



SMART CITIES CHALLENGES IN INDIA -CASE STUDY OF CHENNAI CITY

Dr.C.Vijai

Assistant Professor of Commerce
Sriram College of Arts and Science
Perumalpattu, Thiruvallur

Dr.E.Seenivasan

Asst. Professor of Commerce
Sriram College of Arts and Science
Perumalpattu, Thiruvallur

Abstract

The current study is based on smart city initiatives led by Honourable Prime Minister Narendra Modi Government; to enhance the life quality of Indian citizen and residents which has been gaining increasing importance in the agendas of policy makers. This paper provides with a comprehensive understanding of the notion of sc through the elaboration of a natural resources and energy, transport and mobility, buildings, living, government, and economy and people. Results reveal that a lot of strategies are yet to be decided by the government since the concept of smart cities is very new in India and there are lot of challenges that would be faced by the government during the implementation stage of the smart city project. This paper focuses on the concept of smart city as the Government of India launched the smart city project for developing 100 smart cities in the country and also concentrates on the challenges as well as the key areas for development of smart cities in India along with the case study of Chennai.

Keywords: Smart Cities; Technology Transfer, Challenges,, smart economy, smart solutions, urbanization, Chennai, India.

Introduction

Globally, the pace of urbanization is increasing exponentially. The world's urban population is projected to rise from 3.6 billion to 6.3 billion between 2011 and 2050, a solution for the same has been development of sustainable cities by improving efficiency and integrating infrastructure and services. It has been estimated that during the next 20 years, India still needs



to be focused much more on the consistently growing sectors like, Infrastructure, Industries, Hospital Services, Tourisms, IT, Foreign Direct Investments, Research & Development under PPP model, foreign collaborated Higher Education Systems, Service Industries, e-Governance in a more better way. So it is the need of an hour that India needs to concentrate in constitution of 100 Smart Cities in fourth coming years under the visionary of Prime Minister Shri. NarendraModi to upsurge more Gross Domestic Products (GDP). This research article is focusing on the various challenges in smart cities in India.

Definition of smart cities

The British Standards Institute defines it as “the effective integration of physical, digital and human systems in the built environment to deliver sustainable, prosperous and inclusive future of its citizens”.

A Smarter City uses technology to transform its core systems and optimize finite resources. At the highest levels of maturity, a Smarter City is a knowledge-based system that provides real-time insights to stakeholders, as well as enabling decision-makers to proactively manage the city’s subsystems. Effective information management is at the heart of this capability, and integration and analytics are the key enablers. (IBM, 2013).

Objectives of the Study

1. To study the concept of smart cities.
2. To study the Importance of smart cities.
3. To explore the challenges faced during the development of smart cities.

Research Methodology

This current study has been exploratory in nature where pertinent information has been gathered from various secondary sources of data, such as, journals, books, websites, reports, etc.

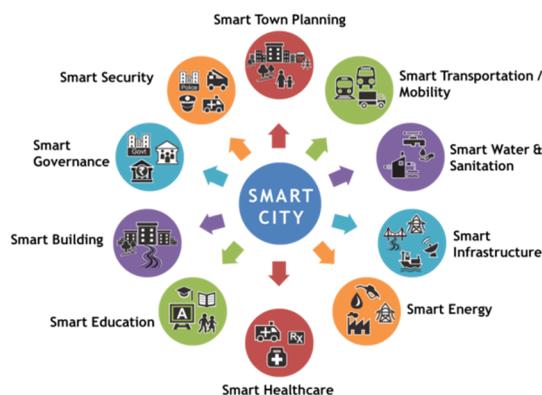
The Concept of Smart Cities

Smart cities do not have a single, acceptable definition. The concept of smart cities is a very broad in nature and encompasses many dimensions including smart urban systems for transport, energy, healthcare and education, water and waste, aimed at improving economic prospects, environment and quality of life, etc. In short, smart cities are the cities that leverage data gathered from smart sensors through a smart grid to create a city that is livable, workable and sustainable.

However, some of the experts in India believe that if Modi government aims to achieve/build smartcities in India, in the exact same sense that Europe or U.S (developed countries) has achieved/built in recent years then that's not really realistic or feasible. What the government needs to do is turn around and ask: "what do people want in a city?" Experts are of the opinion that India has to define the smartness of its cities from its people's perspective.

Smart Cities Mission of the Government is a bold, new initiative. It is meant to set examples that can be replicated both within and outside the Smart City, catalysingthe creation of similar Smart Cities in various regions and parts of the country.

