CIDCO @ SMART
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CIDCO Smart City Lab @ NIUA

Team
Siddharth Pandit
A. N. Nanda Kishore
Ryan Christopher Sequeira
Rewa Marathe
Suzana Jacob

Project Coordinator
P. Suresh Babu
(ACP, A&R)

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CIDCO WE MAKE CITIES
National Institute of Urban Affairs
CIDCO Smart City Plan Overview

Smart City Action Plan vision for CIDCO Navi Mumbai (South) is centered around its citizens. CIDCO’s vision is to develop an environment friendly self-sustained city. It believes, a Smart City is not a destination but a journey wherein the core principles of the organisation are aligned towards delivering people centered governance while ensuring transparency, and the model is rooted in the idea of preserving and enriching the environment. The plan is built on ten building blocks also called the ten objective areas, which together accommodate 88 smart projects.

Smart Organisation
CIDCO recognised early on in its Smart City journey, that to be able to successfully deliver on its Smart City vision, it has to develop itself into a world class organisation. As part of this transformational process, CIDCO reviewed the changes in the business environment and proposed to strengthen the four core fundamental principles around which its Smart City vision is anchored, namely – People, Technology, Environment and Efficiency.

E-Governance, Transparency and Ease of Business
CIDCO’s Twenty Point Transparency plan is focused on improving public services and growing citizens’ expectations. The transparency plan initiated by CIDCO is a coordinated effort by the management to improve citizen experience. The plans range from creating a governance framework for better delivery of key e-governance initiatives to creating policies and procedures that would be a guide for employees and stakeholders in delivery.

Environmental Sustainability
Environmental Sustainability is an integral part of the smart city vision. CIDCO has been sensitive towards preservation of environment since the inception of the Navi Mumbai project and has accordingly taken measures to protect it. With renewed vigour it is rededicating to this cause by strengthening its efforts. Wherever required, CIDCO is determined to regulate undesirable developments and promoting causes such as conservation of water by mandatory stipulations.

Swachh Bharat
Improvement in Health and Sanitation is a priority for CIDCO, towards which, efforts are reinforced by fully supporting Swachh Bharat mission of the Government of India. Through employment of good sanitation practices including solid waste management and preventing open defecation through construction of toilets, CIDCO aligns its initiatives with the national mission.

Quality of Life
CIDCO envisages that one of the key building blocks of a smart city is to develop Navi Mumbai as a city of choice for its residents by offering livability and quality of life. By providing open spaces, and social facilities and improving public safety, CIDCO makes way for a stress free, environmentally friendly citizen experience in CIDCO Navi Mumbai (South). It not only adds value to the city, but offer its citizens opportunity for recreation and protects the environment.

Inclusive Planning
A key building block of the Smart City is to keep it inclusive wherein the women, elderly, differently-abled and sons of soil feel at home. CIDCO has always been ahead of the curve in recognising and addressing this issue. A holistic approach is considered, wherein physical planning (by way of providing plots for various activities) is supported by commensurate social environment.

Provision of Basic Infrastructure
Infrastructure is the core block that involves application of new strategies and technologies to lead a city towards self sustenance. CIDCO is always oriented towards provision of adequate infrastructure in the form of water, sanitation, roads, railways, information and communication technology in order to improve living standards and enhance productivity, mobility and connectivity the city.

Transit Oriented Development
‘Smart Cities’ are those where the residents can either walk to their work places or have public transport system right next to their houses, so that they can reach their work places quickly. CIDCO is one of the first development authorities in India to use Transit Oriented Development (TOD) as its urban development strategy. CIDCO had been developing the bus transport and railway transport systems in Navi Mumbai, now venturing into metro development as well. CIDCO’s ground breaking concept of ‘Railway Station cum Commercial Complex’ makes it a major driving force behind the city’s economic development.

Port City
Development of Jawaharlal Nehru Port Trust (JNPT) was a milestone in Navi Mumbai’s development. The potential of JNPT influence area is huge. CIDCO in its smart city plan will develop settlements which can avail the benefits of the proximity to
the port while overcoming the unique challenges of this area.

Financial Independence
CIDCO believes that cities can flourish if they are financially independent, i.e. all finances required for sustenance of a city have to be generated within the city. These could be based on value added services to citizens, rent on leased public spaces, strategic use of land for commercial ventures etc. Financially sustainable cities attract industries, residential interests, and better social infrastructure and create employment for citizens.

The key strength of CIDCO’s action plan is the focus of investment on projects that will bring investment, jobs and development to the region, enabling sustainable financial growth.

As part of CIDCO@SMART Newsletter, an overview of an objective area and a project of high impact will be presented in each issue. Since this is a combined issue (3 and 4), two objective areas and two projects are presented.

NEWS @ Smart City Lab

CIDCO Smart City Lab presents ‘Technology and City’ at Columbia Global Center Mumbai
- December 17, 2015

Smart City Lab assists in preparation of CIDCO Smart City Action Plan
- December 7, 2015

Smart City Lab participates in FGD on Green Freight
- November 9, 2015

Smart City Lab participates in Consultation on building a framework for Gender Inclusive Smart Cities
- November 9, 2015

Smart City Lab presents at National Energy Policy Workshop at NITI Aayog
- November 6, 2015

CIDCO presents Navi Mumbai Smart City model at 3rd Annual Conference on Smart Cities in India
- October 12, 2015

Bloomberg Philanthropies conducts Ideas Camp on smart city development
- October 1, 2015

Smart City Lab presents at the National Conference on De-polluting Indian Cities
- September 10, 2015

Smart City Lab presents development of Navi Mumbai at ‘Urban Planning for City Leaders’ Workshop at Kuala Lumpur
- September 9, 2015

CIDCO presents Smart City Plan at NITI Aayog
- August 31, 2015

Upcoming trainings for CIDCO staff

January 2016
- Prevention of corruption in administration
- 24th Convergence India 2016
- 10th Annual Conference on Airports in India

February 2016
- 7th GRIHA Summit 2016
- Gender mainstreaming in urban development
- Working with Digital

March 2016
- Maps: A Course on Geospatial Technology (GIS)
- Smart City Expo PUEBLA
- Urban Infrastructure Project Preparation and Management
- India Smart Grid Week 2016
- India Aviation 2016

April 2016
- 7th Annual : Affordable Housing Projects
- Clean and Green India 2016
- Re-imagining India
- Co-creative Place making Course
Completion Timeline of CIDCO’s Smart City Projects

**2014**
- CIDCO Citizens Facilitation Centre
- Online Social Facility Plot Allotment Software
- Public Wifi for Seamless Connectivity
- Unified Data (IEGIS) Repository
- Integrated SAP Implementation
- Smart Parking
- Thane - Turbe - Nerul/Vashi (TTNV) Corridor
- Running of 12 EMU Coaches on Harbour Corridor - A MRVC Cost Sharing Project
- Power Supply Infrastructure Distribution (PSID) Network in Kharghar and Ulwe Node

**2015**
- CIDCO’s Online Plan Approval System (COPAS)
- Vigilance Portal
- CIDCO Estate Management Software
- Legal Tracking System
- Software for the Navi Mumbai International Airport 22.5% and R&R Scheme
- Navi Mumbai International Airport Portal
- Online Payments
- Citizen Portal
- Smart Mobile Applications
  - My CIDCO Mobile Apps
  - Mobile App for GPS based Smart Grievance Reporting
- Citizen Payments
- Citizen Connect Application
- Paperless CIDCO with eOffice
- Coastal Road Ulwe (Connecting MTHL & Proposed Navi Mumbai International Airport)
- Gaadhi Riverfront Development
- Smart City Lighting (LED Street Lights) for Pushpak Node
- Grey Water Pipeline Network
- Extrusion Based Mechanical Biological Treatment for MSW
- Mapping of Public Health Hot Spot
- Development of Greenfield Inter State Bus Terminus (ISBT)

**2016**
- Development of Parks and Open Spaces
- CCTV Based City Surveillance Projects
- Online RTI
- Smart Anti-Encroachment System
- Nodal Informational Management System (NIMS)
- CIDCO Land Information Management System (CLAIMS)
- Smart Housing Allotments
- Conservation of Belapur Fort
- Marina
- Water Leakage Prevention System & Automation
- Passenger Water Transport
- Cycle Track in Kharghar Node
- Electronic Medical Record Integration
- Intelligent Traffic Management
- Ropeway Connectivity at Vashi

**2017**
- Development of Greenfield Inter State Bus Terminus (ISBT)
- Affordable Housing for EWS/LIG
- Development of Khandeshwar Railway Station Precinct
- Development of integrated Complex at Seawoods
- Mangrove Park Airport Site
- Mangrove Park Nerul
**Palm Beach Marg Extension from Ghansoli to Airoli**

