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Smart Cities: An option for eco friendly life





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ustainability is the destination; resilience is the characteristic; smart is the accelerator

Smart city expert Gordon Feller describes "Cities are the keys to a sustainable future for humanity — and will be vital to the future of the rest of our natural world. Only by making cities more efficient, equitable, and healthful can Earth's expanding human population be accommodated in ways that protect the ecological fabric which our society relies upon. Finding sustainable solutions requires that we integrate lessons from all facets of science, technology, and design."

As per the study done by Portugal-based United Nations University in 2016 the global urban population is expected to grow by 63% between 2014 and 2050 against the 32% total population growth during same period, the fastest increase occurring among megacities hosting over 20 million population and located mostly in developing countries. The trend creates unprecedented sustainability challenges.

In 2015, 828 million people lived in slums, lacking basic services such as drinking water and sanitation; the figure increases by 6 million people every year. Cities also witness instances of social instability due to rising inequalities and unemployment; air and water pollution; traffic congestion, and urban violence and crime. Smart City initiatives can help overcome the limitations of traditional urban development that tends to manage urban infrastructure systems in silos. Based on the analysis the

study concluded that Smart Cities have a lot of potential for the many developing countries. But this potential is not being fully utilised. A number of structural factors could actually widen the gap between the potential and reality.

Rapid and unplanned urbanisation in the developing countries led to the growth of slums; sprawl; housing and infrastructure shortages; social segregation and exclusion. The smart cities provide access to the smart technology to make better utilisation of infrastructure, clean energy and energy efficiency, improvements in services and better benchmarking of city performance where citizens are living for many years. Smart City concept is important for the developing countries like India where the people are living in the urban and rural areas are suffering for their daily livelihood. The city sometimes failed to provide the healthcare services, quality education, easy transportation access and other services.

The Government of India has launched a programme "*Smart Cities Mission*" *in* 2015 with an objective to develop 100 cities all over the country making them citizen friendly and sustainable. The Union Ministry of Urban Development is responsible for implementing the mission in collaboration with the state governments of the respective cities.

The present issue discusses the importance of smart cities. It details the "*Smart Cities Mission*" of India and initiatives taken by different countries how are they planning, managing and governing cities in a sustainable way.

Smart Cities: A sustainable living

ities across the developed world and in emerging economies are already positioning themselves to be more climate resilient, competitive, sustainable and essentially, smarter.

Since the 1990s, there is a worldwide investment in ICT (information and communication technology) and infrastructure to create smart, machine-tomachine interactions aimed to cost saving and improving efficiency, governance and transparency within their communities. It is fueled further in part by the Internet of Things (IoT) and big data trends. Smart city projects have targeted crowd control and policing, parking, street lighting, transportation planning and mapping, water and energy management and waste collection.

Now, however, there is a shift in the smart city thinking. Phrases Like climate proofing, citizen enablement and empowerment, disaster planning and recovery, information access, quality of life gains, resiliency, social equality, sustainability, technology justice and urban competitiveness are finding their way into today's smart city vernacular.

What is a Smart City?

There is no universally accepted definition of a Smart City. The conceptualization of Smart City, therefore, varies from city to city and country to country, depending on the level of development, willingness to change and reform, resources and aspirations of the city residents. It would have a different connotation in India than, say, Singapore or Europe. Even in India, there is no one way of defining a Smart City. But generally, it refers to the combination of urban innovation, human networks and the environment.

According to Prime Minister Mr. Narendra Modi, there are five key instruments that make a "smart" city:



- The use of clean technologies
- The use of information and communications technology (ICT)
- Private sector involvement
- Citizen participation and
- Smart governance

Why do we need Smart City?

Every 8th November world celebrates "**World Town Planning Day**." In 1949 the United Nations decided to celebrate this date to acknowledge and promote the role of planning in creating sustainable communities.

However, the 21st century is going to be a century of cities. A United Nations (UN) study points out that more than half of the population on the earth (54.6% or 3.6 billion people) lives in cities. The study shows that by 2050, city dwellers will account for more than 70% of the world's population (over six billion) – 64.1% of the people in developing countries and 85.9% of the population in the developed world will be living in urban areas.

All urban areas face challenges. Big cities, in turn, are increasingly seen as complex systems with connections between their different environments and individuals. So, the growing importance of both urban planning and the development of dynamic decision-making mechanisms, which take into account growth and the inclusion of citizen participation processes.

