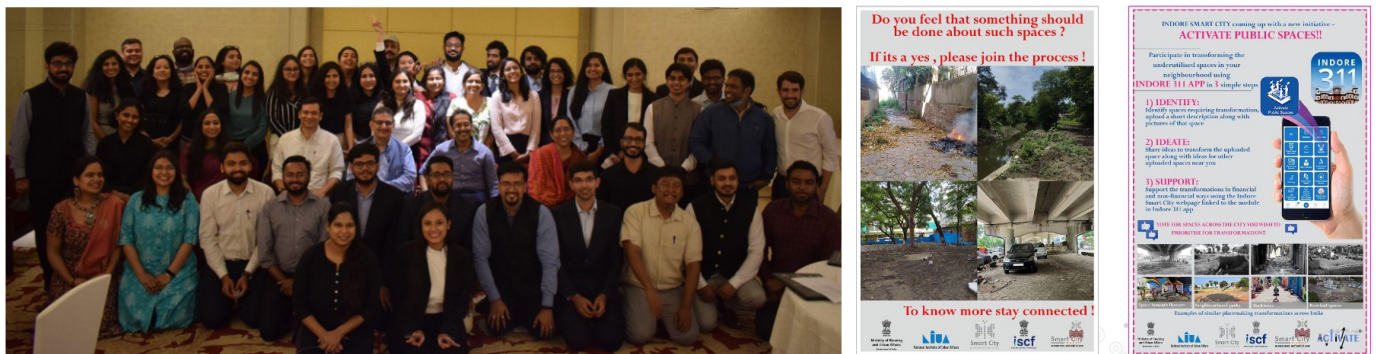
Since the launch in 2020, around 3,987 ULBs/parastatals and 100 Smart Cities have already registered on the TULIP portal and more than 2,780 of them have created internship opportunities. More than 1.8 million students have registered as of June 2023, and more than 37,402 internship opportunities have been posted, against which 125,000 applications of students have been received. Over 4,379 internships have been completed, while around 5,349 internships are ongoing under the programme.

As of June 2023, 120 young professionals under ISCF have piloted 17 smart solutions in 13 cities to seed urban innovation. For instance, the Activate Public Spaces is a digital tool developed under ISCF to implement placemaking initiatives in a city, while encouraging communities in identifying underused spaces, sharing ideas for their transformation, and supporting it through financial and non-financial methods. The plug-in has been incorporated in Indore Smart City's official 311 app, and the support feature has been added to Indore Smart Cities Corporate Social Responsibility webpage.

Similarly, the Mobility Dataspace is a sectoral data management technological stack developed under ISCF to enable the democratic sharing of standardized, high-quality urban mobility data among the quadruple helix of government, civil society, academia and industry.

Source: Interview with the SCM team

FIGURE 6 Graphics of mobile applications of Activate Public Spaces and Mobility Dataspace (Smart Cities Mission)



2.2 Flexibility to self-organize

In general, urban missions in India have tended to release funds to cities through state-level agencies through pooled grants from the central and state governments. However, these transfers have often been hindered by bureaucratic delays and poor coordination across levels of government. The SCM not only channels funding through the SPV, but also empowers it with the authority to approve financial decisions on its own without further approval from higher government levels. Thus, by concentrating power in an institution, the SCM has enabled cities to open new channels for project conceptualization, funding and implementation.⁵

Recognizing the need to strengthen collaborative governance and overcome bureaucratic impediments, the SCM offers cities considerable flexibility in the composition of their SPV board of directors, which tend to be composed of senior decision-makers in government, comprising officers from various departments. The fact that the joint executive director of the Tirumala Tirupati Devasthanam serves on the Tirupati Smart City's board and the director of archives, archaeology and museums (Jammu and Kashmir) on Srinagar Smart City's board shows that cities make contextually relevant choices in this regard.

Where necessary, cities have also taken advantage of this flexibility to induct other relevant persons into the

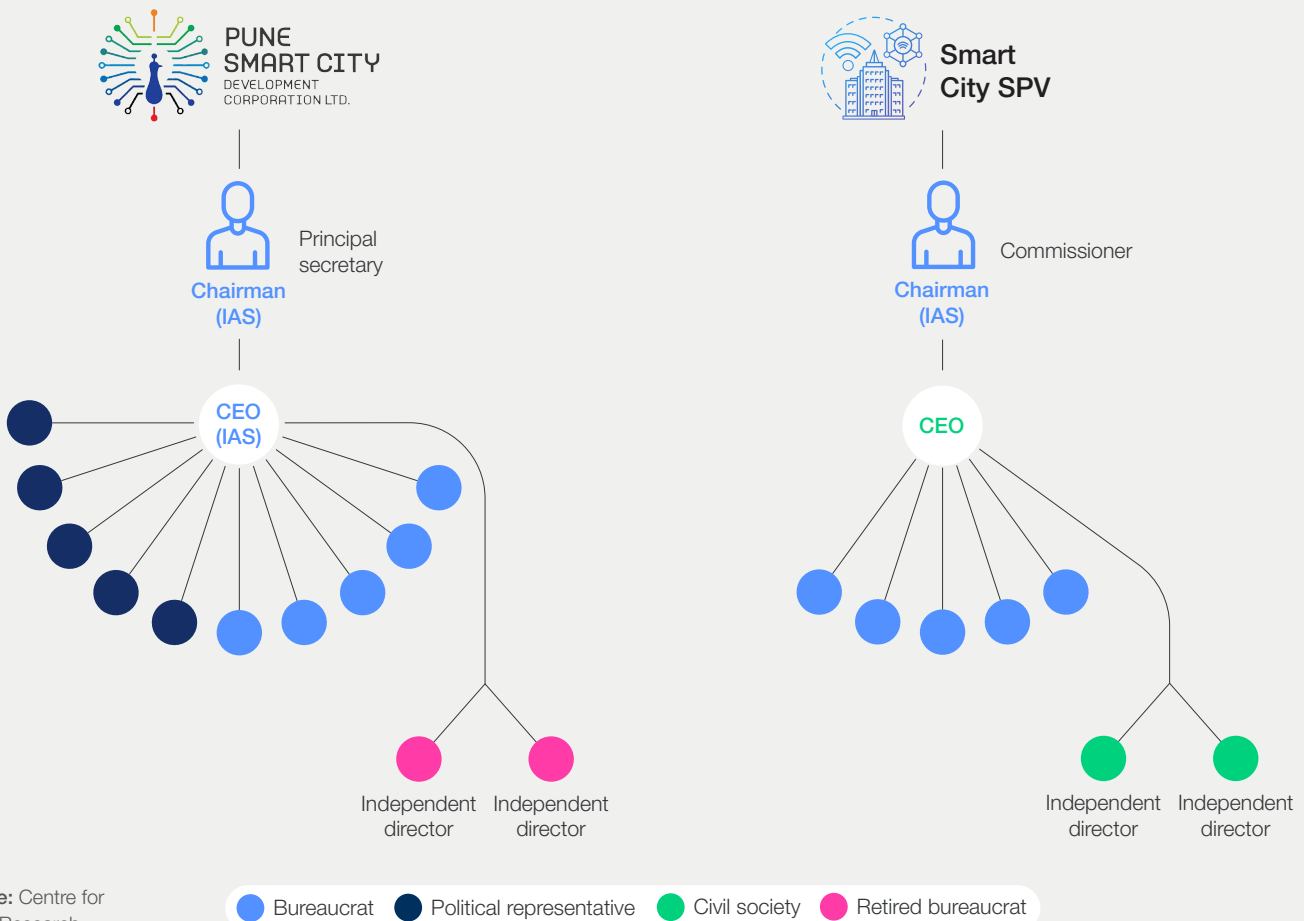
boards, for example from civil society or the private sector, in order to improve SCM implementation. The SPV is envisioned as a concentrated, but flexibly constituted, decision-making body that can potentially overcome the fragmentation found in traditional government decision-making.

The SCM also allows for project implementation flexibility, as is seen in the diversity of agencies in charge of implementing projects across smart cities. For example, in cities such as Gangtok, Madurai and Tirunelveli, SPVs implement more than 90% of projects (by cost), whereas ULBs implement more than 80% of projects in Tiruchirappalli.