**Construction of Coastal Road from NH-4B near Navghar to Sector-63 at Dronagiri**

**Nerul/Belapur - Seawoods - Uran rail corridor**

**Doubling of Belapur-Panvel Corridor**

**Restructuring Projects - Review of Staffing Patterns and Projects**

**Affordable Housing for EWS/LIG**

**NIUA-CIDCO Smart City Lab**

**Development of Terminus Station at Panvel (Stage I)**

**2020**

**Panvel - Karjat Rail Corridor**

**Construction of New Sewage Treatment Plants (STPs)**

**2023**

**Balganga Dam Project for Purely Drinking Water Purpose**

**2024**

**Nature Park**

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**ADDITONAL PROJECTS**

- **Specialised Training**
- **Integrity Initiatives**
  - Changing Minds
  - Specialised Third Party Monitoring of All Projects Above Rs. 5 Lakhs
  - Integrity Pact for All Projects above Rs. 5 Crores
- **Navi Mumbai Airport Influence Notified Area (NAINA)**
- **Navi Mumbai International Airport**
- **Self Financing and Self Sustainable City - Project Report and Reserve Price of Navi Mumbai**
- **Identification of Water Supply Source**
- **Inclusive Planning**
  - Gender Resource Centre
  - Virangula Kendra
  - Access for Disabled
- **Pro-Active 26 Points Action Plan for Navi Mumbai PAPs**
- **CIDCO TARA (CIDCO Transformative Action for Rurban Advancement)**
- **Decentralised Solid Waste Management in JNPTIA**
- **Optional Services**
  - Ambulance with Telemedicine
- **Palghar**
- **Port City**
- **CIDCO Navi Mumbai Metro**
- **Smart City - Policy & Regulatory Mechanism for Buildings**

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**LEGEND**

- Smart Organisation
- Environmental Sustainability
- Financial Independence
- Provision of Basic Infrastructure
- Port City
- Swachh Bharat
- Quality of Life
- Transit Oriented Development
- E-Governance, Transparency and Ease of Business
- Inclusive Planning
OBJECTION AREA

Smart Organisation

About CIDCO Organisational Capacities and Functions
CIDCO is a multi-faceted and multi-disciplinary organisation with 1,750 employees, which includes Planners, Architects, Engineers, Administrators, and other Professionals. Since its inception, CIDCO has ventured into a wide spectrum of activities to accommodate the requirements of the State Government and changing landscape of urban areas in India especially Maharashtra. The multidimensional activities undertaken today by CIDCO can be classified under these broad concepts:
1. Special Planning Authority
2. New Town Development Authority
3. Public Services Agency
4. Advisory Services

Smart Organisation Projects
CIDCO operates with highly skilled & intellectual workforce to accomplish Engineering, Architectural and Economic services along with upholding its ethos of social inclusiveness and environment preservation while delivering mega projects with an eye for the micro details. The total financial outlay of CIDCO’s investment for initiatives proposed under this strategic focus area is Rs.219.50 Crore.

Some of the key projects under this strategic focus area are:

1. Organisational Restructuring to empower employees
   Being an intellectually strong organisation working across multiple interdependent domains, CIDCO has been continuously striving to advance its people and processes. Over the last year, as part of its endeavor to commission the Smart City project, CIDCO undertook a focused transformational process of organisational Restructuring and Business Process Re-engineering. With changing business environment, the focus at CIDCO is shifting to being digital and integrate advanced technologies like GIS and SAP ERP across functions to provide seamless Citizen Centric service.

2. Setting up of ‘CIDCO Smart City Lab’
   CIDCO established the ‘Smart City Lab’ at the National Institute of Urban Affairs (NIUA) as part of its Capacity Building Initiative. Smart City Lab is a research and capacity-building unit to provide support to CIDCO’s technical personnel through action research, documentation and capacity building with a particular focus on the development of ‘smart cities’. The unit serves as an incubation centre for smart and innovative solutions in priority sectors, such as land use planning and management, traffic & transportation, utility networks, public services, conservation/preservation of greenery and energy efficiency.

3. Appointment of expert Project Management and Implementation Consultants (PMICs)
   CIDCO has also adopted the system of appointment of expert Project Management and Implementation Consultants (PMICs) for its major projects in order to leverage the efficiencies and expertise of the private sector. This system is expected to leverage the specific expertise of the Consultants on a needs basis for mega projects with inherent multi disciplinary nature of activities.

4. Re-engineering of CIDCO Processes
   The initiative was mainly driven from the fact of redundant and replicated processes, multiple touch points across departments, unnecessary complexities of sub-processes and lack of collaboration between internal departments. It was decided that to drive real beneficial change, there was need to revisit each and every business process, collectively look for a simplified version and make every effort to map it with “What does it mean to a Citizen?”.

   In consultation with its stakeholders, CIDCO reviewed all its business processes from the touch points of internal and external stakeholders, and re-engineered these in order to make them transparent, effective and citizen centric. Through this, 1299 existing processes and sub processes have been reduced to 812 ‘Re-engineered’ processes.
Since the approval of the National e-Governance Plan (NeGP) by the Union Government in 2006, several city development authorities have engaged in use of Information and Communication Technology (ICT) to make their processes transparent. With the launch of the National Smart City Mission and Digital India Mission in 2015, ICT has gained a further impetus throughout the country.

E- governance, Transparency and Ease of Business is one of the ‘ten building blocks’ on which CIDCO Navi Mumbai (South) is built. CIDCO announced 21 projects in this strategic focus area in its Smart City Action Plan. With many of these projects being developed in-house, the financial outlay towards these pan city initiatives is Rs. 170.07 Crores.

**E- governance, Transparency and Ease of Business Projects**
CIDCO’s projects in E-governance, Transparency and Ease of Business can be labeled in three categories*- ICT Enabled Services, Transparency and Citizen Participation Initiatives and IT Connectivity Projects. ICT Enabled Services simplify interaction through online and telephone services within the corporation and with its citizens, eliminating delays and frustrations in interactions with the government. These services as well as other smart city strategies bring transparency and citizen participation in design, development and evaluation to meet the aspirations of citizens and to bring maximum benefit for all. Such an interaction can happen efficiently only with robust IT Connectivity, which allows high-speed internet connections to all individuals and businesses. Through implementation of these projects, all of which are expected to be completed in 2016, CIDCO will empower CIDCO Navi Mumbai (South) to become a sustainable city with a robust system of governance that simplifies the lives of its citizens.

**ICT Enabled Services**
These projects focus on standardising and computerising processes to remove human error and delays, while mitigating the pressures experienced by all the departments and employees as a result of the constantly growing city. Some of the major projects are SAP implementation, eOffice, Smart Housing Allotment Software, Online Social Facility Plot Allotment Software, Legal Tracking system, CIDCOs Land Information Management software (CLAIMS), Nodal Information Management System (NIMS), CIDCOs Online Plan Approval System (COPAS), Unified Data Repository and Smart Anti- Encroachment System.

**Transparency and citizen participation Initiatives**
These projects provide balanced and objective information to the public and engage them directly to ensure that their concerns and aspirations are consistently understood and considered. Transparency and Citizen Participation initiatives at CIDCO are Citizen Facilitation Centre (CFC), Vigilance Portal, Online RTI, Online Payment and SMART Mobile Applications.

**IT connectivity**
CIDCO carries forward the agenda of Digital India Mission though its various initiatives to provide robust internet connectivity across the city. Orienting towards making high speed internet a public service, CIDCO begins by providing Free Broadband Connectivity to government schools and colleges. Free Public Wi-Fi at selected locations and 4G Connectivity are other projects.

Projects in these three approaches together meet a larger goal in the city of engaging its citizens, increasing efficiency, empowering sustainability, generating business and improving quality of life.

* Categorised by NIUA- CIDCO Smart City Lab
Suburban Railway

The Transit Oriented Development Story

The story of Navi Mumbai’s growth has been shaped by the integration of affordable housing, quality infrastructure and public transport networks. This region of 2 million residents is developed on a suburban rail network that connects it to the Greater Mumbai Metropolitan region. This form of Transit Oriented Development was one of the first in India and still remains one of the few Indian cities integrating public transportation mass transit corridor with residential, office and commercial land use. This story about the suburban rail and its role in Navi Mumbai region continues as CIDCO engages on its Smart City Plan for CIDCO Navi Mumbai South.

The Story So Far

The city of Navi Mumbai (New Bombay) was conceptualised in 1970s with strategic focus on decongesting Mumbai’s population, port operations and industries. Mumbai in the 1960s suffered from extreme population crowding, polluting industries and housing congestion due to lack of affordability. The 1970 Regional Plan recommended development of a new town across the harbour with primary aims of providing affordable housing and economic development through setting up of a port (now Jawaharlal Nehru Port) to offload increasing demand on the Mumbai port. Consequently, 15 nodes have now been developed by CIDCO - the development authority, along major arterial lines and suburban rail (Harbour) connector trunk channel. Each node about 8.5 sq km to 25 sq.km in size and support populations varying from 100,000 to 450,000. The population density of Navi Mumbai is about 4167 persons/sq.km compared to about 25,000 persons/sq.km of Mumbai. However the net residential densities are much higher than the density thresholds for transit requirements of 50 persons/ha.

The first rail connection between modern Mumbai and Navi Mumbai was established with the construction of the Mankhurd- Vashi bridge in 1990s and provided impetus to the growth of Navi Mumbai as an affordable housing option to Mumbai. The rail infrastructure costs were shared by CIDCO (City and Industrial Development Corporation) and the Railways in the ratio of 67:33. Bonds were issued to raise the capital ($300 million at 1990 prices) for rail infrastructure and user surcharges were collected. The current rail network is 52 kms long and has 14 stations which are designed to leverage the commercial space above the stations, provide for quick discharge of the passengers from the platforms and adequate parking facilities. Intermodal connections with feeder buses and rickshaws for last mile connectivity are integrated into the development and design of these stations. The city of Navi Mumbai also operates a bus service under the Navi Mumbai Municipal Corporation, the network has a fleet strength of 411 buses and carry 150,000 passengers daily.