Transforming "Traditional Cities" into "Smart Cities" is an increasingly important demand. With the emergence of digital technology, the Internet, and mobile technologies, this transformation is becoming more viable each day. A smart and sustainable city is an innovative city that uses Information and Communication Technologies (ICT) and other means to improve the quality of life, the efficiency of urban operation and services and competitiveness, while ensuring that it meets the needs of present and future generations with respect to economic, social, and environmental aspects.

Main Focus Areas

Smart City focuses on its most pressing needs and on the opportunities to improve quality of life for citizens. A Smart City has the following main focus areas

Sustainability: Use of digital technology to reduce costs and optimise resource consumption so that its current administration does not compromise its use for future generations;

Inclusive and transparent: Direct communication channels with citizens, operates with open data, and allows for the monitoring of its finances;

Generation of wealth: It provides adequate infrastructure to generate high-quality jobs, innovation, competitiveness, and business growth;

For citizens: It uses digital technology to improve the quality of life of people and to give quick access to more efficient public services

Benefits

Smart City technologies have an impact on the prosperity of a region. Its digital technologies or information and communication technologies (ICT) are used to enhance quality and performance of the



services available in the city. It gives an enormous opportunity to achieve social, economic and environmental benefits.

Smart City therefore provides:

- Better and more convenient services for citizens: enable better services to citizens by managing operations with minimal human intervention.
- Better city governance: e-government services provide much faster and at a low cost.
- A better life environment: reduces energy consumption and greenhouse gas emissions, and improves waste management.
- More modern industry greener and more people friendly;
- Smarter and more intelligent infrastructure: The Internet of Things (IoT) is enabling 'things' (objects and devices) in our lives to exchange data in a common network. It plays a major role in developing smart cities that help planners to understand our everyday tasks; and
- A dynamic and innovative economy

Citizens have an important role as beneficiaries of and participants in city transformations. The transformation of a traditional city into a Smart City also requires the commitment of both leaders and different public departments. It encourages publicprivate cooperation and promotes local competitiveness.

Source: https://www.devex.com/news/the-next-generationcity-resilient-smart-and-sustainable-87412 https://egov.unu. edu /research/smart-cities-for-sustainabledevelopment. html#outline http://greencapacity.ru/information/smart-cities, http://www.iso.org/iso/smart_cities_report-jtc1.pdf, https://publications.iadb.org/bitstream/handle/11319/7743/T he-Road-towards-Smart-Cities-Migrating-from-Traditional-City-Management-to-the-Smart-City.pdf?sequence=3,

Smart Cities: Initiative of Indian Government



N early 31% of India's current population lives in urban areas and contributes 63% of India's GDP (Census 2011). With increasing urbanization, urban areas are expected to house 40% of India's population and contribute 75% of India's GDP by 2030. This requires comprehensive development of physical, institutional, social and economic infrastructural facilities. These are essential in improving the quality of life and attracting people and investments to the City, setting in motion a virtuous cycle of growth and development. Development of Smart Cities is a step in that direction.

The Smart Cities Mission is a new initiative by the Government of India to drive economic growth and improve the quality of people's lives by enabling local development and harnessing technology as a means to create smart outcomes for citizens.

Mission Strategy

The strategic components of Area-based development are city improvement (retrofitting), city renewal (redevelopment) and city extension (Greenfield development) plus a Pan-city initiative in which Smart Solutions are applied covering larger parts of the city. For North Eastern and the Himalayan States, the proposed area to be developed will be one-half of what is prescribed for any of the alternative models - retrofitting, redevelopment or Greenfield development.

Core infrastructure elements

- Adequate water supply,
- Assured electricity supply,
- Sanitation, including solid waste management,
- Efficient urban mobility and public transport,
- Affordable housing, specially for the poor,
- Robust IT connectivity and digitalization,
- Good governance, specially e-Governance and citizen participation,
- Sustainable environment,
- Safety and security of citizens, particularly women, children and the elderly, and
- Health and education

Smart City Features

Some typical features of comprehensive development in Smart Cities are:

 Promoting mixed land use in area-based developments — planning for 'unplanned areas' containing a range of compatible activities and land uses close to one another in order to make land use more efficient. The States will enable some flexibility in land use and building bye-laws to adapt to change;