The SCM also allows for a tripartite arrangement between the SPV, government agencies such as ULBs, and the project bidder to improve capacities to design and execute projects. Reluctant to rely solely on project management consultants, SPVs have brought in other entities with better capacities, such as ULBs and state governments, to complete projects and where local expertise has been used, capacity enhancement has likely occurred.

These engagements demonstrate how the corporate structure of a smart city SPV brings in flexibility in project planning and implementation.

FIGURE 7 Configurations of SPV boards in Pune vs other cities





BOX 3 | Flexible SPV structures for better efficacy

Cities' choices about the composition of Special Purpose Vehicles (SPVs) draw on situated understandings of the role of stakeholders in implementing urban development projects and build on state-specific governance contexts in terms of how state governments and municipalities collaborate. For example, though the boards of directors of smart cities are led by senior bureaucrats, there can be differences in how the CEO position is operationalized within the SPV.

Pune Smart City Development Corporation Limited (PSCDCL) has followed the practice of having a CEO from the administrative services.

Pune's inclusion of five political representatives, including the mayor, in the SPV's board demonstrates PSCDCL's assimilation with the

city's political eco-system. This is enhanced by including the heads of various ULB departments into PSDCL's procurement committee, which is responsible for the technical sanctioning of the projects. This provides a channel for implementing projects that allows for transparent information sharing with the ULB, while retaining the autonomy and responsiveness of the SPV.

By leveraging the flexibility of the SCM in the composition of the SPV's board and in the choice of implementation agencies, Pune were not only able to respond better to their citizens' needs, but also improve the capacities of existing agencies to sustain urban rejuvenation efforts beyond the SCM's duration.

Source: Interviews with Dr Sanjay Kolte, CEO, PSDCL.

2.3 Coordination through technology

There is a lot of data that is generated from everyday activities and it is possible to use that data to improve service delivery to govern in a more informed manner. But, it will not happen automatically. Closing the loop from generation to action requires many stakeholders and suppliers of technology and analytical capacity to work in tandem – a tough task in any circumstance, let alone in cities that are not used to making decisions.

One of SCM's goals is to propel cities towards being data smart by socializing a culture of data awareness and data usage.⁶ The physical manifestation of this are Integrated Command and Control Centres (ICCCs) that help cities develop their ability to integrate multiple services and smart solutions, currently located in different departmental silos and autonomous agencies, into a one-stop shop for data-centric decision-support.

ICCCs act as a nerve centre for the city, providing a centralized platform for monitoring and managing various smart city services, systems and infrastructure. The platform architecture design of an ICCC is imagined across four layers – data acquisition, data aggregation and analytics, business logic application, and command and control. The ICCCs receive real-time information through a network of systems and Internet of Things (IoT) devices,⁷ including smart sensors, cameras, and applications installed and deployed across the city, which can be used to manage day-to-day operations, design policies and handle unforeseen scenarios quickly and effectively. By collecting and analysing this data, usually by a skilled in-house

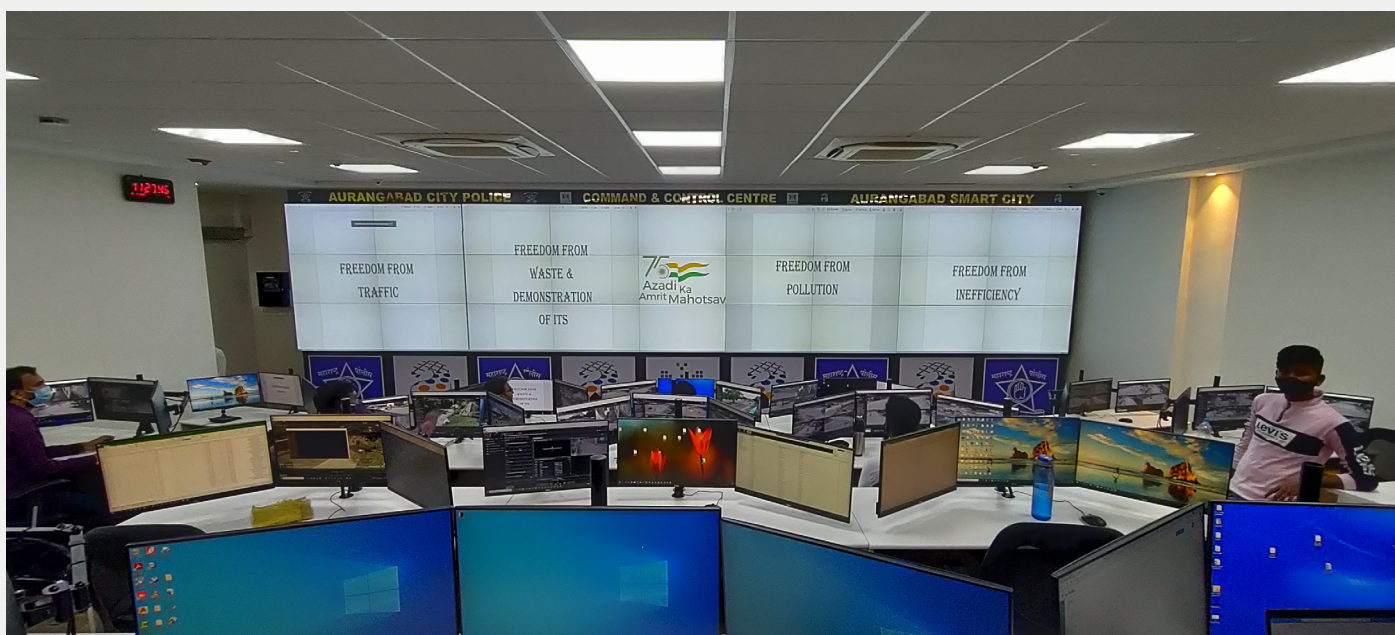
team, government departments have succeeded in improving public service delivery.

ICCCs also help in the daily operations of cities. An example is Bhopal, which by monitoring traffic and issuing automated fines for violations, helped the treasury earn a revenue of ₹2.13 crore (\$258,000) in traffic fines. Surat, one of the earliest to establish an ICCC, now has a suite of applications, from public transport and vehicle fleet management to traffic, property taxes and pandemic control.

ICCCs are currently functional in all 100 smart cities, and since it is one asset that will outlive the mission, the effort is to try and ensure that cities realize the multiple benefits that can accrue from utilizing an ICCC, even if it has not been fully thought through at the time of establishment. Many cities are also treating the infrastructure that is needed to be data smart as a revenue-earning opportunity. The capacity (either of the pipe or the wire) not used by the city is being leased out by cities like Pimpri-Chinchwad and Srinagar and generating revenue for the ICCC and the city in general.