Figure 1





The Importance of Smart Cities in India

India's is urbanizing at an unprecedented rate, so much that estimates suggest nearly 600 million of Indians will be living in cities by 2030, up from 290 million as reported in the 2001 census. With about 30 village dwellers moving every minute from villages to become city dwellers, not many villages will be left India at the end of this century.

Today's cities face significant challenges - increasing populations, environmental and regulatory requirements, declining tax bases and budgets and increased costs. Moreover, the cost of Information and Communication Technologies has plunged making it economical for the government to implement them. Citizens are increasingly getting instant, anywhere, anytime, personalized access to information and services via mobile devices and computers. And they increasingly expect that same kind of access to city services.

With increasing urbanization and the load on rural land, the government has now realized the need for cities that can cope with the challenges of urban living and also be magnets for investment. The announcement of '100 smart cities' falls in line with this vision.

Alongside the hordes of Indians go the jobs and the money as well: a McKinsey Global Institute study estimated that cities would generate 70% of the new jobs created by 2030, produce more than 70% of the Indian gross domestic product and drive a fourfold increase in per capita incomes across the country.

Progress So Far

The cities with ongoing or proposed smart cities include Kochi in Kerala, Ahmedabad in Gujarat, Aurangabad in Maharashtra, Manesar in Delhi NCR, Khushkera in Rajasthan, Krishnapatnam in Andhra Pradesh, Ponneri in Tamil Nadu and Tumkur in Karnataka. Many of these cities will include special investment regions or special economic zones with modified regulations and tax structures to make it attractive for foreign investment. This is essential because much of the funding for these projects will have to come from private



developers and from abroad Gujarat International Finance Tec-City (GIFT), Ahmedabad, to be developed over 900 acres, is billed to be one of the country's first smart cities. It will feature remote management of utilities from a single command center, use of data analytics and realtime monitoring of services. It will provide high-quality infrastructure to woo finance and technology firms from places such as Mumbai, Bangalore and Gurgaon. It will have a special economic zone, an international education zone, integrated townships, an entertainment zone, hotels, a convention center, an international techno park, Software Technology Parks of India units, shopping malls, stock exchanges and service units.

Targets for Smart Cities in India

Government of India (GoI) has laid down targets for Smart Cities in its Draft Concept Note. Those indicators when compared with parameters and benchmarks stated under 'ISO Standard for Sustainable Development for Communities: Indicators for City Services and Quality of Life' are on par and in-agreement on:

Baseline performance expected for urban services in Smart Cities

The need to build and embed a focus on resource efficiency, once the use of Smart City infrastructure begins.

<p>Transport</p>	<p>A travel time of maximum 30 minutes in small and medium size cities and 45 minutes in metro cities Unobstructed footpath at least 2mn wide on either side of all street with RoW5 at least 12mn Dedicated bicycle tracks with a width of at least 2mn, one in each direction, should be provided on all streets with carriageway larger than 10mn High quality and high frequency mass transport within 800mn (10-15 minute walking distance) of all residences in areas over 175persons/ha of built area. Access to para-transit within 300mn walking distance</p>
<p>Spatial Planning</p>	<p>175 persons per Ha along transit corridors 95% residences should have access to retail outlets, parks, primary schools and recreational areas within 400mn walking distance 95% residences should have access to employment and</p>



	<p>public and institutional services by public transport or bicycle or walk</p> <p>At least 20% residential units to be occupied by economically weaker sections in each TOD6 Zone 800mn from Transit Stations</p> <p>At least 30% residential and 30% commercial/institutional in every TOD Zone within 800mn of Transit Station</p>
Water supply	<p>Round the clock water supply</p> <p>100% household with direct water supply connections</p> <p>135 litres of per capita supply of water</p> <p>100% metering of water connections</p> <p>100% efficiency in collection of water related charges</p>
Education	<p>Pre-primary to secondary education</p> <p>1 Pre Primary/Nursery school/2,500 residents</p> <p>1 Primary School (class I to V)/5,000 residents</p> <p>1 Senior Secondary School (Class VI to XII)/7,500 residents</p> <p>1 integrated school (Class I to XII)/0.1mn population</p> <p>1 school for physically challenged/45,000 residents</p> <p>1 school for mentally challenged/1mn population Higher education</p> <p>1 college per 1.25 lakh population</p> <p>1 university; 1 technical education center/1mn population</p> <p>1 engineering college/1mn population; 1 medical college/1mn population</p> <p>1 paramedical institute/1mn population; 1 veterinary institute</p>
Fire fighting	<p>1 fire station/0.2mn population/5-7km radius</p> <p>1 sub - fire station with 3-4km radius</p>
Sewage and sanitation	<p>100% households should have access to toilets</p> <p>100% schools should have separate toilets for girls</p> <p>100% households should be connected to the waste water network</p> <p>100% efficiency in the collection and treatment of waste water as well as collection of sewage network</p>
Storm water drainage	<p>100% coverage of roads with storm water drainage network</p> <p>Zero number of incidents of water logging in a year</p> <p>100% rainwater harvesting</p>
Solid waste management	<p>100% households to be covered by daily door-step collection system</p> <p>100% collection of municipal solid waste</p> <p>100% segregation of waste at source - bio-degradable and nondegradable waste</p> <p>100% recycling of solid waste</p>
Electricity	<p>100% households have electricity connection</p> <p>Round the clock electricity supply</p> <p>100% metering of electricity connections</p> <p>100% recovery of cost</p>