This pattern is very similar to European cities which were destroyed by the war and invested in rail transportation to guide the urban spatial growth. Paris, Stockholm invested in ‘new towns’ to connect the central city using suburban commuter rail rather than highway investments as in the US.
This gave rise to ‘pearls on a string’ urban structure in Europe where high density was observed around commuter station nodes. As the pearls grew with upgraded transportation, the pearl-chain development transformed into a corridor city. The stations known as nodes in Navi Mumbai now form nuclei of decentralised concentration.

**Expansion of Suburban Railway Network under the CIDCO Smart City Plan**

The CIDCO Smart City Plan has earmarked massive investments in expansion of suburban rail infrastructure through a partnership with the Railways. About Rs 1769 crore (or USD 270 million) are being planned to be invested by CIDCO alone, with additional investments from Railways. This plan consists of three new suburban rail corridors, from Belapur to Uran, from Panvel to Karjat and from Thane to Vashi via Turbhe and Nerul and doubling the capacity of an existing corridor from Belapur to Panvel.

The biggest project will be the Nerul/Belapur-Seawoods-Uran rail corridor that will connect Navi Mumbai to Uran, a distance of 27 kms. 10 new stations will be built along this corridor with intermodal connectivity to both the proposed airport and the existing port (JNPT).

The public transportation network in the Navi Mumbai region and the resulting mobility choices influences the quality of life for its citizens. The transit component of “Transit Oriented Development” for CIDCO Navi Mumbai South continues to focus on improvement of suburban rail and introduction of other modes such as ropeway and metro to compliment the demand on suburban network.
Repositories in CIDCO
The use of Information and Communication Technology (ICT) to create easily accessible data interface can bring about major reforms in decision making. CIDCO, in its Smart City Action Plan Vision aspires to achieve better city management by deploying state-of-art urban governance tools. Various smart projects using ICT have been initiated in the Smart City Action Plan for CIDCO Navi Mumbai (South) to create an environment of efficient, accountable, citizen friendly administration.

One of the most important ways in which ICT can improve efficiency in governance is by facilitating data driven or evidence based planning. To use data to drive development, a data repository that is easily accessible across all Departments of the corporation is necessary. Towards this, several initiatives are undertaken in various departments of CIDCO. However, these initiatives have limited advantages as they are being implemented in a piecemeal manner and their scope is limited to the respective departments. Major of these ventures in several parallel systems are:

- **GIS repository** - a single map data repository that consists of a digital geo-database comprised of standardised nodal plans, cadastral information and pertinent land documents
- **Systems, Applications and Products (SAP)** - an organised database of non-geographical data stored for better management of the corporation
- **CIDCO’s Land Information and Management System (CLAIMS)** - an application that stores and disseminate information for all land parcels
- **Nodal Information Management System (NIMS)** - a nodal data repository with spatial and non-spatial plot level information
- **Legal Tracking System (LTS)** - information related to court matters in respect to various land parcels in Navi Mumbai

**Unified Data Repository at CIDCO**
Unified data repository is an ambitious project by CIDCO, which aims at integrating the data stored in different format across various departments and servers in CIDCO. This project, costing approximately Rs. 2 Crores, is expected to be completed in 2016. Creation of Unified Data Repository, also called as Integrated Enterprise GIS (IEGIS) Repository ensures integration of crucial data as a single integrated repository of several others at CIDCO like SAP, GIS, COPAS, CLAIMS, NIMS, CCTV and LTS. It thus creates an environment for better informed decisions, ensuring public good at large.

CIDCO has appointed Maharashtra Remote Sensing Application Centre (MRSAC) for overlaying the spatial data inputs and integrating the respective attribute data for Navi Mumbai. Other information from existing sources like cadastral maps, landuse zone boundaries from sanctioned development plans, High Tension Lines (HTL) are delineated along with the respective Coastal Regulation Zones (CRZ) and approved CZMP (Coastal Zone Management Plans), wetlands, lands handed over to Forest Department. Contours from toposheets prepared by Survey of India is also being superimposed in different layers.

The Unified Data Repository created by integrating all data in different servers of CIDCO will make the day-to-day operations of the corporation seamless, speedy and transparent. It will enable informed decision making through spatial analysis and evidence. The database is a major step by CIDCO towards creation of a citizen centric user interface in CIDCO Navi Mumbai (South).
Interview with V. Radha, IAS, Joint Managing Director, CIDCO

Gender Inclusive Planning at CIDCO

Can you share your vision for making CIDCO Navi Mumbai (South) Gender Inclusive? My vision is to make social inclusion an integral part of CIDCO’s smart city vision. I want to see it permeate into all aspects city development. The initiatives taken for it should become the norm in the future. They should be replicated over time, even when people leave CIDCO, making it a part of the institutional memory.

How have you been able to address issues of gender inclusion in CIDCO as well as in city level policies? CIDCO is in a special position to bring about positive change as we are the planners, engineers and the owners of the land. Particularly, with the new smart city agenda, we can make a difference by leading through example. We made Inclusive Planning a pillar in the our smart city action plan because it has to be a comprehensive approach that looks at the issue of gender inclusion in association with the issues of youth and the elderly across the board. It cannot be a few isolated piecemeal actions.

Can you talk about the current gender representation in the workforce at CIDCO? CIDCO’s senior management has a strong presence of highly educated women. We do not differentiate on basis of gender in any means and pursue a zero tolerance policy for cases on sexual harassments. Our assessment of the employees is based purely on competence and integrity. And I am proud to say that we have plenty of it in our organisation.

As part of the Inclusive Planning Pillar, what are some of CIDCO’s initiatives on Gender Inclusion for CIDCO Navi Mumbai (South)? CIDCO has a comprehensive strategy for inclusive planning. Instead of providing separate land parcels, we are also going to integrate the social facilities for women, senior citizens and youth under one roof. This will help create an active vibrant community which lends safety to the neighborhood and makes these come alive with interaction and activity. We also realise that NGOs who run these facilities are not developers and constructing them is a complicated task with all the clearances and permissions involved. To simplify the matter, CIDCO has decided to build these facilities for the NGOs to run. A board note has been passed on the subject. Drawing upon the work of Balkalyaan in Pune, CIDCO is building recreation facilities for the disabled which will used on the concept of time share. CIDCO takes the issue of elderly and disabled seriously in context of gender inclusive planning as elderly and disabled women are some of the most vulnerable members of the society. CIDCO is also working with PAP women to understand and mitigate their issues. Following a competitive selection process, CIDCO is sponsoring children of PAP (incidentally all girls) to study for UPSC examination in Pune and New Delhi. Our agenda is to empower women through education.

Can you share some of your earliest experiences on the subject of Gender Inclusion, including your work at BMC (BrihanMumbai Municipal Corporation), in setting up the Savitribai Phule Resource Centre? Initially as the district collector of Aurangabad, I was met with a sense of disbelief across all the levels of the organisation. Aurangabad is a politically significant district with a lot of issues and I was its first woman collector after 1840. I pushed the agenda of development, speaking about long term issues such as water. People were so amazed to see me, a woman, in the position of power, they would queue up simply to see me and meet me at work in Taluka places. Initially it was quite unnerving, particularly after working in Pune where I had been easily accepted in my position as woman. But over time I saw complete transformation in the district as we continued working together on the agenda on development. Eventually I was accepted with total warmth and affection. This was a wonderful experience for me.

At BMC, I headed the prevention of sexual harassment committee as the senior most woman officer. We realised that the cases of sexual harassment were numerous and that they were being dealt with as a reaction with poor understanding of the issue. Primarily because it is all built on negativity. I understood that we had to change the discussion to something that was positive and constructive. Sexual harassment was an issue that went beyond employees and extended to the citizens who visited BMC to use its services. So we decided to broaden the scope of our task and we set out to establish a gender resource centre that educated people at BMC and the community on the issues of gender inclusion. We also focused on capacity building and empowerment of women. All of this was done in collaboration with nonprofit organisations such as Akshara. We developed training programs in coordination with all the various committees at BMC. We also focused on women entrepreneurship. Our special focus was on marginalised women including the elderly and the disabled. This was a comprehensive effort and a truly good example of how a massive organisation like BMC should address the complex issue of gender.
According to the Smart City Plan (SCP) of Smart Cities Mission, the process for planning the Smart City commences with the self assessment of the city, preparation of the city profile and thereafter progresses to intense citizen engagement at multiple levels in the city using different means. The SCP says, ‘a sound engagement strategy should involve better communication by government, soliciting feedback for problem identification, co-creating solutions and involving local citizen champions, while ensuring the active participation of various groups of people, such as youth and students associations, welfare associations, tax-payers associations, senior citizens, special interest groups, slum dwellers and others.’ The evaluation criteria of SCP at Stage II of Smart Cities Challenge loudly announces the significance of citizen engagement. 16 points out of 100 at this stage is devised for citizen engagement, split up as 10 points in creating city vision and developing strategic plan, 5 points in proposal for area based development and 1 point in proposal for pan city solution.