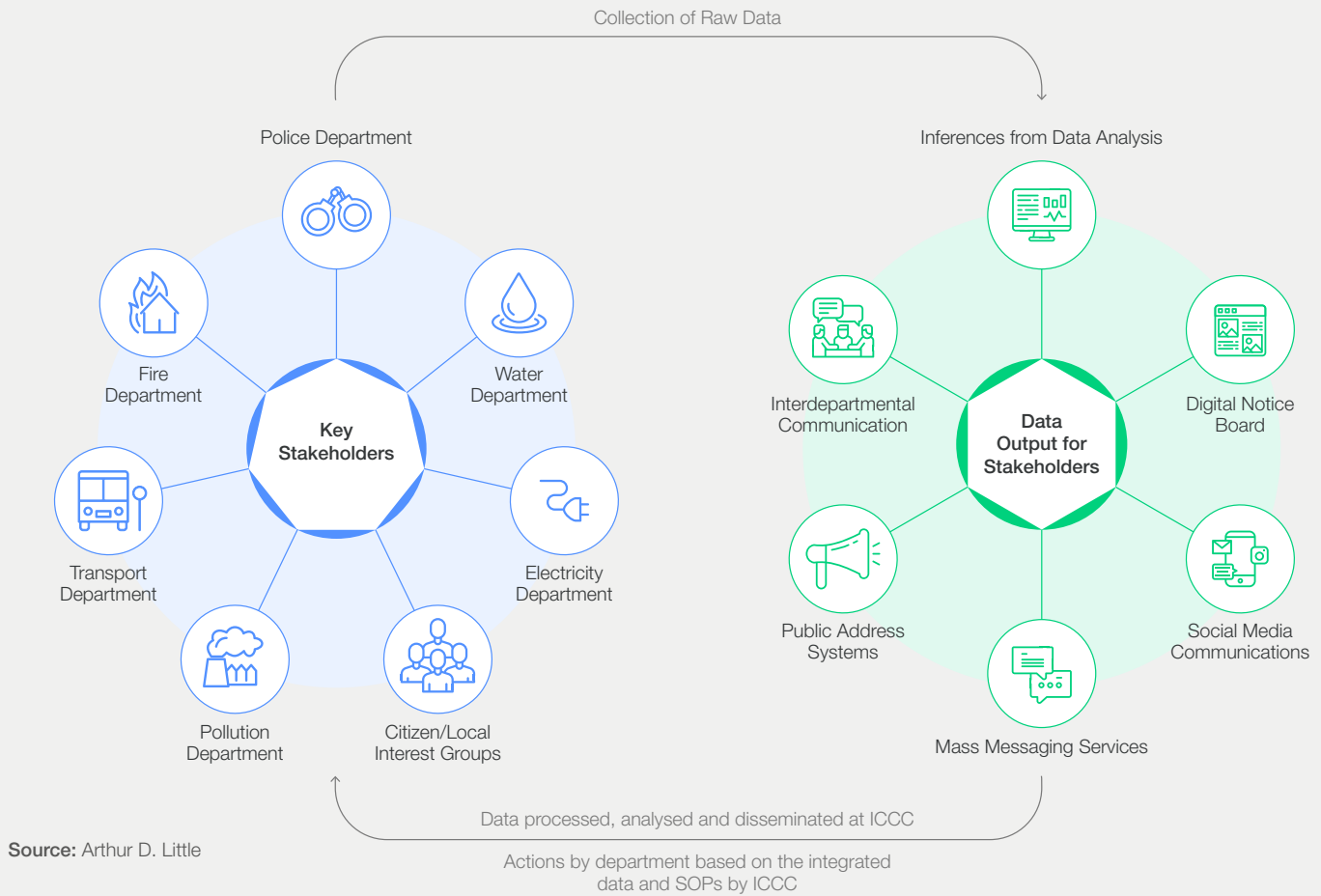
The ability of cities to leverage ICCCs depends on the capacities of existing institutions in the city, interdepartmental cohesion and political will. Some successful ICCCs, such as in Bhopal, have successfully completed the first implementation phase and are now entering the second phase, wherein they have developed in-house capacity and expertise to develop applications for different state and city departments. Other more nascent ICCCs are in the process of leveraging its benefits.

FIGURE 8 Integrated Command and Control Centres in Chandigarh (left) and Gwalior



Source: <https://iccc.smartcities.gov.in>

FIGURE 9 | Flowchart of ICCC operations



Source: Arthur D. Little

BOX 4 | How ICCCs support daily operations

One of the first Integrated Command and Control Centres in India, the ₹880 million ICCC at Vadodara City, was inaugurated in October 2017, and is currently used for e-governance, public awareness and communication, health, mobility, water sanitation and hygiene, among other use cases. It has its own data policy and conducts training and workshops to train its data team.

By operationalizing of several smart technologies such as Automatic Number plate Recognition (ANPR) systems, Adaptive Traffic Control Systems (ATCS), variable messaging sign boards, public address systems, emergency call boxes, environmental sensors, optical fibre network, vehicle tracking, and Supervisory Control and Data Acquisition (SCADA) systems, the Vadodara ICCC has been able to gather granular data and share it with relevant urban local bodies (ULBs) to improve their decision-making process, hence promoting a data-driven governance model.

For instance, the video feed from 400+ surveillance cameras strategically positioned at over 130 locations across the city is continuously monitored by the police force to track and address

criminal activities. An uninterrupted supply of clean water is ensured via the SCADA system, which monitors the water distribution network.

The Vadodara ICCC also helps address civic issues such as garbage dumping, littering, damage to public utility and road repairing by sharing the information and its analysis with Quick Response Teams (QRT) and/or Joint Enforcement Teams (JET). Vadodara's use of the ICCC to create a green corridor, a predefined lane for ambulances and other emergency vehicles such as police vans and fire trucks, reduces the response time for a host of emergency services through efficient coordination of vehicle location and identification for shortest routes.⁸

As a result of the city's ICCC and the various ULBs' highly effective coordination, not only is ICCC management better able to get an overview of the city's governance, but individuals on the ground are also kept up to date on the status of other teams and resources. This unified view of current status and events reduces misconceptions and enables much faster and more effective decision-making.

Source: Interactions with officials in Vadodara

BOX 5 | How ICCCs resolve critical time-sensitive issues

ICCCs are capable of not only managing day-to-day activities, but are also instrumental in managing region specific issues. Cities have an earmarked budget for data-related activities.

Cities that face floods every year have invested in the rejuvenation of lakes and other water bodies to absorb more water. This will not be a quick fix solution as flooding could continue to be an issue – rejuvenation of lakes and other water bodies to absorb more water. However, it also recognizes that this will not be a quick fix and flooding could continue to be an issue for the city for some time.

A comprehensive flood monitoring system has been put in place in the ICCC. This system comprises 42 flood sensors strategically

installed at various locations, including 14 subways, 22 canals, four lakes and two river mouths. Additionally, the ICCC has deployed flood cameras at 62 different locations. These cameras are distributed across 21 canals, four lakes, two river mouths and 14 subway locations. Certain areas have multiple cameras to ensure comprehensive coverage.

While real-time flood monitoring is of utmost importance to ensure public safety and improving the livability, the command-and-control centre has faced its own set of criticisms such as that of the public pertaining to lack of proactiveness in resolution of their grievances, which passes through ICCC.

BOX 6 | The role of ICCCs during COVID

ICCCs came into their own during the COVID-19 pandemic when cities were able to deploy the centres as “war rooms” to coordinate disease control and relief activities across multiple departments and agencies to respond in real time using tools like data dashboards, scenario visualization and simulation models.

Cities used them to help other stakeholders, including civil society and local businesses, to collaborate with the city administration through websites and mobile applications. Consultants, the local IT industry and academic institutes helped with technical know-how and capacity building and training of city personnel. As a result, these war rooms were quickly able to help in tracking and monitoring those infected with COVID-19, managing hospital capacity, ensuring doorstep delivery of essential goods and services during the lockdowns, food relief for the poor and information dissemination.⁹

For example, in Pimpri Chinchwad, a surveillance and GIS dashboard with geotagged households identified COVID-19 epicentres by generating heatmaps, allowing for a targeted response. In addition, a public healthcare and patient tracking dashboard, where hospitals, health departments, medical professionals and local administration could upload and track real time data was created, which led to a significant reduction in coordination time among varied stakeholders and strengthened inter-agency coherence in the city's COVID response.

In Lucknow, a citizen mobile app was integrated with the dashboard metrics by using GPS coordinates to monitor movements of self-quarantined citizens. These were updated in real time on the ICCC dashboard, triggering an alert if a self-quarantined person moved beyond the prescribed geofence.

Source: World Economic Forum “Technology and Data Governance in Cities Indian Smart Cities at the Forefront of the Fight Against COVID-19” Insight Report, December 2020.



Delivering governance benefits: Selected sectors

Exercising choice, flexibility and coordination enables cities to deliver governance benefits, illustrated through case studies in three broad sectors: ecology, mobility and economy.

While the SCM provides for choice, flexibility and improved coordination, the ability of smart cities to adopt these new approaches varied greatly, depending on existing governance capacities and the local institutional and economic landscape, among other factors. This section illustrates how the SCM has helped cities improve their quality of life and respond to citizen needs while enhancing governance ecosystems in the process.