	Tariff slabs that work towards minimising waste
Telephone and Wi-Fi connectivity	100% households have a telephone connection including mobile 100% of the city has Wi-Fi connectivity with 100 Mbps internet speed
Health care facilities	Availability of telemedicine facilities to 100% residents 30 minutes emergency response time; ·1 dispensary/15,000 residents Nursing home, child, welfare and maternity, center - 25 to 30 beds/0.1mn population Intermediate Hospital (Category B) - 80 beds/0.1mn population Intermediate Hospital (Category A) - 200 beds/0.1mn population Multi-Specialty Hospital - 200 beds/0.1mn population Specialty Hospital - 200 beds/0.1mn population General Hospital - 500 beds/0.1mn population 1 Diagnostic centre/50,000 residents; 1 Veterinary Hospital/0.5mn residents 1 Dispensary for pet/0.1mn residents

SMART CITY CHALLENGES

The India Smart Cities Challenge is a competition designed to inspire and support municipal officials as they develop smart proposals to improve residents' lives. Cities will compete in the first round - with the best proposals receiving funding from the Ministry of Urban Development.

The India Smart Cities Challenge is designed to inspire greater creativity from municipal officials and their partners, more involvement and inspiration from citizens, and the development of proposals that will produce concrete benefits in peoples' lives. people every minute from rural areas, the Government has introduced the 'Smart City Challenge', handing over the onus of planned urbanization to the states. In the approach to the Smart Cities Mission, the objective is to promote cities that provide core infrastructure and offer quality of life to citizens, a clean and sustainable environment and application of 'smart' solutions. Those states that measure up to the guidelines and nominate cities could get funding of Rs 100 crore per year per city for the next five years. The



funding is a golden chance for states to rejuvenate their urban areas but the Smart Cities Mission still has its own challenges to face.

1. Retrofitting existing legacy city infrastructure to make it smart:

There are a number of latent issues to consider when reviewing a smart city strategy. The most important is to determine the existing city's weak areas that need utmost consideration, e.g. 100-per-cent distribution of water supply and sanitation. The integration of formerly isolated legacy systems to achieve citywide efficiencies can be a significant challenge.

2. Financing smart cities:

The High Power Expert Committee (HPEC) on Investment Estimates in Urban Infrastructure has assessed a percapita investment cost (PCIC) of Rs 43,386 for a 20-year period. Using an average figure of 1 million people in each of the 100 smart cities, the total estimate of investment requirements for the smart city comes to Rs 7 lakh crore over 20 years (with an annual escalation of 10 per cent from 2009-20 to 2014-15). This translates into an annual requirement of Rs 35,000 crore. One needs to see how these projects will be financed as the majority of project need would move through complete private investment or through PPPs (public-private partnership).

3. Availability of master plan or city development plan:

Most of our cities don't have master plans or a city development plan, which is the key to smart city planning and implementation and encapsulates all a city needs to improve and provide better opportunities to its citizens. Unfortunately 70-80 per cent of Indian cities don't have one.

4. Financial sustainability of ULBs:

Most ULBs are not financially self-sustainable and tariff levels fixed by the ULBs for providing services often do not mirror the cost of supplying the same. Even if additional investments



are recovered in a phased manner, inadequate cost recovery will lead to continued financial losses.

5. Technical constraints of ULBs:

Most ULBs have limited technical capacity to ensure timely and cost-effective implementation and subsequent operations and maintenance owing to limited recruitment over a number of years along with inability of the ULBs to attract best of talent at market competitive compensation rates.