While it is beyond argument that a sound citizen engagement can create an ownership of the plan among citizens and hence make implementation of the same easier, it is also true that citizen engagement if not done in an effective manner can only delay development and yield no productive results. Therefore, it is required that the right method of engagement be deployed at the right time to the right people to avail the full benefit of citizen engagement in any smart city. This within the very short time frame of Smart Cities Mission is a challenge for the city authorities. Hence, the activity of strategic planning and comprehensive citizen engagement is expected to be widely held beyond Smart City Mission in coming years. Foreseeing this, CIDCO Smart City Lab has developed a strategy for citizen engagement which can help city authorities guide the activity in their city.

Citizen Engagement in SCP Framework

In the SCP, the profiling of the city is the basis for selecting the appropriate techniques and the target groups for the engagement strategy. The profiling should thus arrive at a detailed demographic profile of the city, identifying various groups of people, whose aspiration for their city may be different. This profiling is necessary so as to identify the target groups for engagement and also to ensure representation of various groups in the different rounds of engagement process. As

Citizen Engagement in CIDCO Navi Mumbai (South)

Over the years, CIDCO has acted as a pro-active organisation, leading development in anticipation of growth in a region, instead of a response. The launch of the first smart city in India- CIDCO Navi Mumbai (South), on 4th of December by the CM of Maharashtra-Devendra Fandavis, well ahead of the National Smart Cities Mission illustrates this approach. The launch was followed by a three day exhibition open to all citizens at CIDCO exhibition centre in Vashi, Navi Mumbai. It displayed 88 smart projects organised into 10 building blocks of smart development to be implemented in CIDCO Navi Mumbai (South) in the next few years. The exhibition which was given wide publicity throughout the city acted as a platform to inform the citizens of the various smart initiatives of CIDCO. Over 50,000 citizens, which included businessmen, real estate developers, project affected persons, senior citizens, school and college students visited the booths. Project brochures of all projects with the cost, completion date and other particulars were made available for the visitors. In addition to disseminating information, the exhibition also enabled a lot of one-on-one interaction of citizens with the Managing Director, Joint Managing Director, Central Vigilance Officer, Head of the Departments and Engineers of CIDCO. The event received major positive feedback.
rightly stated in the SCP, citizen engagement provides support for projects and reduces potential conflict by ensuring that the projects meet the most urgent needs of the communities. It provides the opportunity to co-create the smart city by collectively identifying creative and innovative solutions to common urban challenges, thereby creating a significant sense of ownership among the citizens.

SCP mandates citizen engagement at three stages—visioning the smart city, identifying area based development and pan city solutions, and implementation of the area based development proposal and pan city solution. Though participation of maximum number of citizens is expected, the scope, mode, extent and other particulars of citizen engagement is left to the liberty of the city authorities such that each city may deploy its most effective strategy.

Citizen engagement strategy developed at CIDCO Smart City Lab is illustrated in the diagram on the next page. International Association for Public Participation (IAP2) identifies five forms of engagement, which are, inform, consult, involve, collaborate and empower. A simplification of the same is attempted here by regrouping these five into three broader categories namely, (i) information: one way communication of city authorities to citizens, (ii) direct participation: engagement in terms of two way communication or collaboration of city authorities with citizens directly, and (iii) indirect participation: engagement in terms of two way communication or collaboration of city authorities with representatives of citizens. These three categories at various stages have varied purposes, as elaborated in the diagram. Within the framework defined by SCP, the comprehensive strategy, as described under, deploys the various forms of citizen engagement at various stages so as to yield the best outcome. The strategy proposed here is most suitable for SCP, while it can also be absorbed with suitable modifications in any city or area development exercise.

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**IAP2 Public Participation Spectrum**

International Association for Public Participation (IAP2) is an international organisation advancing the practice of public participation. IAP2’s spectrum of public participation defines the various forms of engagement as-

**Inform**

To provide the public with balanced and objective information to assist them in understanding the problem, alternatives and opportunities and/or solutions

**Consult**

To obtain public feedback on analysis, alternatives and/or decisions

**Involve**

To work directly with the public throughout the process to ensure that the public concerns and aspirations are consistently understood and considered

**Collaborate**

To partner with the public in each aspect of the decision including the development of alternatives and the identification of the preferred solution

**Empower**

To place final decision-making in the hands of the public

Source: International Association for Public Participation. www.iap2.org
Based on city profile, City Administration will identify key priority areas for citizens to rank to indicate their opinion. Eg: public transportation, solid waste management, transparency in governance, adequate water supply, steady power supply etc.

**DIRECT PARTICIPATION**
Purpose: Empower
Who: All citizens
What: Citizen vote for one vision
How: Face-to-face consultations (Ward level meetings), written submissions, online polling, mobile polling

**INFORMATION**
Purpose: Inform
Who: All citizens
What: Invitation to participate to develop sub-goals for the vision statement
How: Through e-mail, telephone and other personal contact modes, institutions and experts are invited to develop sub-goals

**DIRECT PARTICIPATION**
Purpose: Involve
Who: Domain experts, research institutions, focus groups for various domains, executive officers of development authority and municipal corporation
What: City administration through desk research with experts will identify 5-10 solutions for pan city proposal and area based proposal
How: Face-to-face consultations, written submissions, online consultation

**INDIRECT PARTICIPATION**
Purpose: Involve
Who: Domain experts, research institutions, focus groups for various domains, executive officers of development authority and municipal corporation
What: City administration will develop sub-goals through collaboration with the identified stakeholders
How: Face-to-face consultations, written submissions, online consultation

**INFORMATION**
Purpose: Consult
Who: Domain experts
What: City administration through desk research with experts will identify 5-10 solutions for pan city proposal and area based proposal
How: Face-to-face consultations, written submissions, online consultation

**DIRECT PARTICIPATION**
Purpose: Empower
Who: All citizens
What: Citizen vote for one vision
How: Face-to-face consultations (Ward level meetings), written submissions, online polling, mobile polling
**Strategic Plan**

(Pan city and Area based proposal)

---

**INFORMATION**

**Purpose:** Consult

**Who:** Domain experts, research institutions, focus groups for various domains, executive officers of development authority and municipal corporation, a departments, working groups

**What:** Invitation for scenario planning on the basis of identified 5-10 proposals and selection of proposal

**How:** Through e-mail, and other personal contact modes.

---

**INDIRECT PARTICIPATION**

**Purpose:** Engage

**Who:** Ward members, focus group, municipal commissioner, city officials, executive officers, domain experts, working groups

**What:** Invitation for scenario planning on the basis of identified 5-10 proposals and selection of proposal

**How:** Through e-mail, and other personal contact modes.

---

**INFORMATION**

**Purpose:** Inform

**Who:** All citizens

**What:** Publicise the scenarios of the identified pan city solutions and invite to rank the various proposals based on the scenarios generated

**How:** Advertisement in print and electronic media. Notifications through social media, Displays, Bill boards

---

**INFORMATION**

**Purpose:** Consult

**Who:** Ward experts, municipal commissioner, city officials, executive officers, domain experts, working groups

**What:** Invitation for scenario planning on the basis of identified 5-10 proposals and selection of proposal

**How:** Through e-mail, and other personal contact modes.

---

**INFORMATION**

**Purpose:** Inform

**Who:** All citizens

**What:** Publicise the IP and FP for the intended area based proposal

**How:** Advertisement in print and electronic media. Notifications through social media, Displays, Bill boards

---

**DIRECT PARTICIPATION**

**Purpose:** Empower

**Who:** Ward members, focus group, municipal commissioner, city officials, executive officers, domain experts, working group

**What:** Develop scenarios for each of the pan city solution.

**How:** Face-to-face consultations, written submissions, online modes of discussion with experts

---

**INFORMATION**

**Purpose:** Inform

**Who:** All citizens

**What:** Publicise the scenarios of the identified pan city solutions and invite to rank the various proposals based on the scenarios generated

**How:** Advertisement in print and electronic media. Notifications through social media, Displays, Bill boards

---

**INFORMATION**

**Purpose:** Inform

**Who:** All citizens

**What:** Publicise the IP and FP for the intended area based proposal

**How:** Advertisement in print and electronic media. Notifications through social media, Displays, Bill boards

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City administration will select the pan city proposal based on expert engagement and citizen votes.
The Business Plan for JNPT was prepared in 2006. It included an introduction to the port, its connectivity and competitive position. A detailed set of traffic forecasts are used to identify the vision, goals and strategy for the port. It also identifies a plan of action to achieve these goals both at an overall level as well as for individual projects. CIDCO Smart City Lab did an appraisal of the business plan, the summary of which is presented here:

**Handling Capacity Assessment**

Currently the port has 1200 hectares of developable land of which 670 Hectares is available for expansion as operational land. As per the projects identified, the port would require 546 hectares of land for short to medium term development of CFS,EPZ/FTZ (Free Trade Zone) and other supporting infrastructure. The remaining land of 124 hectares would be required for future expansion opportunities.

**Strategies**

- **Cost**: JNPT would endeavour to reduce costs by improving efficiency and thereby ensure competitive services for user.
- **Customers**: JNPT would attract and retain customers through addition of core and value added services.
- **Geographies**: JNPT would focus on the Northern and Maharashtra region and would enable traffic from the regions through planned development within and nearby the port.
- **Services**: JNPT would provide value added services and would capture a larger share of the logistic value chain.