Case studies from three key sectors – ecology, mobility and economy – are presented with a view to articulating the diversity of approaches and articulating some of the implementation mechanisms and on-ground impacts of the SCM.

3.1 Ecology: Green solutions

Creating clean and sustainable urban environments through “smart” solutions has been a key objective of the SCM, eliciting diverse responses from cities. While some cities ramped up environmental impact monitoring, others took a focused approach. For example, Bhopal eased data collection and decision-making for its pollution regulator by installing environment sensors in the smart poles that dot the entire city.

Other cities have focused on resilience – Coimbatore has revived local water bodies and Bhubaneswar has put more electric buses and e-rickshaws on its roads. Indore has gone a step further by recycling solid waste to generate its own transport fuel and evolving a unique monetization model such as green bonds and carbon credits sales to ensure long-term financial viability.

Bio-CNG and carbon credit programme in Indore

Declared the cleanest city in India for the sixth consecutive year in 2022, Indore has emerged as a model for sustainable urban development. Not only does the city produce compressed natural gas, or Bio-CNG, from bio-waste, it also uses it to make its public transport ecologically better. Indore’s robust circular economy generates revenue by selling by-products and royalties from processing plants.

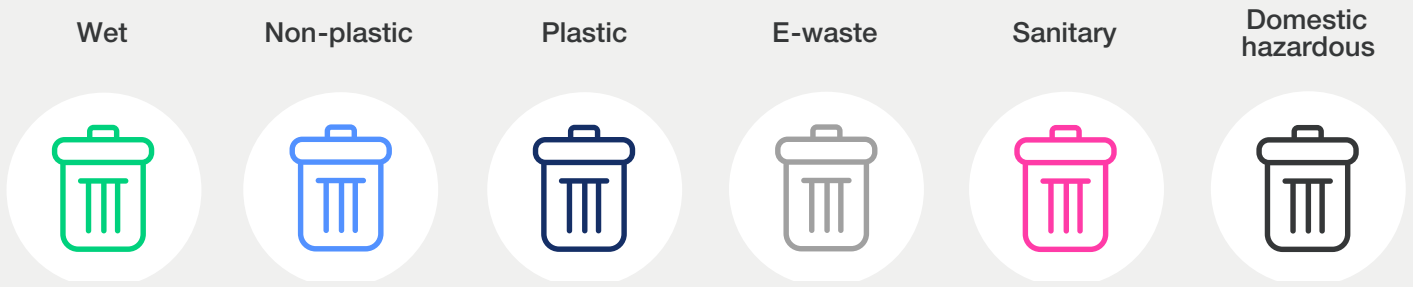
India’s first Bio-CNG plant was installed in Indore in 2017. The overall capacity of all the bio-CNG plants has reached 550 tonnes per day, which can provide fuel to 400 buses in the city.¹⁰ The Indore Municipal Corporation also receives lower cost gas from one of the private plant operators.¹¹ Bio-CNG has emerged as a simple sustainability measure,

which has created a multiplier effect in reducing the city's carbon footprint and increasing self-reliance in terms of energy.

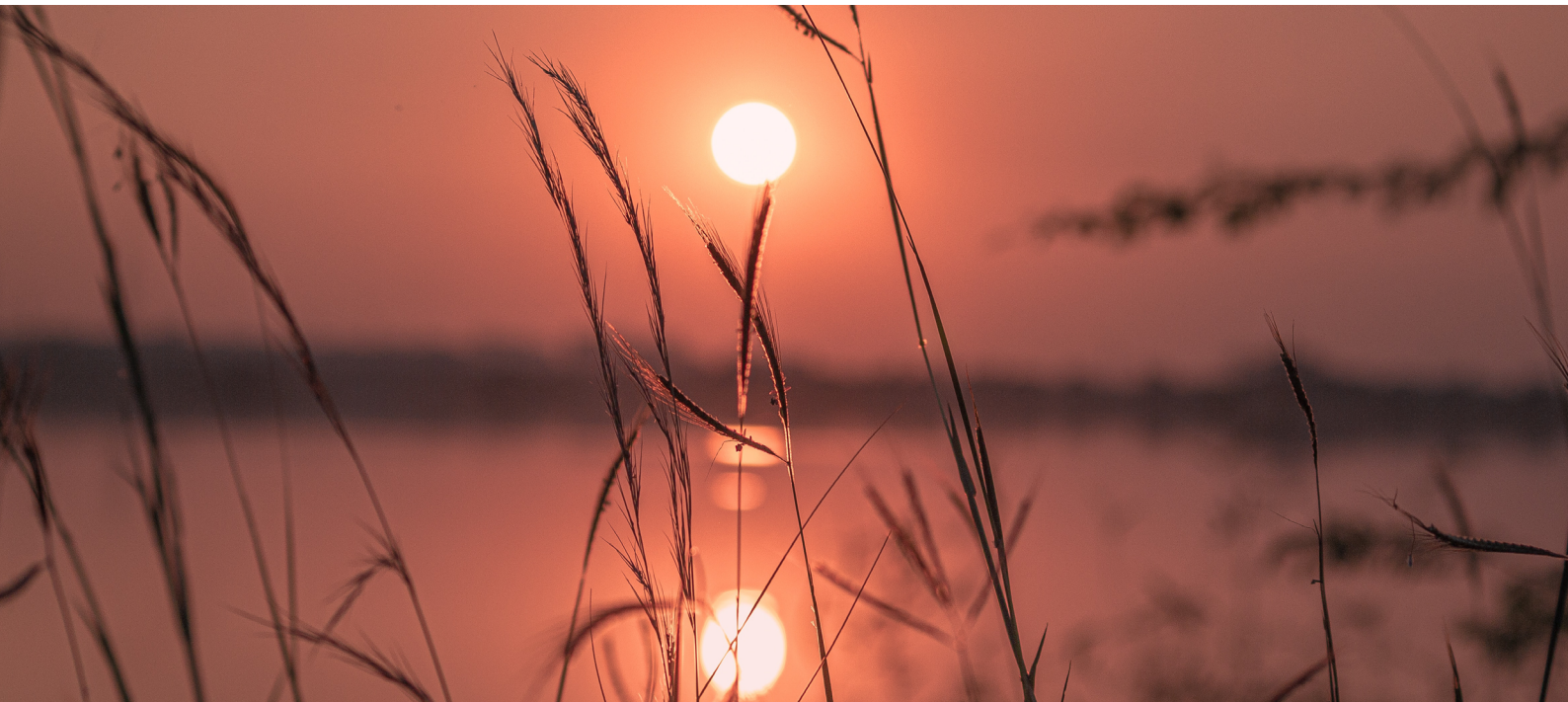
Public support in the operation of this model, especially at the waste separation stage, is the cornerstone of its success. From the point of collection, 100% of the waste is separated into six types, which helps in either proper disposal or reuse depending on the type of the waste (See Figure 10).

While the Devguradiya plant helps in the refuelling of buses, the Choithram Mandi Plant generates around 3 tonnes¹² of organic fertilizer every day. The plants employ around 500 ragpickers, who have experienced an increase in their income from ₹5,000 per month to ₹12,000 per month¹³ since this initiative took off.

FIGURE 10 Six-bin segregation in municipal solid waste management



Source: Arthur D. Little



With a view to financial self-sustainability in the long term, the Indore Smart City Development Limited (ISCDL) has sought to generate revenue through the trade of carbon credit. Leveraging the significant amount of carbon credit generated via such various green projects as decentralized composting, plastic recycling, sewage treatment plant, LED lighting and forestry, Indore has earned revenue of more than ₹9 crore¹⁴ (\$1 million) since the commencement of this model in 2017.

With this, the Indore Municipal Corporation (IMC) became the first municipal corporation in the country to successfully trade carbon credits in the international market. The company also currently has 30 memorandums of understanding¹⁵ with government bodies and smart cities to advise them on adopting the Indore model to improve financial sustainability by leveraging carbon credits. Indore's robust circular economy also generates revenue by selling by-products and royalties from processing plants.