- Housing and inclusiveness expand housing opportunities for all;
- Creating walkable localities reduce congestion, air pollution and resource depletion, boost local economy, promote interactions and ensure security. The road network is created or refurbished not only for vehicles and public transport, but also for pedestrians and cyclists. Necessary administrative services are offered within walking or cycling distance;
- Preserving and developing open spaces parks, playgrounds and recreational spaces in order to enhance the quality of life of citizens, reduce the urban heat effects in Areas and generally promote eco-balance;
- Promoting a variety of transport options Transit Oriented Development (TOD), public transport and last mile para-transport connectivity;
- Making governance citizen-friendly and cost effective — increasingly rely on online services to bring about accountability and transparency, specially using mobiles to reduce cost of services and providing services without having to go to municipal offices; form e-groups to listen to people and obtain feedback and use online monitoring of programmes and activities with the aid of cyber tour of worksites;
- Giving an identity to the city based on its main economic activity, such as local cuisine, health, education, arts and craft, culture, sports goods, furniture, hosiery, textile, dairy, etc;
- Applying Smart Solutions to infrastructure and services in area-based development in order to make them better. For example, making Areas less vulnerable to disasters, using fewer resources, and providing cheaper services.

Coverage and Duration

The Mission has already been commenced since 2015 and announced 100 cities to be converted in to "Smart City" during five years (FY2015-16 to FY2019-20). The Mission may be continued thereafter in the light of an evaluation to be done by the Ministry of Urban Development (MoUD) and incorporating the learnings into the Mission.



How to make Proposal

There is no prescribed model by the Government for the Smart Cities. The approach is not 'one-size-fitsall'. Each city has to formulate its own concept, vision, mission and plan for a Smart City that fits its local context, resources and levels of ambition. Accordingly, they have to choose their model of Smart City and answer the question: What kind of Smart City do they want? For this, cities will prepare their Smart City Proposal (SCP) containing the vision, plan for mobilisation of resources and intended outcomes in terms of infrastructure up-gradation and smart applications.

Identified Smart Cities

The total number of 100 smart cities has been distributed among the States and UTs on the basis of equitable criteria. The formula gives equal weightage (50:50) to urban population of the State/Union Territory (UT) and the number of statutory towns in the State/UT. Based on this formula, each State/UT has a certain number of potential Smart Cities, with each State/UT having at least one. The number of potential Smart Cities from each State/UT will be capped at the indicated number. This distribution formula has also been used for allocation of funds under Atal Mission for Rejuvenation and Urban Transformation - AMRUT.

The distribution of Smart Cities will be reviewed after two years of the implementation of the Mission.

Based on an assessment of the performance of States/ Urban Local Bodies (ULBs) in the Challenge, some re-allocation of the remaining potential Smart Cities among States may be required to be done by the Ministry of Urban Development.

S. No.	Name of State/UT	No. of cities short- listed	Names of Cities	S. No.	Name of State/UT	No. of cities short- listed	Names of Cities
1	Andaman &			17	Kerala	1	1. Kochi
2	Nicobar Islands	1	1. Port Blair	18	Lakshadweep	1	1. Kavaratti
2	Anuma Frauesh	5	2. Tirupati 3. Kakinada	19	Madhya Pradesh	7	1. Bhopal 2. Indore 3. Gwalior
3	Arunachal						4. Jabalpur
	Pradesh	1	1. Pasighat				5. Satna
4	Assam	1	1. Guwanati				6. Ujjain
5	Dilldi	5	2. Bhagalpur	20	Mahawaahtwa	10	7. Sagar
			3. Biharsharif	20	wanarashtra	10	1. Navi iviumbai 2. Nashik
6	Chandigarh	1	1. Chandigarh				3. Thane
7	Chhattisgarh	2	1. Raipur				4. Greater
0	D 0.D:		2. Bilaspur				Mumbai
8 Q	Daman & Diu Dadra &	1	1. Diu				5. Amravati
9	Nagar Haveli	1	1. Silvassa				6. Solapur
10	Delhi	1	1. New Delhi				7. Nagpur
			Municipal				9 Kalvan -
			Council				Dombivali
11	Goa	1	1. Panaji				10. Aurangabad
12	Gujarat	6	1. Gandhinagar	21	Manipur	1	1. Imphal
			2. Ahmedabad	22	Meghalaya	1	1. Shillong
			3. Surat	23	Mizoram	1	1. Aizawl
			4. Vadouara	24	Nagaland	1	1. Kohima
			6. Dahod	25	Odisha	2	1. Bhubabeshwar
13	Haryana	2	1. Karnal	26	Puducherry	1	2. Raurkeia 1. Oulgaret
			2. Faridabad	27	Puniab	3	1. Ludhiana
14	Himachal					•	2. Jalandhar
	Pradesh	1	1. Dharamshala				3. Amritsar
15	Jharkhand	1	1. Ranchi	28	Rajasthan	4	1. Jaipur
16	Karnataka	6	1. Mangaluru				2. Udaipur
			2. Belagavi				3. Kota
			4 Hubballi -				4. Ajmer
			Dharwad	29	Sikkim 1		1. Namchi
			5. Tumakuru				
			6. Davanegere				