**Traffic Projection**

- **Million TEU's**
  - 2005-06: 2.68
  - 2015-16: 11.00 (10.90 million TEU's)
  - 2025-26: 24.21

**Datasheet**

The Business Plan for JNPT was prepared in 2006. It included an introduction to the port, its connectivity and competitive position. A detailed set of traffic forecasts are used to identify the vision, goals and strategy for the port. It also identifies a plan of action to achieve these goals both at an overall level as well as for individual projects. CIDCO Smart City Lab did an appraisal of the business plan, the summary of which is presented here:

**Introduction**

Ranks 31st among the top 100 Container Ports in the world handling 56% of India’s total containerised cargo. Spread over a land area of 2,584 hectares and served by 16 Container Freight Stations and over 23 Inland Container Depots.

**Goals**

- **Long Term**
  - To expand JNPT to new locations
  - Invest into hinterland connectivity ventures
- **Achievement of 10Mn TEUs of traffic at JNPT**
- **Short Term**
  - To develop logistics capabilities and services at JNPT
  - Improve efficiency across the port

**Criticality**

- **Ease of Implementation**
- **H**
- **L**

**Traffic Project**

- **MTPA**
  - Million metric tons per annum
  - 05-06: 3.26
  - 11-12: 7.76
  - 16-17: 10.42
  - 21-22: 13.14
  - 24-25: 15.39

**Cargo Distribution 2004-05**

- Container Cargo 87%
- Bulk Cargo 13%
**Road Linkages**

Shortcomings on Internal Links

- Single evacuation route dependence
- Mixing of container and passenger traffic at junctions
- Long distances between key points
- Shared roads for container traffic and other vehicles
- Narrow roads restricting movement of container traffic
- Absence of parking facilities for tractor trailers

**Proposed Land Use Distribution**

- **Total Developable Area**: 1200Ha
  - Residential: 162
  - Rail Network: 50
  - Port Operational Activities: 670
  - Commercial: 45.64
  - Public Utilities: 61
  - Open Spaces: 3.57
  - Social Facilities: 2.07

- **Total Non-Developable Area**: 778Ha
  - Mangrove & Nature Park: 713.5
  - Channels (Adjoining Nhava Creek): 23.5
  - Tree Belt: 41


**Rail Infrastructure**

- **1943** trains (2003-04) i.e. **5.32** trains per day
- Average detention period **12:08** hours
- Average productivity **1.33** trains/line
- Container trains from JNPT to Vasai Road – average speed **7.61**kmph
- **50%** of road traffic can be shifted to rail

**Transportation**

- Non-trans shipment Cargo
  - Rail: 28%
  - Road: 72%

**Train Distribution and Detention**

- Dedicated Trains
  - 7:38 hour detention 57%
- Mixed Trains (JNPCT + NSICT) 13:50 hour detention 43%

**Rail Corridor Traffic Distribution**

- South-Central: 1%
- Central: 72%
- North: 27%
- North-West: 16%
Designing for Bicycle based Mobility

Bicycle users in cities of India generally constitute a relatively high modal share of intra-city trips. However, there has been a consistent lack of prioritisation in terms of policy incentives and investment in bicycle infrastructure over the last few decades. This coupled with the growing length of commutes and aspirations of upward mobility in terms of owning a motorised vehicle has halved the modal share in moderate and large Indian cities to only about 13 to 21 percent today (Tiwari & Jain, IUTJ, December 2008).

In the last 10 years, there has been a marked rise in investments within the realm of urban transport in India. After development of significant automobile infrastructure has not had the desired effect, there have been calls for a renewed focus on sustainable modes such as mass public transit, bicycles and pedestrian prioritisation. With the development of Smart Cities in India, bicycle based planning can feature as an important part in developing and promoting cities with core infrastructure, a decent quality of life for its citizens and a clean and sustainable environment. It would truly follow the recommendations of the National Urban Transport Policy by moving people and not vehicles.

Successful bicycle based planning is focused on elements of planning, legislation, infrastructure and advocacy. However, from a design perspective one needs to understand the various considerations that would need to be included to create a safe and user-friendly system. Bicycles can be used for three different types of usage that would require different design considerations

1. Transit mode
2. Local neighbourhood commutes and last mile transit connector
3. Leisure and exercise

System Planning

The fundamental difference in planning for each of the types listed above is the style of system that would be needed which are dependent on the network type. In all three, the specifications for the surface would need to be such that it is even and continuous with no level changes without a ramp of minimum gradient 1:12. If combined with the sidewalk, they should be of a texture of a sufficient coefficient of roughness to be anti-skid and of a colour to visually distinguish it from the space reserved for pedestrians. The potential system designs for the bicycle network as detailed below are based on the degree of separation from other modes that depend on the design speed of the road or street.

Segregated Lanes

To serve as a city level transit mode, bicyclists would need to use arterial roads for some parts of their commute. Given the higher speed of vehicular traffic on these roads, it is desirable to have physically segregated lanes for bicycles to ensure user safety. These could be designed as a part of the carriageway or the sidewalk depending on the volume of bicyclists. Based on the design speed of the road, segregation could be designed as road markings/striping, raised strips, planting or bollards or combinations of the same with the former being for slower design speeds and the latter for faster.

The segregated lanes may be designed as single direction or bi-directional, including a contra-flow lane. A two-way lane...
is preferred especially where the road width is such that crossing is difficult and requires significant wait at a signalised intersection. Two-way lanes reduce the length needed to be travelled by a cyclist, but requires an increase in the minimum width provision for the lane from 2.1 metres to 2.5 metres. If there are relatively lower volumes of cyclists, it may also be possible to have two-way lanes only on one side of the road.

**Shared Streets**
Short distance commutes that take place within neighbourhoods characterised by streets of narrow width and slower traffic may have bicycle users use the same street network as a shared street with mixed traffic. These could generally cater to neighbourhood level commutes for daily needs and local destinations. Also, the influence zone of a mass rapid transit system can increase to around three times in area (from a radius of 500 metres by walk to one of 1500 metres by bicycle) if bicycles can be used a feeder instead of solely walks. Bicycles as a feeder system would need to be supported with ancillary infrastructure that would be covered subsequently.

**Alternate Routes**
Cyclists of leisure and exercise generally use a system at off peak hours when other traffic is scarce. As there is no particular destination or route involved, it is difficult to plan for these users as part of the street network. However, a system that includes alternate routes for bicycles that run in tandem with the regular motorised routes are preferred by these users as they have a lower possibility of interruptions of vehicular traffic. These could be greenways through large city level green open spaces or could also be streets that are closed off to vehicular traffic. While alternate routes definitely serve leisure activities, if planned with the rest of the city, they can also work for the other use requirements by allowing these users to cut across portions of the city unhindered by vehicles. Sharing of such a network would require larger widths of bicycle tracks to allow commuters to bypass sociable riders who may bicycle parallel to each other and at a slower pace.

**Ancillary Infrastructure**
Additional infrastructure outside that of the physical one needed for bicycling is required to create feasible environments for the comfortable usage of a bicycle. Without these, significant portions of potential cyclists are left out due to concern for equipment safety and/or capital investment.

**Parking**
An extremely important part of planning for bicycle mobility (which is routinely ignored) is the provision of safe and secure parking for the bicycles. This becomes a major deterrent in choosing the bicycle as a mode choice. Even where bicycle parking is provided, it is often in the most inaccessible part of the building, even though it needs very little space as compared to larger vehicles. Parking systems need to have the option of both short-term and long-term provisions – the latter required especially for the bicycle to act as a feeder system. Without long-term bicycle parking, the only other way bicycles can act as a feeder is if the bicycle can be carried onto the mass transit network. While provision of parking may not always be possible in the public domain, it must be mandated as a part of the parking requirements with preferably more accessible locations allocated to bicycles.
Bike-share
In addition to provision of the physical infrastructure, occasional users and users unwilling to invest in a personal bicycle can be incentivised to use a bicycle if provided as a rental. However, instead of relying on a rental system, where loan and return is usually at the same location, a share system is preferred, as it could be picked up and dropped off at various locations along the system. This would incentivise potential last mile users and commuters to also use the system rather than only neighbourhood users who would be using the bicycle only within the range of a rental location. Costs of the system – both in terms of capital investment and maintenance – could be cross-subsidised by leveraging advertising revenue on the bicycles and also on the rental locations.

Safety
Ensuring safety and security of the users of a bicycle system is critical. The issue must be addressed across the system at every stage, particularly at conflict points with other modes of transportation.

Street Lighting
Provision of street lighting for bicycles is needed for multiple reasons – increased visibility of bicyclists, who usually tend to be less visible than other vehicles - due to their negligible surface area, thereby reducing potential night-time accidents and personal injuries; reducing the bicyclists being blinded by the headlights of oncoming vehicles due to an otherwise stark difference in brightness of the two environments; social inclusion by enabling the use of amenities without fear (due to increased visibility); and promoting personal fitness by encouraging bicycling outside daylight hours.

It is generally found suitable to combine street lighting for bicycles with that of pedestrians such that they are low mast (3-4 metres height) with full cut-off fixtures and so that their spread overlaps and there are no dark spots that would tend to become problem areas. A luminaire of around 20-25 lux is recommended.