FIGURE 11 | Key metrics of impact of Indore's green solutions



Source: Arthur D. Little

To further add to its list of eco-friendly and financially sensible projects, Indore intends to construct a 60 MW¹⁶ solar power plant at Jalud to pump water from Narmada and save ₹527.93 crore¹⁷ (\$65 million), mainly on electricity costs, in the next 10 years. Leveraging its track record and brand value, the city successfully issued bonds for this project, which were oversubscribed by almost six times. Indore's focus on green solutions is also seen in its efforts to improve the quality of water in a water-stressed environment and the creation of all-inclusive play spaces for children.

The autonomy of the ISCDL, a well-functioning ICCO, and an active smart city advisory forum (SCAF) that interfaces with multiple stakeholders have played a significant role in Indore's transformational journey. Apart from the local body, this project has involved the water department, a private operator, and power and transport departments. It has gone from being a city with a poor solid waste management system marred by issues of overflowing garbage bins and drains before 2015, to one characterized by sustainable and environmentally friendly urban governance.



With multiple green initiatives undertaken and successfully completed by Indore Smart City, we aim to act as a knowledge centre not only for Indore, but also other upcoming smart cities.

Divyank Singh, Chief Executive Officer, Indore Smart City Development Limited

FIGURE 12 | Bio-CNG implementation in Indore



Source: <https://www.smartcityindore.org/image-gallery/>

Located in the Noyyal Basin, Coimbatore has a large lake system that is supplied by the river and rainwater runoff. The system, which traces its history to the Chola times, serves to manage floods during rainy season and cope with water scarcity in the dry season. However, as the city grew, sewage and solid waste was discharged into the drainage system and ended up in the lakes.

When the SCM was announced, Coimbatore was the only city to propose a lake rejuvenation project, building on residents' demands for clean lakes

and public spaces, which the city had lacked until then. Coimbatore Smart City Ltd. Engaged with multiple stakeholders (e.g. local civil society and environmental interest groups and officials from the water, transport and housing departments, and academic institutions like Tamil Nadu Agriculture University) in the early stages. Hence, right at the outset, the project articulated two discrete but interlinked aspects of the project: water rejuvenation and public place making. Approximately 35% of the total funds of the SCM in Coimbatore have been deployed for the lake projects.

FIGURE 13 | Revitalized public spaces along a rejuvenated lake



Source: Coimbatore Smart City

Eight major tank sites in Coimbatore were selected for rejuvenation – Narsampathy, Krishnampathy, Selvampathy, Kumaraswamy, Selvachintamani, Periyakulam, Valankulam and Singanallur. The emphasis has been on eco-restoration, including increasing water security, reducing of flooding by reviving interconnections among the lakes, minimizing pollution discharge into lakes and enhancing biodiversity, all of which build climate resilience.

A careful design of the interface between humans and the water body to create diverse opportunities for public recreation, including a 32-kilometre-long greenway for walking and cycling that connects all the lakes and also key landmarks in the city, has ensured the project gets continued and widespread public, including political, support.



In Coimbatore, there was a lot of demand for lake rejuvenation. Many small volunteering movements were already happening and every lake had some caretakers to clean or protect it. The SCM was a great opportunity (to develop) a full package for the city's lakes.

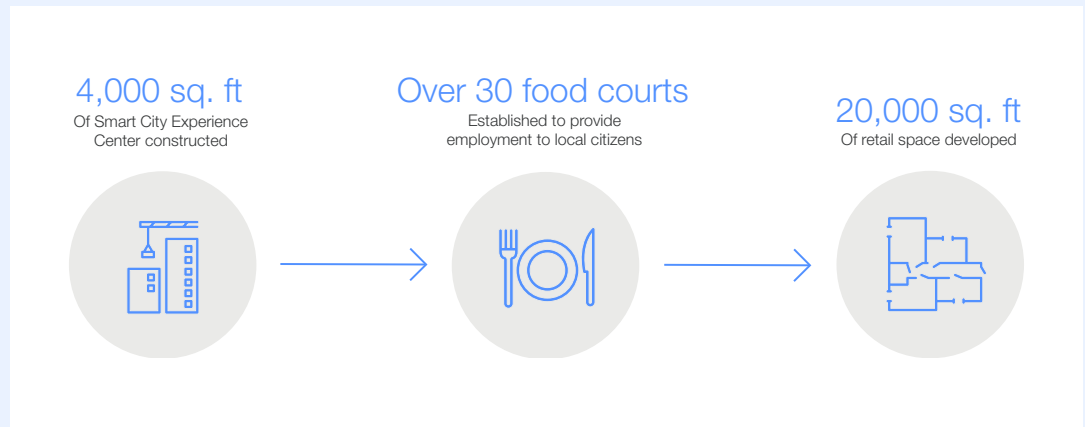
Andrews Jacob, Project Manager CDD

Treatment of wastewater has reduced the overall contamination, which has improved the ecological balance of the lake in addition to enhancing the aesthetics of the public space. Ongoing investments include the installation of automated water quality monitoring equipment, such as flow metres, and water testing and data transmission devices, adding a digital layer to the ecological project.

Enhanced security and CCTV monitoring have improved the perception of safety and made

it feasible to develop such amenities as food courts, boating and water sports. Revenue is also realized via advertisements, rental retailing of facilities such as an amphitheatre, sound and light show, etc., which enables the project to fund its operations and maintenance costs. The project has created 20,000 square feet of retail space, over 30 food courts and a 4000 sq. ft. Smart City Experience Centre. The success of the project has encouraged demands from other parts of the city, where too the SCM and the corporation have started lake eco-restoration projects.

FIGURE 14 | Impacts of Coimbatore's lake restoration



Source: Interview with consultant from CDD India who were part of the project implementation consortium



3.2 Mobility: Public transport systems

Urban mobility and public transportation serve as the fundamental pillar of a thriving city, forming the backbone that supports rapid urbanization. Enabling citizens with affordable and efficient public mobility systems contributes to the overall well-being and economic development of cities; thus, Indian cities are keen to invest in creating robust mobility solutions.

The SCM places a significant emphasis on the mobility sector, evident from the fact that approximately 19% of total investments under the initiative have been allocated specifically for mobility and its related areas. Particularly, the use of Information and Communication Technology (ICT) is driving a transformative shift in the mobility sector. A notable example in this is the implementation of Intelligent Traffic Management Systems (ITMS); out of 100 smart cities in India, more than a third have adopted such systems. This demonstrates the adoption of advanced technologies to improve urban governance, a key objective of the SCM, in this case through efficient traffic management and enhanced urban mobility.

Public transportation model in Surat

In India, using SCM, Surat Municipal Corporation (SMC) and its SPVs, the Surat Smart City Development Limited (SSCDL) and Surat Sitilink

Limited worked closely together to develop a comprehensive public bus transportation system, assisted by CEPT University. Designed in close alignment with the SMC's comprehensive mobility plan until 2046, the project has improved citizens' experience and enhanced operational effectiveness.

Surat boasts a 108-kilometre-long Bus Rapid Transit System (BRTS) corridor, the longest in the country. City buses are operational on 14 routes (307 BRTS buses) and 52 routes (407 city buses) that cover urban and suburban areas of the city. Surat Bus Transportation service has linked the non-BRTS routes and buses on Google Transit, with real-time tracking via Google Maps.

The route network is dense and extensive, ensuring that 98% of the city's population has access within 500 metres. An increase in daily average ridership from 65,000 in 2017 to about 200,000 in 2023 is widely attributed to better frequency and on-time performance of the bus system. Not only has schedule adherence improved from 83% to 97%, but the system is also much safer now, with 33% less speed violations and 96% adherence to assigned routes. Currently, Surat is exploring whether advertising revenue from the BRTS can reduce dependence on Viability Grant Funds (VGF) from the government.



Public transport is not just about moving people from point A to point B, it is about connecting communities, reducing traffic congestion and promoting a sustainable future using smart interventions.

Shalini Agarwal, IAS, Chair, Surat Smart City Development Limited (SSCDL); Chair, Sitilink Ltd. and Municipal Commissioner, SMC

These successes are built on some distinctive governance features from the SCM playbook.