6. Three-tier governance:

Successful implementation of smart city solutions needs effective horizontal and vertical coordination between various institutions providing various municipal amenities as well as effective coordination between central government (MoUD), state government and local government agencies on various issues related to financing and sharing of best practices and service delivery processes.

7. Providing clearances in a timely manner:

For timely completion of the project, all clearances should use online processes and be cleared in a time-bound manner. A regulatory body should be set up for all utility services so that a level playing field is made available to the private sector and tariffs are set in a manner that balances financial sustainability with quality.

8. Dealing with a multivendor environment:

Another major challenge in the Indian smart city space is that (usually) software infrastructure in cities contains components supplied by different vendors. Hence, the ability to handle complex combinations of smart city

9. Capacity building programme:

Building capacity for 100 smart cities is not an easy task and most ambitious projects are delayed owing to lack of quality manpower, both at the centre and state levels. In terms of funds, only around 5 per cent of the central allocation may be allocated for capacity building programs that focus on



training, contextual research, knowledge exchange and a rich database. Investments in capacity building programs have a multiplier effect as they help in time-bound completion of projects and in designing programs, developing faculty, building databases as well as designing tool kits and decision support systems. As all these have a lag time, capacity building needs to be strengthened right at the beginning.

10. Reliability of utility services:

For any smart city in the world, the focus is on reliability of utility services, whether it is electricity, water, telephone or broadband services. Smart cities should have universal access to electricity 24×7; this is not possible with the existing supply and distribution system. Cities need to shift towards renewable sources and focus on green buildings and green transport to reduce the need for electricity.

Chennai - A Case Study for becoming a Smart City:

- ❖ Corporation of Chennai is the Oldest Municipal Institution in India established on the 29th September 1688
- ❖ Sir Josiah Child, one of the directors of the East India Company was responsible for the formation of the Corporation of Chennai, on the model of Dutch Government in the East Indies.
- ❖ Area of CoC is 426 Sq.Km.; and is headed by the Mayor, who presides over 200 councilors each of whom represent a ward in the city.
- ❖ More than 400 years old and is the 36th metropolitan city across the world.
- ❖ 31st largest urban area in the world Detroit of India because of its automobile industry
- ❖ 2nd largest IT Exporter in India
- ❖ Only city in South Asia to figure in the 52 places to go around the world by The New York Times.



- ❖ **Leading tourism guide Lonely Planet named Chennai as one of the top ten cities in the world to visit in 2015.**

1. Demographic Profile

Indicator	City (Municipal Corporation)	State (Urban)	India (Urban)
Total Population	4646732	34917440	377,106,125
Total Population of UA (if)	8653521		
Share of ULB population in District Urban population (%)	100.00		
Population Growth Rate (AEGR) 2001-11	0.67	2.39	2.76
Area (sq. km)*	175		
Share of ULB area in district (%)* #	100.00		
Density of population (person per sq. km)*	26553		
Literacy Rate (%)	90.18	87.04	84.11
Schedule Caste (%)	16.78	14.21	12.60
Schedule Tribes (%)	0.22	0.38	2.77
Youth, 15 - 24 years (%)	17.17	17.12	19.68
Slum Population (%)	28.89	23.15	17.36
Working Age Group, 15-59 years (%)	68.52	67.23	65.27

Source: Census of India, 2011

* District Census Handbook, Census of India, 2011

* The ULB is spread in more than one district.

SWOT Analysis – Chennai City:

1. STRENGTH



- Chennai is privileged as the Capital of Tamil Nadu and is the fifth-largest city, fourth-most populous metropolitan area in India, 31st-largest urban area in the world and the third-largest expatriate population in India after Mumbai and Delhi
 - Lonely Planet has ranked Chennai the 9th best city in the list of 2015's top 10 cosmopolitan cities in the world. Chennai is ranked as a beta-level city in the Global Cities Index ahead of Hyderabad and Kolkata.
 - Chennai with its strong presence in planned environment has scored the number one position as "MOST LIVEABLE CITY" in India as per Institute for Competitiveness, 2012
 - India today ranked Chennai as the "Best City" for two consecutive years (2014 & 2015) in its Best Cities Survey for its excellence and betterment in parameters like expenditure on education, crime rates, economic growth and investment generation.