Street Markings
Other than demarcation of bicycle lanes in visually segregated systems, street markings are required to encourage adherence to bicycle priority zones – both lanes and crossings. It is important that these markings are easily visible during the day and night so their colour and material should be chosen such that they contrast with the road surface and also reflect some amount of light ensuring their visibility at night. A common material used in India is thermoplastic paint which is also used for centrel ine and lane markings on vehicular roads.

The markings should not only demarcate the extents of the bicycle lane but also indicate in words and symbols that the zone is reserved or prioritised for bicycles. At times, the entire stretch or repeated sections of the lane are marked in solid fill. If done as repeated sections, they should be in patches of at least 5 metres and not be more than 25 metres apart from each other. Colours that are used generally are green, blue or at times red. Alternately, glass beads may to added to the road mix to allow continuous low intensity reflectivity.

Signage
Alongside markings, it is important to reinforce regulations and information with the use of signage. Like regular traffic signage, these would include mandatory signs that indicate what users should do rather than what not to; regulatory signs like no parking, no entry etc.; priority signs like stop and give way; information signs of lanes and crossings, whether
Intersection design

Bicycle accidents are most common at conflict points with other vehicles. In segregated systems, this tends to be generally at intersections where bicyclists and motorised vehicles cross streets and traffic. It is imperative that intersection design is done carefully to reduce the occurrence of incidents and injuries.

There are generally three ways to physically deal with intersections depending on the intensity and speed of vehicular traffic though these must be supplemented with markings and signage as discussed earlier. First, signalised intersections with either separate signal phases for bicycles, which may be combined with the pedestrian phase or alternatively bicycle phases combined with the phase for vehicles. The latter however, can only work if supplemented with ‘no free left’ turns. If provided in areas with a low volume of bicyclists, pelican signals that allow green bicycle phases only on demand are preferred.

When bicycle movement is combined with vehicles, bicycles requiring to turn right would require the second model of intersection design which are bike boxes that allow bicycles with a safe and visible way to get ahead of queuing traffic during a red signal phase. Third are protected intersections, which can be used in lower traffic intensity zones, which slows down the traffic at intersection, allowing safe passage. This works by creating a corner refuge island that allows increased reaction time and visibility.

Traffic Calming

To ensure safety of users, traffic calming is necessary on shared streets and at intersections. It reduces the speed of vehicular traffic and gives priority to bicyclists. Traffic calming may be of four types –
1. Narrowing: curb extensions, road diets, pedestrian refuges etc.
2. Vertical deflection: speed humps, rumble strips, speed tables, changed material etc.
3. Horizontal deflection: chicanes, chokers etc.
4. Restricted access: medians, barriers, bollards etc. for reduced vehicular access

**Amenities**

Bicyclists as well as other commuters require supporting amenities which increase levels of comfort (these are not mandatory for any system). These amenities include drinking water, public toilets, seating/pause spaces, hawker and vending zones and shaded areas. These are of use not only for bicyclists but also pedestrians and other short-term street users.
India Habitat Centre (IHC) is a multipurpose complex in central Delhi with work, commercial and social spaces. Located at a distance of around 2 kilometres from the nearest metro stations, employees and visitors to India Habitat Centre face the typical ‘last mile connectivity’ issues. As a solution, IHC is creating a bike-share system and connecting it to Jor Bagh Metro Station. The NIUA-CIDCO Smart City Lab at the National Institute of Urban Affairs supported the endeavour and provided necessary planning and technical expertise that would be required for developing the system.

There were two options for the route - via 4th Avenue and Jor Bagh Road or via Lodhi Road and Aurobindo Marg. The latter was chosen as almost half of Lodhi Road already has a dedicated bicycle track, while the rest has a service road generally used only for parking. The generous sidewalk on Aurobindo Marg, which has little to no users, was optimal for inclusion in the shared bicycle system. To make the bike share system safe and comfortable, the Smart City Lab has proposed interventions along the proposed route addressing design of the lane, design of the intersection, traffic calming, traffic safety and the existing parking policy. The necessary permissions and coordination for execution of the proposal is being managed by India Habitat Centre and includes purchase of equipment and engaging an operator for the day to day management.

In order to make room for the users of the bike-share system in the form of a bike lane, the NIUA-CIDCO Smart City Lab has proposed the following interventions to the existing right-of-way.

**Lane design**
As per the guidelines proposed by the Unified Traffic and Transportation Infrastructure (Planning and Engineering) Centre (UTTIPEC) of the Delhi Development Authority, a lane width of 2.5 metres has been specified for the track to allow contra-flow movement along the route. The surface has been mandated to be made even and continuous with no level changes without a ramp of gradient 1:12. While it would have been preferable to continue the demarcated and physically separated bicycle track that exists on half the length along Lodhi Road, it is not possible at present as the service road measures only 7 to 7.5 metres in width and since parking could not be removed completely due to the existence of the Lodhi Road Post Office and Mausam Bhavan along the stretch. It is not possible to have provision of both, on-street parking and a dedicated track with free movement of vehicles in the centre.

**Case Study:**
**Bike-share system at India Habitat Centre**

Proposed interventions for bike-share system at India Habitat Centre
Future developments in the system could either remove parking along the stretch or trim the side-walk from the existing 3.5 metres to 2.5 metres and use the space as discussed above. However, in the mean time a visual segregation has been proposed that delineates the lane with reflective thermoplastic paint. To avoid high expenditure, a minimum 5 metre delineation at a distance of every 25 metres has been proposed. As reiterated by the personnel of the Delhi Police, who man the stretch, the delineation would help territorialise the space for bicyclists and consequently have an effect on the speed and where the vehicles that use the service lane park.

In addition, indicators designed both as markings along the lane surface signify the priority for bicyclists by use of a bicycle symbol and also indicative sign posts that would show it is a reserved track.

**Intersection design**

Since the major intersection between Max Mueller Marg and Lodhi Road already has a bicycle track along both the arms of Lodhi Road, no major structural changes are proposed here. However, it is suggested that visual indication of the bicycle crossing would be beneficial as it would ensure increased visibility although not necessary since it in any case is ahead of the pedestrian crossing demarcated by a zebra crossing.

Instead, it requested that the signalling department of Delhi Police include a bicycle signal that would be green when Lodhi Road moving east is green i.e. approximately 45 seconds and an additional pedestrian and bicycle green (two phases later)

During all vehicular red that would be for 15 seconds with an additional 5 seconds of blinking.

Where the bicycle lane merges into the service lane halfway down Lodhi Road, the lane requires to ramp down at a gradient of 1:12 with placement of a bollard in the centre to block the illegal access of the bicycle lane by two wheeler motorised vehicles.

The other minor intersections that crossed the entrance gates to Jor Bagh Colony are designed as a continuation of the visually segregated bicycle track with thermoplastic paint as specified above. This to ensure that the vehicles entering or exiting Jor Bagh Colony onto Lodhi Road, give priority to bicycles already crossing the intersection.

On the Aurobindo Marg stretch however, the Safdarjung Fire Station has an exit for Fire Tenders who would need to exit in a hurry in case of emergencies. Here, the lane design has
a ‘give priority’ sign for the bicycles to ensure that the Fire Tenders have priority access. In addition, the portion in front of the access gate delineated with a diamond checkerboard pattern to indicate caution.

Lastly, the intersection between Aurobindo Marg and Jor Bagh Road needed to be crossed to access the bicycle parking that placed behind the vomitory of the station. A kerb cut has been proposed in the median to enable the bicycles to cross with ease.

Traffic Calming
An important part of bicycle based planning is design of traffic calming especially at conflict points such that it reduces the speed of crossing vehicles so that even in case of an accident, injury would be reduced to a minimum. The bicycle track on the service lane of Lodhi Road has numerous conflict points where there are punctures between the main carriageway and the service road. These conflict points could have been avoided by placing the lane on the left of the service road, however this was decided not to be done as the consequent conflict points with the entry roads to Jor Bagh Colony, albeit fewer would be on blind corners, thus increasing the tendency of an accident. Further, by keeping it on the right side of the service lane, the pedestrian crossing points between the on street parking and the built edge are eliminated.

To address these conflict points between the service lane and the punctures from Lodhi Road, it proposed to reduce the turning radius to a minimum of 4.5 metres from the existing 6 metres and adding a zone of cobble stones with a double speed hump running longitudinally along the middle. This would ensure that the vehicle entering or exiting the service lane reduces its speed to avoid a sharp jolt within the vehicle and ensuring safe passage of crossing bicyclists.

At the intersections, where exits from Jor Bagh Colony join Lodhi Road, a table top crossing has been proposed so that not only similar traffic calming is achieved, but side-walk continues, allowing pedestrians to cross without climbing up or down, thereby ensuring universal access.

Parking
As discussed earlier, the service lane is currently primarily used for parking, which would need to continue in the current state of affairs. However, the Delhi Police has been requested to keep the parking only to the left of the service lane, so that the bicycle track may continue unhindered on the right.

To ensure this, other than visual delineation as discussed earlier, regulatory signage indicating ‘No Parking’ is proposed to be installed on the right hand side of the track. Initially, this has been done with temporary signage by the Delhi Police. But the NDMC proposes to install permanent signs along with the above interventions when the surface of the service lane is being relaid in February 2016.

In the meantime, to make most use of the winter when bicycling in Delhi is more feasible, the system has begun a trial run from December 16th, 2015 with implementation of the minimum interventions required such as the traffic signal phasing, repair of some broken patches of the side-walk on Aurobindo Marg and delineation of the track with a single line along the service lane of Lodhi Road.