Governance flexibility: Three separate bodies could work in close collaboration because they were headed by the same individual for the duration of the project. The Municipal Commissioner of Surat is also the chairperson of Surat Smart City Limited and Surat Sitilink, though the CEO and MD, respectively, are different. The SPV could leverage its power to hire competent and suitable firms to provide best class solutions for Surat's needs.

Data-driven coordination: Inter-agency coordination is enabled by Surat's ICCO, the Surat Municipal Administrative and Control (SMAC). SMAC provides data to power the city's Intelligent Transit Management System (ITMS), which manages operations (e.g. trip and schedule

adherence through a suite of sub-systems like Automatic Vehicle location, Depot Management, Vehicle Planning Scheduling & Dispatch, Incident Management and Enterprise Management.

This data not only improves safety through incident management, stopping violations and speeding, but also improved efficiency through peak time analysis, dynamic routing and performance analysis of drivers. Data trends enable decisions about new routes, frequency management and route extensions. Additionally, the Integrated Transport-Mobility Administration Centre (IT-MAC) acts as the brain for the public bus system, also managing other civic vehicles like ambulances, fire brigades, solid waste management vehicles, etc. The project implementation phase involved multiple agencies, including the traffic police, urban development authority and utility companies.

FIGURE 15 | Images of the Surat BRTS corridor and station



Source: Surat Sitalink Ltd.



Public transport is the backbone of a sustainable and efficient urban mobility system, providing equitable access to transportation, reducing congestion, and minimizing environmental impact. With this vision, Surat has been working towards a sustainable public transport system.

Swati P. Desai, Chief Executive Officer, Surat Smart City Development Limited (SSCDL)

Customer-centric SMART mobility solutions:

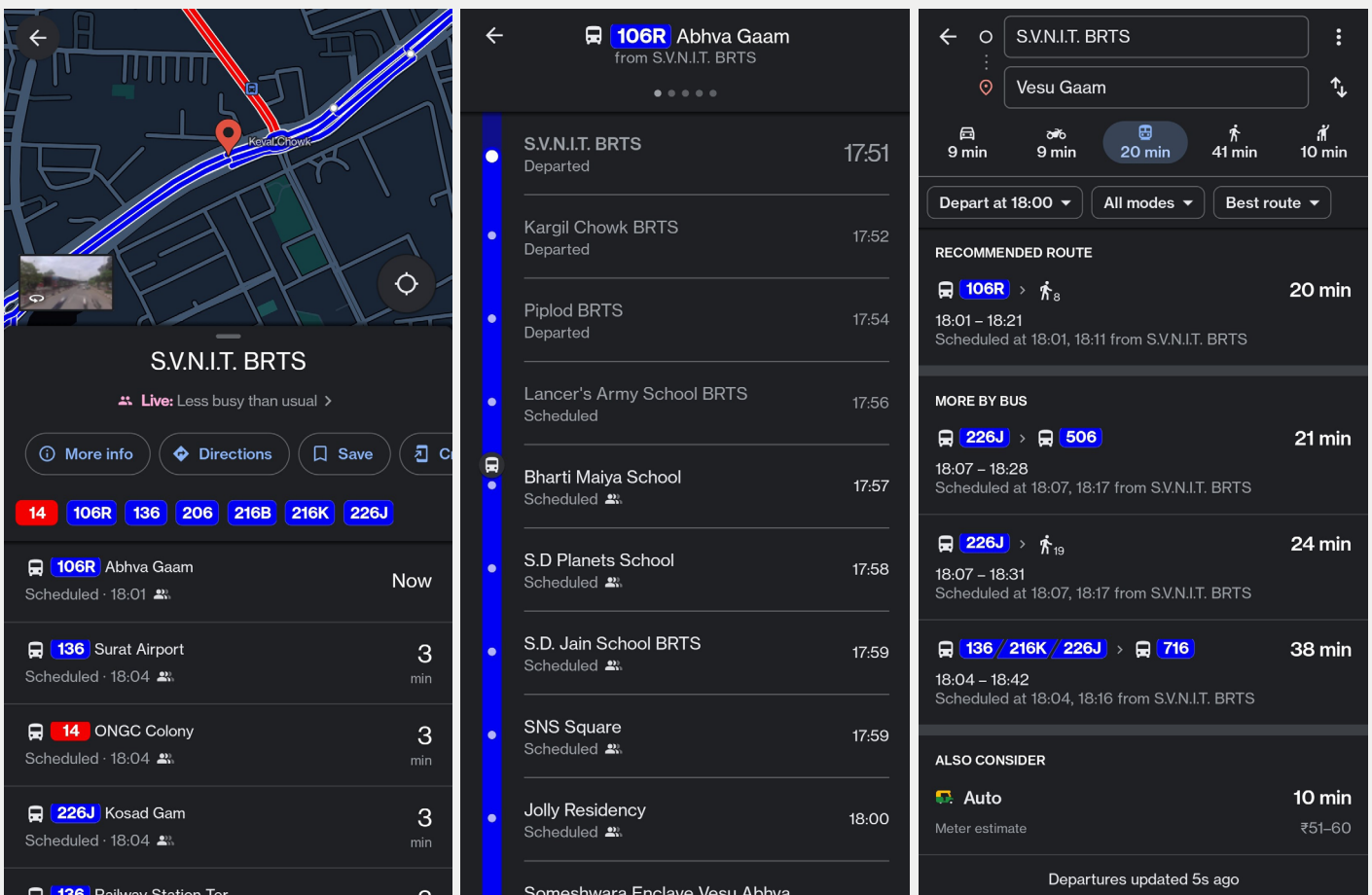
Most BRTS buses and bus stations are equipped with a Passenger Information System that shows real-time status. By onboarding the Surat Bus Transportation service on Google Transit, SSCDL has provided other users also with easy access to real-time bus information. This enables advance planning and shortens commute time for users.

The Surat money card, a personalized open loop digital payments co-branded card issued by ICICI bank in collaboration with SMC, can be used by residents for the transport system and as a regular debit card at retail stores, e-commerce sites, etc. Almost 20% of the total amount spent via these cards is spent on non-transport activities. To date, over 127,000 Surat money cards have been issued.

On the revenue collection side, the Automatic Fare Collection System, which supports m-ticketing and the Surat money card support, uses QR code technology to generate passenger tickets. This can also be done through the Sitilink app. This system is integrated with enterprise management, providing analytical capability to decision-makers to efficiently plan for future growth.

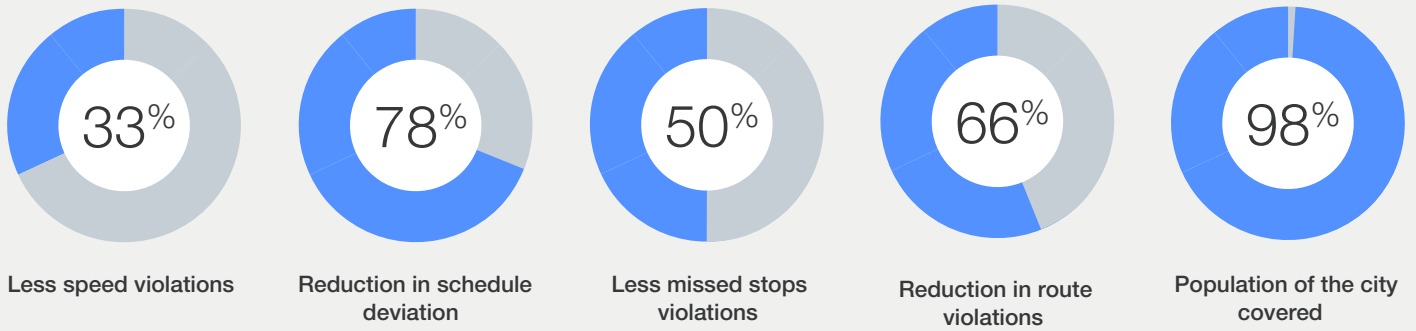
While Surat's commitment towards data and technology-enabled improvements to public transport is commendable, its experiences also highlight the importance of integrated management for separate mobility modes within the city. Finding technically competent personnel to operate sophisticated systems and achieving financial sustainability are key challenges.