S. No.	Name of State/UT	No. of cities short- listed	Names of Cities	S. No.	Name of State/UT	No. of cities short- listed	Names of Cities
30	Tamil Nadu	12	 Tiruchirapalli Tirunelveli Dindigul Thanjavur Tiruppur Salem Vellore Coimbatore Madurai Erode Thoothukudi Chennai 	33	Uttar Pradesh	12	 Moradabad Aligarh Saharanpur Bareilly Jhansi Kanpur Allahabad Lucknow Varanasi Ghaziabad Agra Rampur
31	Telangana	2	 Greater Hyderabad Greater Warangal 	34 35	Uttarakhand West Bengal	1 4	 Dehradun New Town Kolkata Bidhannagar
32	Tripura 1		1. Agartala				3. Durgapur 4. Haldia

- Jammu & Kashmir has asked for more time to decide on the potential cities
- 12 cities have been shortlisted from Uttar Pradesh against 13 cities nominated for Smart City project

At the national level, an Apex Committee (AC), headed by the Secretary, MoUD and representatives

of related Ministries and organisations will approve the Proposals for Smart Cities Mission; monitor their progress and release funds. The proposals are also monitored at State and City level.

Source:http://smartcities.gov.in/writereaddata/smartcityguidel ines.pdf https://india.gov.in/spotlight/smart-cities-missionstep-towards-smart-india

Smart Cities: An international scene

t is a major challenge for policymakers and administration to provide quality life to city dwellers and manage the pressures exerted by demographic growth, urbanisation and climate change. Globally, more people live in urban areas than in rural areas. In 1950, 30% of the world's population was urban, and by 2050, 66% of the world's population is expected to live in urban areas. "Smart cities" are needed to safeguard their citizens' right to a liveable, sustainable environment. According to the United Nations, by 2030, six out of every 10 people will be city dwellers, rising to seven out of every 10 people by 2050.





Evaluation Group (SEG 1) on Smart Cities is currently preparing a reference architecture and standard-isation roadmap in cooperation with many different organisa-tions. The aim is to identify and close gaps and develop relevant international standards as building blocks for tailor-made solutions.

Standards for Smart Cities

Improvement of the efficiency of cities can be achieved by interconnecting individual systems such as energy, water, sanitation and waste management, transportation, security, environmental monitoring or weather intelligence. Many systems used today in cities are originated from different suppliers. They are maintained by various agencies sometimes working in isolation. Standardised interfaces are required to put in place to connect them both physically and virtually. The use of International Standards also facilitates the long-term maintenance and repair of city infrastructure.

The International Organization for Standards (ISO) has released a standard that applies strictly to city performance. It gives cities a common performance yardstick. ISO 37120:2014 establishes a set of open data indicators to measure the delivery of city services and quality of life. It defines common methodologies that cities can use to measure their performance in areas such as energy, environment, finance, emergency response, governance, health, recreation, safety, solid waste, telecommunications, transportation, urban planning, wastewater, water, sanitation and more. ISO standards have a key role to play in the construction and development of cities.

Cities depend on electric power and hardware to move people and things, collect data and exchange information. Today without electricity, modern city management, the Internet of Things and all subsidiary services will remain dream. Energy is essential for cities and economies to prosper. The **International Electrotechnical Commission** (IEC) makes International Standards for all electrical, electronic and related technologies. The IEC Systems The **International Telecommunications Union** (ITU) tackles standardisation requirements for the Internet of Things (IoT), with an initial focus on IoT applications in smart cities. It is responsible for international standards to enable the coordinated development of IoT technologies, including machine-to-machine communications and ubiquitous sensor networks. These standards address urban development challenges.

Worldwide standards facilitate the development of tailor-made solutions adapted to different circumstances. There are still many gaps today, thereby creating a barrier to technology integration, technology transfer and thus the replication of good practices.