Just before the opening, applications for use of the bicycles were invited from the employees of the institutions at India Habitat Centre. Almost 150 applications were received and passes for free use of the system were issued to 50 applicants on a first come first served basis. Within a month, the number...
of applications have risen to 280, out of which 200 passes have been issued. The system includes 25 bicycles with stands at Jor Bagh Metro station and Gate 1A of India Habitat Centre and a battery powered vehicle to ferry the bicycles as per demand that currently numbers above 65 trips per day.

Special mention must be given to the Chairman of NDMC for supporting the initiative, Delhi Metro for providing land for the bicycle stand at Jor Bagh, the DCP (Traffic) and ACP (Traffic) of the South Zone of Delhi Police for assisting with the regulation and enforcement of the ‘No Parking’ zone, M/s Delhi Cycles Pvt. Ltd. who are operating the system and Hero Cycles for providing the cycles. Also, a definite citation to the management of India Habitat Centre for leading by example and continuing their care for the habitat and conceptualising, initiating and funding the scheme. It is hoped that the success of this endeavour would allow expansion to the other nearby nodes first and then to remaining magnet points and transit nodes in the city.

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Proposed for IHC bike-share system Phase 1</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Segregated lane</td>
<td>Yes</td>
<td>Lodhi Road</td>
</tr>
<tr>
<td>Shared street</td>
<td>Yes</td>
<td>Lodhi Road and Aurobindo Marg</td>
</tr>
<tr>
<td>Alternate route</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Parking</td>
<td>Yes</td>
<td>IHC and Jor Bagh Metre Station</td>
</tr>
<tr>
<td>Bike-share</td>
<td>Yes</td>
<td>IHC and Jor Bagh Metre Station</td>
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<tr>
<td>Street lighting</td>
<td>No</td>
<td></td>
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<tr>
<td>Street markings</td>
<td>Yes</td>
<td>Along entire route</td>
</tr>
<tr>
<td>Signage</td>
<td>Yes</td>
<td>Along entire route</td>
</tr>
<tr>
<td>Signalised intersection</td>
<td>Yes</td>
<td>Intersection of Lodhi Road and Max Mueller Marg</td>
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<tr>
<td>Bike box</td>
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<tr>
<td>Protected intersection</td>
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</tr>
<tr>
<td>Traffic calming</td>
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<td>Lodhi Road service lane</td>
</tr>
<tr>
<td>Amenities</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>

Bicycle parking of bike-share system at Gate 1A, IHC

Potential expansion of bicycle tracks to connect surrounding nodes around IHC
Singapore is the world’s only island city-state. Located at the southern-most tip of continental Asia and peninsular Malaysia, it is a tropical rainforest, consistently hot and humid year round. In many respects, it really shouldn’t exist at all. The island has no energy deposits, no forests and no farms. For years, the country has had to import drinking water from neighboring Malaysia (Hatch, 2013). Today it is a leading commercial, financial and transportation hub. For the past decade, it is the only Asian country with the top AAA sovereign rating from all major credit rating agencies, including S&P, Moody’s and Fitch. It ranks high on key measures of national social policies. It has the highest Human development Index in Asia and stands 9th globally (Wikipedia).

Singapore started working for a smart sustainable future long ago. Over the last half-century, the government has worked tirelessly to transform the nation into the cosmopolitan metropolis it is today.

Singapore’s planning process is structured around a concept plan with a 40-50 year time frame. It is revised every 10 years (starting in 1971) with publication of detailed plans on smart growth every 5 years.

Sustainable Singapore Blueprint outlines Singapore’s national vision and plans for a more liveable & sustainable Singapore, to support the diverse needs and growing aspirations of Singaporeans. It was first published in 2009. In 2014, the Ministry of the Environment and Water Resources and the Ministry of National Development led a review of the Sustainable Singapore Blueprint 2009, which took stock of achievements over the previous five years as well as the latest developments in Singapore and around the world. As part of this review, more than 6000 people from various stakeholder groups stepped forward to participate in public consultations and focus group discussions. Publication of Sustainable Singapore Blueprint 2015 is aimed towards renewal of the strategies laid out in the older version and tracking their progress (National Climate Change Secretariat, Prime Minister’s Office Singapore, 2014).

Sustainable Singapore Blueprint 2015 begins with “What if” scenarios that encourage the readers to imagine what future do they want to live in. It is guided by the vision of a Liveable and Endearing Home, a Vibrant and Sustainable City, and an Active and Gracious Community for its citizens (National Climate Change Secretariat, Prime Minister’s Office Singapore, 2014). The Home, City and Community themes were based on the environmental vision developed through the national exercise conducted by the Singapore Environment Council (SEC) to understand Singaporeans’ environmental values and to redefine a vision for our environment. (National Climate Change Secretariat, Prime Minister’s Office Singapore, 2014)

The Blueprint directly addresses the readers, building a sense of collective ownership and highlighting the significance of
their decision in the Singapore’s future. It emphasises the need of commitment from government, partnership with industry and participation of the citizens for building a Singapore that every citizen is happy to live in. The documents invites the citizens to join in the development process, again posing questions about the future and encouraging them to imagine. It ends with targets for the year 2030, listing indicators and metrics for assessing development.

Singapore is very conscious of its limitation and it focuses on prioritising the use of limited land between competitive national needs. The Sustainable Singapore Blueprint emphasises the need to work for clean and healthy environment and the need to maximise reuse and recycle. Sustainable Singapore Blueprint 2015 not only lays forth the action plan for Singapore’s growth in the next fifteen years, it invites and engages the citizens to be a part of the process. It recognises achievements of the past and identifies the challenges of the future. Through the language, presentation and the visuals of the document, Sustainable Singapore Blueprint 2015 presents the development process as a truly collaborative task.

References
I nformation and communication technology (ICT) is a broad term that covers everything that enables users to store, retrieve, manipulate, transmit or receive information electronically in a digital form, e.g., personal computers, email, smart phones. ICT is vital for the economic growth and development of our cities. Telecom sector in India started evolving with the liberalisation of the national economy in the 90s. The last two decades witnessed major transformation, with India emerging as a source of ICT services as well as a consumer. The number of internet users in India increased 9 fold between 2003-2013 and it is estimated that India’s internet user base is currently overtaking the internet user base in the US. (Verma, 2015) All these changes have led to a change in approach towards the use of Information and communication technology in the development sector in India. Electronic governance or e-governance is the application of information and communication technology (ICT) for delivering government services, exchange of information communication transactions, integration of various stand-alone systems and services between government-to-customer (G2C), government-to-business (G2B), government-to-government (G2G) as well as back office processes and interactions within the entire government framework (Intekhab Khan, 2015). The primary role of e-governance is to simplify the process of governance, by making it more transparent and accountable using information and communication technology.

The National Smart City Mission in India is a program that works on an incremental approach with an intense top down effort to build bottom-up stakeholder participation. It incorporates both ICT for e-Governance (from North America) and ICT for infrastructure and resource management (from Europe, Singapore etc). The mission builds a tripartite coalition between center, state and urban local body. It is competitive, convergent and driven by best practices from other previous and current missions.

Information and Communication Technology and e-Governance in India
Development of urban infrastructure in India was not a focus of the national policies for a long time. Jawaharlal Nehru National Urban Renewal Mission (JnNURM) of 2005 was the first programme of its kind, which addressed the issues related to building urban infrastructure. The main thrust of this programme was to ensure improvement in urban governance and financial strength of Urban Local Bodies (ULBs). JnNURM used information and communication technology as a tool for implementation of e-governance reform at the local municipal levels. Previous acts and policies before built the framework needed for this step. The New Telecommunication Policy of 1999 addressed the convergence of IT, media, telecom and consumer an identified role of IT & Telecom in provision of good infrastructure, transparency and security of state. The Information and Technology Act of 2000 gave legal validity of electronic contracts, legal recognition of digital signatures, security procedures for electronic records and defined penalties against cyber crime. Under JnNURM, e-Governance was a of the mandatory reform for ULBs and its broad aim was to:

- improve efficiency and effectiveness in interaction between local government and its citizens and other stakeholders,
- improve quality of internal local government operations and management information systems to support and stimulate good governance
- bring about transparency and accountability in urban local body operations
- help improve reach of the delivery of services to citizens

Modules under the e-governance reforms are:
1. e-Procurement
2. Municipal accounting system
3. Property tax and user charge collection
4. Registration of birth and death
5. Public grievance redressal
6. Off Site Real Time Monitoring System
7. Citizen Service Centers
8. Building permit allocation
9. Double entry accrual accounting system
10. Council management system
11. Health programme management and
12. Personnel information system

Evolving Role of ICT
Over the last decade, the use of ICT has remained more or less the same - focused on e-governance reform through different programmes and initiatives. But now, this focus is shifting and ICT is being looked at as an enabler and a tool for problem solving. Its purpose is widening to include engagement of social entrepreneurs, social movements, enabling crowd sourcing of data, problem solving and a sharing economy. Perhaps the greatest asset of information and communication technology as a tool for development of our cities, is its ability to have large scale impact with small incremental interventions. JnNURM was followed by the National e-Governance Plan. Approved by the Government of India in 2006, it was the first attempt at a national plan and structure for e-governance in India. It was built on a three tier structure -

1. Common Service Centres (CSCs)
   - Front-end delivery points for a range of citizen services

2. Common and support infrastructure
   - Allows information to be shared electronically between different agencies of the government and with citizens.
   - Includes:
     - the State Wide Area Networks (SWANs), which form the converged backbone network for data, voice and video throughout a state / UT and
     - the State Data Centers (SDCs) which can provide common secure IT infrastructure to host state-level e-government applications and data

CONVERSATION
Smart City: ICT Beyond e-Governance
3. 27 Mission Mode Projects (MMPs)

- Transforms high priority citizen services from their current manual delivery into e-delivery
- Each MMP is owned and spearheaded by the relevant ministry/agency of the national government or by a state government
- It is called ‘mission mode’ because it has a definite timetable, service levels, project implementation team, and process re-engineering plans

Rapid urbanization of our nation is putting immense pressure on our cities and its systems. Resource management and conservation will be the key to a sustainable future. Efficiency in our processes and harnessing the maximum potential of the tools at our disposal will define our growth and development. Information and communication technology is one such tool, and we must realise its true potential in the development of our urban infrastructure.