(a) Economy

- Chennai has a huge talent pool of 8.75 lakh white collar jobs. It is the largest automobile hub in India and is amongst the top 10 automobile clusters in the world. Chennai witnesses continuous growth in IT / ITeS sector, Medical Tourism, Industrial, Warehousing & Logistics with excellent business opportunities (in resource & knowledge based industry)

(b) Communication

- Chennai is one of the four cities in India through which the country is connected with the rest of the world through undersea fiberoptic cables. The city is the landing point for major submarine telecommunication cable networks such as SMW (connecting India with Western Europe, Middle East and Southeast Asia), i2i (connecting India with Singapore), TIC (connecting India with Singapore), and BRICS (connecting India with Brazil, Russia, China, and South Africa and also the United States)

(C) Infrastructure

(i) Medical Facilities



- **Chennai is India's Health Capital that attracts about 45% of the health tourists from abroad and 35% of the domestic health tourists. Presence of 20 government health care across the city. The General Hospital, Park town, established in 1664, is the first medical institution in India and Government Institute of Mental Health, Kilpauk, established in 1794, is the Second largest mental health institute in India. Multi- and super-specialty hospitals across the city bring in an estimated 150 international patients every day due to excellent facilities and low cost offered here.**

(ii) Education Facilities.

- **Chennai is in second place for literacy among the metropolitan cities of India with a 90.18 % literacy rate.**

(iii) Connectivity

- **AIR: Chennai serves as a major gateway to southern India. The Chennai International Airport, comprising the Anna international terminal and the Kamaraj domestic terminal with a total passenger movement of 12.9 million, is the third busiest airport for passenger movement and the second busiest cargo terminus in India.**

- **RAIL: Chennai hosts the headquarters of the Southern Railways. The city has two main railway terminals Chennai Central Station and Chennai Egmore which provides access to other major cities and other small towns across the country.**

- **METRO RAIL: Phase -1 of 10.1 km out of 45.1 km is operational and the rest is expected to start operation by 2016. Phase - 2 for 100 km under three corridors is under planning stage.**

- **ROAD: Chennai is one of the cities in India that is connected by the Golden Quadrilateral System of National Highways. It is connected to other Indian cities by four National Highways such as NH 4, NH 205, NH 45 & NH 5, 11 State Highways SH-49, SH-55, SH-57, SH-104, SH-109, SH-110, SH-111, SH-112, SH-113, SH-114, SH-121.**



The 6 lane Outer Ring Road of 62 km stretch runs from Minjur to Vandalur via Nemelichery. The phase 1 of 29.5 km is complete and phase 2 of 32.5 km stretch is likely to be fully operational by end of 2016

- **BUS:** The Chennai Mofussil Bus Terminus (CMBT) is the largest bus station in Asia. It is the main intercity bus station for Chennai, administered by 7 Government owned Transport Corporations, which operate intercity and interstate bus services. The city has a fleet of 3,798 buses servicing more than 51 lakhs passengers per day.

The City Public Transport System is ranked at Level 2* for its Level of Service and is expected to be upgraded to level 1* very soon.

* Service level bench marking of MoUD Guidelines (1- High; 4- Low)

- **PORT:** The city is served by two major ports, Chennai Port is one of the largest artificial ports in India and the largest in the Bay of Bengal, and Ennore Port.

(iv) Water

- CMWSSB through various schemes have been able to reduce the physical losses in terms of UFW in water distribution networks to 11.34% (2015) from 25% (2013).

(d)Growth Corridors

- There are 5 growth corridors with 3 in the Southern Suburb (East Coast Road - Entertainment & Leisure Corridor, Old Mahabalipuram Road - IT/ITES Corridor, NH-45 - SEZ Corridor), 1 in the Western Suburb (NH-4 Auto and Manufacturing Industrial corridor) and 1 in the Northern Suburb (NH-5 Logistics and Warehousing Industrial corridor)

(e) NMT and Pedestrian Infrastructure Facilities

- The City towards the goal of NMT has already completed 26 roads providing infrastructure for pedestrians with other roads in progress. It is rated at level 2.



High mode share of NMT mode (28% walking + 6% cycling) and public transport (26% bus, 5% rail) (Source: CCTS 2008)

- **Chennai, the winner of SUSTAINIA AWARD 2015 is transforming the city's approach to transportation from car-centric to people-friendly – addressing safety concerns and air pollution in one go.**

(F) Tourism

- **The Marina Beach, Light House, Vevekanandarillam, Museum, Zoo, Santhome Cathedral Basilica, Memorials of Mahatma Gandhi, Rajaji, Kamarajar and Bakthavatsalam, Pulicat, Mamallapuram, Vedanthangal, Kapaleeswarar Temple, Adyar Theosophical Society, Connemara Library, Guindy National Park, Chokidhani, Dakshinachitra, Muttukadu, etc are the major tourist attractions. Adding to it lot of strong administrative focus is on urban greenery and recreational activities.**