FIGURE 16 BRTS real-time tracking of buses and routes



Source: Arthur D. Little

FIGURE 17 | Key impact metrics of the Surat public transport system



Source: Arthur D. Little, based on interactions in Surat

BOX 8 | Public bike sharing system, Chandigarh

With the highest per capita ownership of vehicles in the country, Chandigarh sought non-motorized transport solutions for mobility. Building on existing bicycling infrastructure, a Public Bike Sharing (PBS) system was the logical choice for Chandigarh Smart City Limited (CSCL).

Costing about \$2.42 million, the Chandigarh PBS comprises 3,750 bicycles, 465 out of 617 planned bicycle docking stations, and 265 kilometres of dedicated cycle track, the longest in the country.

FIGURE 18 | India's extensive PBS network and dedicated cycling track in Chandigarh



Source: Chandigarh Smart City

Implemented through a public-private partnership, this is a DBFOT project wherein the platform is designed, built, financed, operated and eventually (after 10 years) transferred to CSCL by a private sector concessionaire who also bears the total costs of the project including infrastructure, maintenance and marketing.

A diverse range of users – including city officials, delivery persons, women and children – use bicycles for both recreation and work, renting them for ₹10 per half hour. The city's SmartBike app has gained over 267,000 registered users, while

more than 830,000 rides have been taken so far, covering about 3.3 million kilometres. On average, some 1,200 rides are taken every day and the number goes up to 1,600 on public holidays.

However, challenges remain. The COVID-19 pandemic hit advertising revenue and vandalism can affect 25 bikes per day. The cycle tracks have also incentivized people to start using their own bicycles more frequently, demonstrating welcome changes in mobility behaviours to more environmentally friendly non-motorized systems.

FIGURE 19 | Cycling track in Chandigarh and public bike sharing system bikes



Source: Arthur D. Little

3.3 Economy: Growth and innovation

The Smart Cities Mission has encouraged cities to leverage local and regional economic bases and socio-cultural conditions to boost production, livelihoods and competitiveness both in the manufacturing and services sectors.

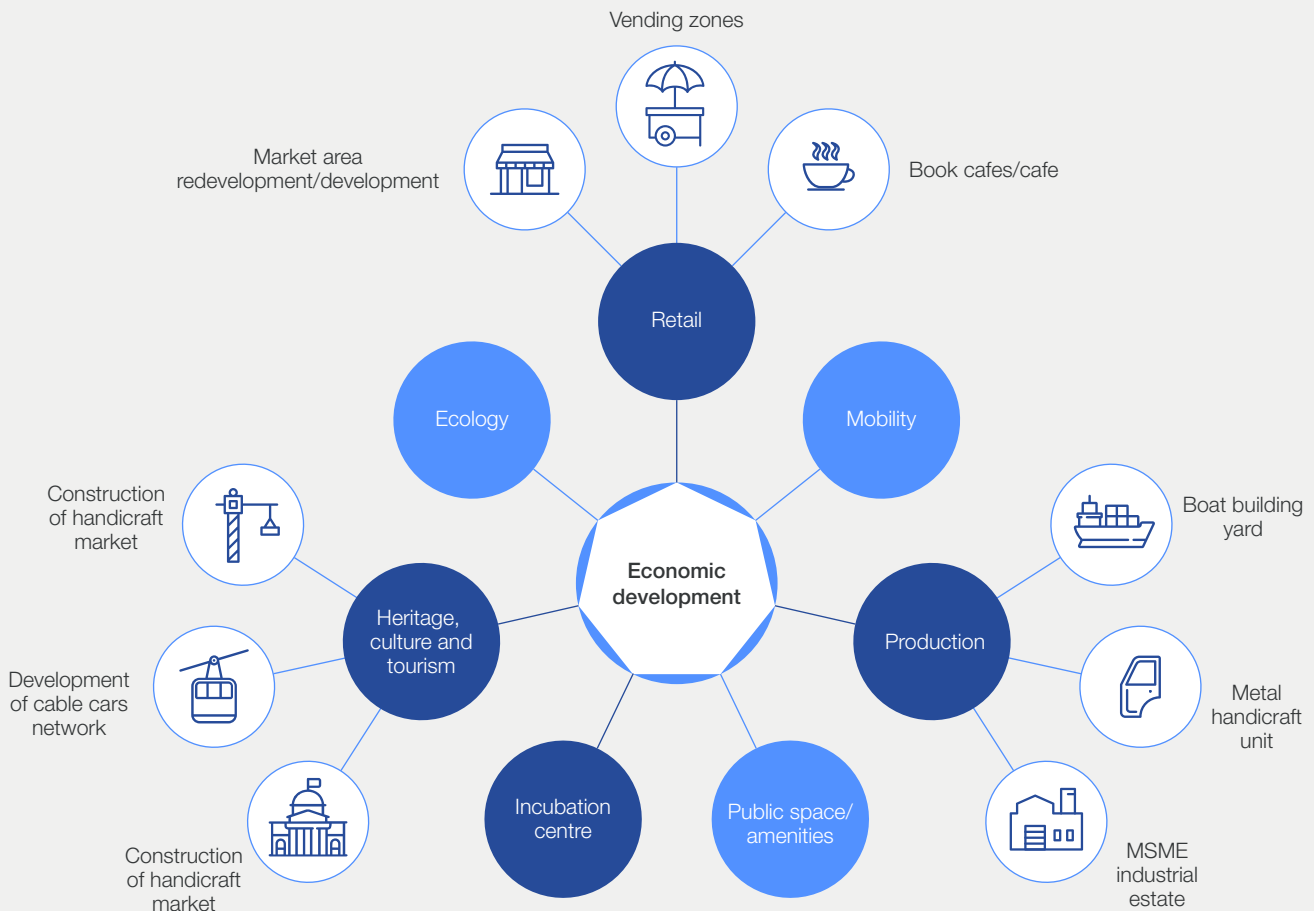
As seen in Figure 12, cities have focused on four types of projects for economic growth: growing trade, especially retail commerce; boosting tourism through enhancing cultural, heritage and other resources of interest; enhancing local production; and boosting entrepreneurship.

Of the total 421 projects focused towards economic growth, nearly 30 percent are related with public space improvement and about 27 percent with retail improvement.¹⁸ Srinagar, which hastened project implementation to be at its best as the host of the G20 Tourism Working Group meeting in May 2023, exemplifies how cities combine these aspects to rejuvenate key economic precincts and core areas.

The SCM also contributed to the key imperative of urban employment generation. Clusters of artisanal and traditional production predate the colonial era and continue to sustain the livelihoods and local economies of many cities in India today.

Leveraging SCM funds, smaller cities have been able to energize traditional industry clusters. For example, the Moradabad Smart City Ltd. (MSCL) responded to demands articulated by the Smart City Advisory Forum to support the city's brass handicrafts industry. The 'Make in Moradabad' project, an echo of the national thrust towards export-oriented manufacturing, is building a CNG-fuelled brass furnace to wean small, unorganized sector manufacturers away from polluting fuel like coal, and setting up world-class materials testing laboratories that will also serve nearby industrial towns. Kakinada has already completed a new boat building yard to support the livelihoods of local fisher communities.

FIGURE 20 Types of projects aimed at boosting city economies under SCM



Source: Centre for Policy Research based on the SCM GMIS

At the same time, the SCM's focus on innovation and digital transformation has urged cities to develop entrepreneurship through incubation centres, leveraging the success of the StartUp India programme, which has now reached nearly 100,000 firms. In Surat, the 220-seat Surat iLab offers emerging entrepreneurs affordable and well-equipped office space, mentorship channels and training programmes. By easing entry barriers, it has successfully incubated startups providing solutions for managing organic waste, maintaining community toilets and pest control, which are already being utilized by the Surat Municipal Corporation.

Even a smaller city like Satna has set up an incubation centre to strengthen the nascent entrepreneurial ecosystem in the region, with considerable emphasis on organizing bootcamps and hackathons to educate potential entrepreneurs. Currently hosting 15 startups, the incubation centre provides training and mentorship for registration, creating business plans and investment pitches, certifications, marketing and branding.