**Role of Information and Communication Technology in Urban Development**

Today, National Smart Cities Mission and Digital India programme are driving the agenda of ICT in urban development. They encourage cities to leverage the potential of ICT in improving quality of life through provision of core infrastructure to the citizens. The National Smart Cities Mission calls for a collaborative, interdisciplinary and comprehensive approach that encourages the cities to look at ICT beyond its traditional role of e-governance and citizen engagement. Elements of the national smart cities mission also act as the points of convergence with other national initiatives, providing the platform for solutions that cut across the traditional silos of the planning system. The purpose of Digital India Programme is to ensure that Government services are made available to citizens electronically by improving online infrastructure and by increasing Internet connectivity. It has three core components, the creation of digital infrastructure, delivering services digitally, digital literacy.

National Smart Cities Mission has 24 program areas. Proposals for different cities include area based or pan-city initiatives that address at 2-3 of these. The key focus here is that the implementation across the board is based on ICT as a tool. The solutions can be as simple as sensors that turn the streets lights on or off based on daylight, to complex automated tsunami warning systems. In addition to this, e-Governance and IT connectivity have dedicated program areas. Many of these solutions are already being used successfully in different parts of the world. Some of them are:

- GPS based bus tracking system that intimates the user of ETA through a digital display, a mobile app or a computer screen - New Brunswick, New Jersey
- Crowd sourced maps in disaster situations to aid in rescue operations. Nepal Earthquake, 2015
- Open Data platform that shares socio-economic and physical datasets along with their unique spatial IDs. New York City, New York
- Daylight and/or occupancy based sensor based lighting in public buildings to reduce wastage of energy
- Air quality sensors

ICT has led to transformation of planning practices in the past, particularly in the field of spatial data analysis. The variety of Geographic Information Systems (GIS) platforms available today have critically reduced the time taken for scale spatial and statistical analysis. This has also led to the development of user friendly applications such as Google maps which do network analysis and computation for easy path finding and navigation. Advances in information and communication technology have led to the propagation of this tool to widely accessible platforms over time, eventually making it an everyday tool, readily available to anybody with a smart phone, tablet or a computer. However, it is important to note that poverty and lack of education can keep some of
the ICT based facilities and services from the citizens. This gap in the ability of the different segments of the society to access modern information and communication technology is commonly referred to as the Digital Divide. The Digital India programme addresses this issue through two of its pillars - universal access through mobile connectivity and public internet access programme.

Smart City Mission is about smarter ways of imagining and developing cities, using ICT is an enabler for strategic interventions. Through convergence with other missions, risk management and mitigation (citizens, finance and land), its role is to enable propagation of services and facilities across social, economic and physical barriers. With all its given potential, use of ICT faces some significant challenges -

- Digital Divide
- Maintenance and upkeep of a complex system for all the services
- Interoperability & integration of data
- Privacy of the citizens
- Security of the system & authenticity of information
- Crossing the language barrier

However, upon addressing these issues, ICT can bring about transformation by

- Empowering citizens by bridging the knowledge gap
- Enabling data driven and evidence based planning
- By bringing about large scale impact with incremental small scale, and
- System reform, through transparency, efficiency and accountability

Information and communication technology is a powerful tool, which can empower people through propagation of information and citizen engagement. It build channels of communication and bring efficiency to systems. Indian cities have an opportunity to explore its application through the competitive process of the National Smart Cities mission. Successful implementation of ICT in urban development in India will cut across the traditional silos of the infrastructure, through sharing of data and promote a comprehensive, multi-disciplinary and collaborative approach.

References
Privately Owned Public Space’ or ‘POPS’ is a term coined by Jerold S. Kayden of Harvard University. It refers to a public space which is owned by a private entity yet is usable by the public. It is the result of a trade between a local government and the property owners which involves zoning incentives in exchange of a publicly usable and accessible space or utilities. It is an incentive based policy tool that stimulates social responsibility and creates better cooperation between public and private (LUK, 2009).

Public space is a place where all the public is allowed to have the rights of access and use, but not necessarily related to its ownership. The policy of “privately owned public space” allows the contribution from the private sectors and beneficial to the private urban development. The policy is a strong shaping force on the city and can transform commercial districts into enjoyable places (LUK, 2009) Cities across the world, including New York (where the concept originated in the 60s), Seattle, Tokyo, Bangkok, Hong Kong, have successfully demonstrated this. While the systems in these cities differ from each other, the principal of trading tax/zoning incentive remains constant. POPS across each these cities are identified with standardised signage that informs the public to their presence.
Public spaces are places of social interaction. All over the world, people use it for eating and drinking, business meetings, phone calls, resting, reading, listening to music, working, etc. Irrespective of the size of the city or town or village, they remain one of the most important elements of the built environment. With the cooperation between public and private sector, cities can generate privately owned public spaces that make the communities vibrant and attractive.

It is important to note that while involvement of private sector can cut the cost of urban development, privatisation of the public spaces may easily occur without careful guidelines and regulations. Loopholes in the policy can easily cause mis-uses of the policy for owner's benefits and neglect of the social welfare. Monitoring these spaces is essential to maintain their quality. Accessibility, visibility and usability are important to ensure the protection of the public realm. (LUK, 2009)

References


A smart bus shelter is an urban installation that changes the typical experience of wasting time waiting for a bus.

A smart bus shelter provides real time information to the users
It provides transit data like route number of next bus, arrival time for the next bus etc. or even available seats in the next bus. It improves the experience of bus travel.

A smart bus shelter is a platform for urban informatics
It interacts with users by way of bus route guide, digital map, destination search, traffic broadcasting station, weather forecast etc. It is an interface through which city can inform its citizens.

A smart bus shelter is inclusive
It considers the requirements of differently-abled, women, children and the elderly. Braille boards and strategically placed buttons aid visually impaired to locate buses by way of touch and announcement. CCTV video recording ensure public safety.

A smart bus shelter is more than a waiting place
It integrates components ranging from mobile charging points to public Wi-Fi to solar panels and much more.

These bus shelters gather real time information by establishing ICT enabled linkages with buses through GPS tracking and RFID tags. LED displays at bus shelter display bus number of arriving buses for facilitating the users. Interactive touch screens in the bus shelter function as city dashboard and act as an interface of city with the users. It makes waiting for a bus no longer cumbersome or unreliable, but rather a fun activity.
The Smart Cities Mission stands out from previous initiatives in India with its competitive nature and strategic approach. It insists on cities to identify their strengths, weaknesses, opportunities and threats (SWOT); prepare suitable vision statements, make proposals and, implementation and financial plans for the same. The motivation is to drive economic growth while improving quality of life, by enabling development and harnessing technology. The scoring criteria of the stage II of the smart cities competition lays emphasis on the significance of strategic approach. It can be seen as given below, that city assessment and visioning exercise is given a 30% score, area based development take a good 55% of score and 15% score is attributed to pan city solutions. This suggest that more weight is given towards assessing the city holistically and in making comprehensive area development proposals - which can be replicated in other areas of the city and scaled to city level in a later period. Pan city solutions, which are majorly Information and Communication Technology (ICT) enabled, are reasonably easier to implement and is therefore given less weight.

**Progress**

Stage I of Smart Cities Mission was completed in August 2015 when 98 cities were nominated by the States for stage II of the competition. The Mission is presently at stage II, with 97 Smart City Plans (SCPs) submitted by December 2015. These SCPs will be evaluated and a list of early winners, up to 20 cities with the best plans will be announced by February 2016. These cities will engage in the implementation of their SCPs, while the remaining cities will have a chance to compete in the next cycle.

### Criteria for short-listing cities for Stage II of the competition

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<th>Area-based development</th>
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<td>7% ‘Smartness’ of proposal</td>
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<td>5% Citizen engagement</td>
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<td>15% Results orientation</td>
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<tr>
<th>City Level Criteria</th>
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<td>5% Vision and goals</td>
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<td>10% Citizen engagement</td>
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<td>10% Strategic plan</td>
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<td>Implementation framework, including feasibility and cost-effectiveness</td>
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Total 100
97 cities which submitted SCPs for Smart Cities Mission Stage II

For any comments/suggestions please contact Siddharth Pandit, CIDCO Smart City Chair at spandit@niua.org