2. WEAKNESS

(A) Transportation

- **Mode share: Declining trend in NMT modes (reduction in walking by 2%, cycling by 11%) and public transport (by 13%) between 1992-95 to 2008 due to lack of adequate infrastructure. (Source: CCTS 2008)**

- **Increasing use of private vehicle: Mode share of cars have increased by 5%, two-wheelers by 18% from 1992-95 to 2008. (Source: CCTS 2008)**

- **Road safety: High road fatalities due to lack of dedicated NMT facilities**

- **Inadequate parking space**

- **Increasing pollution levels**

(B) Solid Waste

- **Solid waste management with limited source segregation**



- **Prevalence of open storage at primary bins - Shops, households and commercial establishments continue to dump the waste in compactor bins**

- **Minimal recycling & lack of adequate processing capacities like RDF plants/ composting units. Capacity constraint in the existing dump yards**

(C) Storm Water

- **Flooding or water logging in streets and subways during heavy rains due to flat terrain of Chennai**

(D) Water Supply

- **Chennai city doesn't have reliable water source. It is observed that water shortage has hit the city 14 to 15 times over the past 25 years.**

3. OPPORTUNITY

(A) Transport

- **Existing demand for last mile connectivity: 10.1 km elevated portion of Chennai Metro Rail phase 1 is operational since June 2015 and the remaining portion is expected to start operations by 2016.**

- **Metrorail is likely to influence and increase the modal share of residents - more than 50% trips are by walking or cycling; more than 62% trips within 2 km.**

- **NMT policy shall be leveraged to the maximum extent to create NMT infrastructure**

- **Engaging private sector & corporates**

- **Develop public parking facilities such as multi level car parks, on-street parking management system, cycle sharing system, etc.**

(B) Water Supply

- **Improve source reliability by source creation, reduce NRW and source substitution through Rain Water Harvesting, waste water reuse, etc.,. Encourage volumetric billing.**



(C) Sewerage

- **Emphasis waste water reuse options, increase the production of energy from waste at STPs.**

(D) Solid Waste

- **Improve door-to-door collection and segregation at source aggressively**

4. THREAT

- **Limited land availability.**
- **Inadequate reliable water source, aging water supply and sewer lines, water pollution due to leakages and old sewer pipes, etc**

Challenges for Chennai in becoming the Smart City:

A universal cultural hub for safe and sustainable living with enhanced mobility, smart urban infrastructure and become more resilient to the physical, social, and economic challenges.

Implement NMT Policy

• **Infrastructure development has been a key driving force to Chennai's growth and has been critical in attracting corporate and individuals alike. Chennai's infrastructure is under constant strain. Traffic bottlenecks, restricted civic amenities and high pollution are all characteristics of this strain on infrastructure. However, over the past several years, a number of initiatives aimed at improving connectivity have been undertaken to ease some of this burden. The major initiative is the Metro Rail Network, consisting of three corridors. The metro stations are the gateway to smaller areas/ neighbourhoods within the city and NMT is important to serve and support the last mile connectivity.**

The "Second Master Plan for Chennai - 2026" prepared by CMDA during 2008 and the report "Chennai Comprehensive Transportation Study" prepared by Corporation of Chennai during 2009-10 emphasis the need for Non-Motorized Transport for Chennai.



• 'Chennai will be a city with a general sense of well-being through the development of a quality and dignified environment where people are encouraged to walk and cycle; equitable allocation of public space and infrastructure; and access to opportunities and mobility for all residents'(Non-Motorized Transport (NMT) Policy, Corporation of Chennai (CoC), 2014). The CoC has initiated the NMT project planning and implementation in a consultative and transparent manner: policies are implemented in close consultation with users, key stakeholders and broad citizen participation. The CoC has already been recognized for this environmentally friendly approach to transportation, by winning the prestigious global 'SUSTANIA AWARD 2015'.

• The Corporation of Chennai (CoC) aims to increase the use of cycling and walking by creating a safe and pleasant NMT network of footpaths, cycle tracks, greenways, and other facilities to serve all citizens in the CoC area. The designs of Chennai streets will be consistent with best practices in pedestrian-oriented, multi-modal street design.