Rejuvenating retail and tourism through public space improvement: Srinagar

Lal Chowk and its adjacent area are not only historically and culturally significant, but they are the main hub of economic and trade activities in Srinagar and have been the focus of several attempts at decongestion and renewal over the years.

The Srinagar Smart City Limited (SSCL) is currently in the process of revamping this central business district (CBD), covering areas of Lal Chowk, Residency Road, Jhelum River Front, M A Road, and the interconnections including Polo View, Jehangir Chowk, Chunthi Kul and Regal Chowk.

The Polo View Market upgradation has been completed and the rebranded Polo View High Street retail market was inaugurated on 12 May 2023. According to officials at the SSCL, it is the

first pedestrian and wire-free market of Srinagar city. The project involved the Kashmir Power Distribution Corporation, J&K Urban Environmental Engineering Department, traffic police and sports council apart from the municipal corporation.

Set up in 1954, Polo View Market is an old market that is popular among locals and tourists alike. By redesigning this old market comprising shops, offices, old government buildings and cafes, and abutting the market roads into the more contemporary high street retail format, Srinagar hopes to create a new economic and social hub for the city.

The project has made bold urban design interventions like an exclusive pedestrian zone, a new road with on-street parking and renewed interconnections with the Jhelum riverfront. The use of traditional Devri stones and cobblestones have also given the street a historic look. Developing seating around Chinar trees, making the space wire-free by taking telecom and electric underground, ensuring accessibility for the differently abled and for emergency services, high-quality illumination, restoration and improvement of existing structures, public bicycle docking facility, segregated storm-water drainage and sewer network are all features of this new design.

SSCL officials have consulted the stakeholders and met with them often in the market, both before and during the construction of the project. Despite disruptions over several months that have affected everyday business in the market, local traders are optimistic about increased business.¹⁹ Smart City officials attributed the seamless implementation of this project to the active participation of various departments.²⁰

FIGURE 21 Polo View High Street retail market in Srinagar



Source: Centre for Policy Research

Kakinada is a coastal city in the state of Andhra Pradesh, well-known for its fishing-related activities. The city has leveraged the Smart Cities Mission to create sustainable livelihood opportunities for its indigenous fishing community, who are an important part of its cultural and social fabric.

Operated in partnership with the Fisheries Department and a local private company, the Kakinada Boat Building Yard is built at an outlay of a little less than \$1 million and is expected to create direct employment opportunities for 200 people. Located on the banks of the Buckingham Canal, the yard provides a safe and conducive working environment for the community, which earlier carried out their boat-building activities on the canal's banks, under extreme weather

conditions. These activities resulted in the dumping of untreated waste disposal from the boat-building process into the canal, itself an important ecological site for the city. The yard also reduces the time of boat construction and boat repair by allowing all-weather activities in the monsoon season and during the night.

Underpinned by a tripartite agreement between the Kakinada Smart City Corporation Limited, Department of Fisheries, and M/s United Kireeti Marines Ltd., to whom the facility is currently leased, the boat building yard is a financially sustainable project. The revenue is shared between the Kakinada Smart City Corporation Limited and the Fisheries Department.

FIGURE 22 | Kakinada boat building yard



Source: Kakinada Smart City

“ Earlier maintenance and construction of boats were done in very harsh weather conditions. This project provides us with better conditions and also helps us earn more with better health conditions.

I. Bhairava Swamy, Member of the Fisher's Community

“ The project has been able to bring the Fisheries Department and the Fisher's Community under the same roof.

Naushad Ahmad, Program Manager, Kakinada Boat Building Yard

“ The rate of leasing by KSCCL is subsidized for certified persons from the fishing community, thus making the whole project affordable to the community.

Ch. Ramu, Member of the Fisher's Community

The diversity of projects in this section all speak to the choice exercised by cities when they put forward projects for the Smart Cities Mission.

A number of these projects were also implemented quickly. For example, two biomethanation projects in Indore and the bioremediation of the old dumping yard were completed in less than six months. The Kakinada boat yard took just 15 months as did the Polo View market in Srinagar, which required coordination across multiple agencies, including the power distribution company, environmental engineering department and traffic police.

To some extent, this can be attributed to flexible and streamlined decision processes of the SPV. However, in many other projects, there have been the usual delays; the systematic study of successful processes would help streamline procurement for cities in the future. Many projects also require coordinating across multiple agencies even during

operation. Similar coordination is needed for Bio-CNG in Indore, where the water, power and transport departments are involved, apart from the municipal corporation and the private operator of the plant. Surat's Sitalink uses the city's ICCO to coordinate and Kakinada's boatyard brings together the community and the fisheries department.

The structure of the SPV arguably makes it easier to bring different stakeholders, including civil society and elected representatives, together across projects. But, in the absence of clearly established practices, the extent to which it is done across cities and in specific projects varies based on context. Nevertheless, the experience across sectors illustrates the changes in governance that the mission is bringing about, though institutionalizing this could take more time and effort.



Conclusion

A city is smart if it is able to respond to its residents. By that metric, many of the cities of the Smart Cities Mission have arguably done reasonably well.

Compared to previous interventions, the Smart Cities Mission has allowed cities more leeway in the choice of what they would use the money for and this has resulted in a diverse array of projects across multiple sectors. Some are large flagship interventions, such as Surat's mobility system or Coimbatore's lakes, while others are small redevelopments of neighbourhood infrastructure that bind people to each other.

In the case of many of the larger initiatives, there was an existing groundswell of demand from residents that was turned into a project by the SPV. The SPV, mandated by the mission, may have been seen as an imposition by some at the start of the mission, but the flexibility it affords as a project implementation body has come to be realized as an asset. As a corporate body, it can engage more effectively and non-hierarchically with a broader range of stakeholders and its empowered board of directors, which includes senior provincial officials, cut through layers of decision-making and provide a forum for interdepartmental coordination.

In addition to the SPV, the second ubiquitous institution of the mission, the ICCC, is also a forum for coordination across multiple city agencies and contributes to data-informed decision-making. In many cities, the ICCC is being used to manage multiple activities, ranging from traffic to crime to solid waste management. Its continuance after the mission is now a priority for the government, both federal and provincial.

One of the more encouraging aspects is the kind of activity that has started in the smaller smart cities. These mid-sized cities are the fastest-growing segment of the Indian urban landscape and improvement in their governance will have multiple positive spillovers for economic growth and social cohesion.

Indian cities, with some notable exceptions, have limited agency. At the end of seven years of the Smart Cities Mission, it appears that cities are becoming more comfortable with governing themselves. At its inception, it was felt that the mission would be too technocratic and overly oriented to the private sector, for where Indian cities were situated at that time. In part, this was also because the SCM's mechanisms for engaging with civil society and the elected representatives were not clearly defined, and its experience in this regard has varied across cities, reflecting their specific contexts, some more successfully than others.

As the mission has progressed, however, many of the apprehensions have waned and while IT and data still remain at the heart of the mission, it is increasingly seen not as something imposed from above, but as an enabler that allows stakeholders make more informed decisions, and importantly, respond to the demands from the city's residents.

As noted in this document, technology is just a tool. The mission has gone much beyond technology, and through its funding approach and institutional insistence on the SPV, it has begun to change city governance ecosystems across different scales – in small, mid-sized and large cities. In doing so, it has re-energized the conversation about urban governance in India, which bodes well for the future.

Contributors

World Economic Forum

Purushottam Kaushik
Head, C4IR India

Shefali Rai
Project Specialist, C4IR India

Arthur D. Little

Brajesh Singh
Associate Director, ADL, India & South Asia

Centre for Policy Research

Partha Mukhopadhyay
Senior Fellow, CPR, India

Mukta Naik
Fellow, CPR, India

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World Economic Forum
91–93 route de la Capite
CH-1223 Cologny/Geneva
Switzerland

Tel.: +41 (0) 22 869 1212
Fax: +41 (0) 22 786 2744
contact@weforum.org
www.weforum.org