Together, these measures will achieve the following:

- Improved access and mobility for all residents;
- Social & economic empowerment through the provision of improved low-cost mobility;
- Gender equity through the provision of NMT facilities that are safe for women to use.
- Social inclusion in creating NMT facilities that follow principles of universal design and are usable to the greatest extent possible by everyone, regardless of his or her age, ability, or status in life;
- Reduced local and global environmental impacts of CoC's transport system through expanded use of zero pollution modes;
- A changed culture that accepts the use of cycling and walking as acceptable and aspirational means to move around in the city;



- Further, it will put in place laws and regulations to ensure that NMT facilities and areas are not encroached by the motorized transport modes and other street users.

Goals to make NMT a success:

1) Encourage the use of NMT and public transport modes so that it will provide sufficient budgetary support to build and maintain the necessary transport infrastructure and amenities.

2) Roads with high pedestrian traffic and cycling potential will be given priority so that the desired modal shift from walking and private car to cycling and walking can be realized.

3) Explore opportunities of mobilizing private sources of funding to fund public transport and NMT improvements that support meeting the goals of this policy.

4) Develop adaptable and flexible long-term NMT plans, which will be updated regularly. The plans will include reporting on an evaluation of progress, the existing conditions, current initiatives, appraisal of available funding sources, and defining future interventions. The plans will be data-led and should eventually result into a dense network of streets and paths that meet NMT requirements as much as possible.

5) Combine incentives for NMT and public transport with disincentives for private car use to make NMT and public transport competitive. One of the strategies will be to progressively make parking expensive and scarce within commercial districts to make cycling, walking and public transport trips more feasible and cheaper. This strategy will also reduce unnecessary private car trips to the CBD and reduce congestion.

6) Develop a street and traffic management system to improve traffic circulation, enforcement of NMT priority areas and no-parking zones, and keeping all motorized vehicles (including public transport and motor cycles) from obstructing NMT paths. Cyclists will not be allowed on pedestrian facilities.



7) Ensure that NMT modes are included in all urban transport system studies, transport investment proposals, and that all reports generated will be freely available (open) for public scrutiny and used to improve NMT travel conditions.

8) To augment the available public on-street and off-street parking and integrate it with the private parking in-order to maximize the revenue and to not choke the current condition

To achieve this, the city aspires to see the following change in the next 5-10 years.

- Mode share of NMT modes to stabilize at current levels (28%) or increase in future;
- Reduce the vehicular traffic (no. of cars & trip lengths) per capita;
- Reduction in air and noise pollution of the city;
- Increase in integrated networks of pedestrian walkways, pedestrian only spaces and bicycle lanes across the city, measured in increased NMT space coverage and length;
- Appropriate road pricing mechanisms to be adopted to ensure at least 400 on-street parking spaces are charged per 1 lakh population (Current: 23 charged parking spaces per lakh population). Total parking supply (on-street and off-street) remains at 2015 levels or reduces in the future;
- Increase in safe NMT crossings (street signals, footbridges, underpasses, marked crossings);
- Road deaths to reduce to 1 death per lakh population per year, with zero pedestrian & cyclist fatalities (Current: 16 deaths per lakh per year, of which 44% are NMT users);
- Increase in amount of public events (music, culture, sports, food, etc) to be organized in the public realm (parks & plazas, streets temporarily closed off from traffic);
- Additional increase in Real Estate prices in streets and neighborhoods with implemented NMT policies

Storm Water Management



- Manage the storm water during heavy rains and flooding due to low pressure from Bay of Bengal. The recent episode of Chennai floods (Nov-Dec 2015) has imposed the necessity of managing the storm water and implementing flood monitoring & warning system

- 100% storm water network in order to ensure there are no flooding zones.

- Implement an ICT layer over the network to ensure its efficient working.

Water Management

The city vision is to provide safe and reliable water supply by

- 100% coverage in terms of quantity and quality of water supply and sewer networks

- incorporating a broad range of water source options

- 24x7 water supply at consumer end, installation of smart meters

- Reuse of tertiary treated water for non potable usage for commercials & industries.

Sewerage Management

- 100% collection & Treatment sewerage as per MOUD guidelines

- Complete automation of sewerage pumping station, STP, etc.

Solid Waste Management

The city vision is to achieve the following by 2030,

- Door to Door collection, with source segregation concept and promote composting facilities at household level - Reduce 30% of waste at source.

- Introduce 4 R concept- Refuse, Reduce, Recycle and Reuse. Recycling of waste like bottles, paper, card board sheets etc - Reduce another 30% of Waste.



- Introduce "pay as much as you throw" - Reduce the waste by another 10%
- Augment disposal of left out food waste from marriage halls, hotels, public functions etc by promoting food collections on call.
- Increase Bio-gas generations, Composting plants for treating Biodegradable waste.
- Implement waste collection on Call, Augment Waste to Energy plants
- Smart Dustbin with RFID and GIS mapping at public places only.
- Ban on Plastic usage by bringing legislation
- Non-recyclable waste to be sent to landfills under three categories: controlled landfill, inert landfill, and isolated landfill based on waste characteristics.

Energy Efficiency

- Convert the existing conventional street lighting to smart LED street lighting that ensures power saving to a huge extent.
- To organize the existing cabling network in-order to ensure uninterrupted power supply to the city. Minimize the outages
- Harvest solar energy by installing solar roof top at public places and government offices. Also make it a compulsory for the upcoming residential developments to include solar roof tops as a part of approval requirement.

Pollution

- Reduce pollution by retrofitting the open spaces and by reducing the private vehicles.
- The NMT policy enhances the integration of public transport that eventually reduces the use of private vehicles which factors to 70% of the current traffic.

Conclusion



We are really lucky to have our great visionary leader like Shree Narendra Modi in institution of 100 New Smart Cities. Even though it is 7060 Cr for the initial investment for set out Smart Cities, let we put hands together to make India more economically brighter. In addition, the global warming can be reduced in constituent of this Smart Cities. Let us hope soon India will provide Quality of Life (QoL) to its citizens on par with other Smart Cities like Barcelona, Helsinki, San Fransco, New York, Singapore. Welcome to the Future of 100 Smart Cities in India, with a positive way collectively and cheerfully.

References

1. Martine, G., and Marshall, A. State of world population 2007: unleashing the potential of urban growth. In State of world population 2007: unleashing the potential of urban growth. UNFPA
2. Davies Kingsley and Golden H.H. " Urbanisation and development in pre-Industrial Areas", Economic Development and Cultural Change, 1954, Vol.3 no 1.
3. Greenfield, A. (2013). Against the Smart City. London: Verso. ASIN B00FHQ5DBS
4. Hans Schaffers, Nicos Komninos, et.al (2011) "Smart Cities and the Future Internet: Towards Cooperation Frameworks for Open Innovation"
5. Kundu, A. and Basu, S. "Informal Manufacturing Sector in Urban Areas An Analysis of Recent Trends", Manpower Journal, 34(1), April - June 1998.
6. Koenigsberger, O. "New towns in India" Town Planning Review 23 (2), 95-131, 1952. J. Domingue et al. (Eds.): Future Internet Assembly, LNCS 6656, pp. 431-446, 2011
7. Volker Buscher, Michelle Tabet. Gareth Ashley, Léan Doody, Jason McDermott, Michael Tomordy, "Smart Cities Transforming the 21st century city via the creative use of technology", Arup's IT & Communications Systems team, 2010.



8. AnujTiwari and Dr. Kamal Jain, "GIS Steering Smart Future for Smart Indian Cities." International Journal of Scientific and Research Publications, Volume 4, Issue 8, August 2014.
9. . CharbelAoun, "The Smart city Cornerstone: Urban Efficiency."Schneider Electric White Paper, 2013
- 10.Faisal Razzak,"Spamming the Internet of Things: A Possibility and It's probable Solution", The 9th International Conference on Mobile Web information Systems, Procedia Computer Science 10(2012) 658-665.
- 11.Giffinger, R., Fertner, C., Kramar, H., Kalasek, R., Pichler-Milanovid, N., &Meijers, E.,"Smart Cities: Ranking of European Medium-Sized Cities. Vienna, Austria: Centre of Regional Science (SRF), Vienna University of Technology, (2007).
- 12.. HafedhChourabi, Taewoo Nam, Shawn Walker, J. Ramon Gil-Garcia, SehIMellouli, KarineNahon, Theresa A. Pardo& Hans Jochen Scholl, "Understanding Smart Cities: An Integrative Framework." Hawaii International Conference on System Sciences, 2012.
- 13.Kehua Su, Jie Li and Hongbo Fu, "Smart City and the Applications."IEEE, 2011.
- 14.. Pinank R. Patel, Himanshu J. Padhya, review paper for smart city, International journal of advanced research in Engineering, Science and Management.
- 15.. Robert E. Hall, "The Vision of a Smart City." 2nd International Life Extension Technology Workshop, 2000.
- 16.. Rocco Papa, Carmela Gargiulo and Adriana Galderisi, "Smart cities: Researches Projects and good practices for the cities." TeMa Journal of Land Use, Mobility and Environment, 2013, 5-17.
- 17.. SomayyaMadakam, R. Ramaswamy, The State of Art: Smart Cities in India: A Literature Review Report (Dec 2013)