Smart Cities in the world

According to Frost & Sullivan, the global smart city market will be valued at US\$1.565 trillion in 2020. More than 26 global cities are expected to be smart cities by 2025 and 50% of which will be from Europe and North America. Smart cities are cities built on 'Smart' and 'Intelligent' solutions and technology that will lead to the adoption of at least 5 of the 8 following smart parameters—smart energy, smart building, smart mobility, smart healthcare, smart infrastructure, smart technology, smart governance, smart education and smart citizen. Many of the world's major cities have embarked on smart city projects.

Barcelona

Barcelona is a pioneering city regarding the concept of Smart City. It was named the European Capital of Innovation in 2014 by the European Union. It is the first city in the Spanish State coined a "Smart City" and is named the fifth overall in Europe in 2013 ahead of Paris, Stockholm and London. Smart city projects range from smart traffic lights, telecare services and electric cars to public Wi-Fi. Smart city platform, known as the Urban Platform, brings together data from the opensource sensor network, the city's information systems, as well as social networks, allowing it to solve urban challenges across silos.



LED streetlamps activate only when movement is detected. It saves 30% energy. These are equipped with sensors to collect data from the environment. Elderly and disabled citizens are connected to the Telecare service. It proactively checks on residents. Sensors monitor rain and humidity to determine how much water is needed to irrigate parks. Municipal smart bins monitor waste levels and are cleared only when they are full, optimising waste collection operations. Digital bus stops provide bus arrival times, free Wi-Fi and USB charging ports, while a smart parking system guides vehicles to available parking spaces, reducing congestion and emissions.

Copenhagen

It is considered as the greenest city in the world. Copenhagen is a centre for clean technology innovation and is committed to being carbon neutral by 2025. It promotes and builds bike lanes and super cycle highways. An intelligent traffic management system optimises traffic flow and remedies road congestions. A dynamic Radio-frequency identification (RFID) - based road pricing system is used to promote green transportation. The city sends less than 2% of waste to landfill. Half of the waste is recycled. Most of the waste is used to generate heat for the city's district heating network. Its highly efficient district heating system connects 98% of all households, while in the summer months a district cooling system relies on cold seawater abstraction to save 70% of energy compared to traditional air-conditioning.

Dubai

The Dubai Smart City initiative aims to transform it into a leading global smart city. It includes over 100 initiatives and a plan to transform 1000 government



services into smart services. Initially, it will cover transport, communications, infrastructure, electricity, economic services and urban planning. The Dubai Open Data Law shares non-confidential information between government agencies and the public. The new law will make the data accessible to researchers, investors and service developers via an integrated platform, and create opportunities for collaboration between the public and private sectors. The Smart City Plan also includes a framework for aligning districts of Dubai with the Smart City vision and dimensions.

Helsinki

The objective of Helsinki's Smart City activities is to harness the innovative capabilities of the entire urban community by promoting cooperation between application developers, and the rest of the city's ICT ecosystem. Fiksu ('Smart') Kalasatama initiative develops Helsinki's Kalasatama area into a world class model district of smart urban development. An automated waste collection system reduces garbage truck traffic by 80-90%, smart grids and real-time energy monitoring to reduce energy consumption by 15%, and parking spaces with electric car charging. Mobility-as-a-Service packages with an app plans ideal travel routes using all available modes of transport. Forum Virium Helsinki is an innovation unit within the Helsinki City organisation playing a key role in implementing Helsinki's Smart and Open City strategy.

London

London is a global centre for entrepreneurship and is known for pioneering the use of open data to create innovative solutions and solve city challenges on the ground. Its London DataStore is one of the first open data platforms in the world. With 50,000 visitors every month, its 500 datasets have resulted in transport apps, interactive maps, population and demographic projections and urban planning projects. Almost 400 smartphone apps were created after London's transport data was released to the public. To solve the chronic congestion woes, it has implemented congestion charging through number plate recognition, smart parking systems and intelligent traffic lights that prioritize public transport.



New York City

The city of New York has been announced as the Best Smart City of 2016 at the Smart City Expo World Congress in Barcelona, as part of the World Smart City Awards. Its smart technologies are based on four pillars; LinkNYC, expanding connectivity among citizens; Marketplace.nyc and Urban Tech NYC, growing the innovation economy ecosystem; a programme for piloting and scaling smart technologies; and a set of comprehensive guidelines for ensuring the equitable deployment of smart city technologies. The Mayor's Office of Technology and Innovation (MOTI) spearheads the City of New York's "Smart City, Equitable City" strategy for technology and innovation. It works to better the lives of all New Yorkers and communities across by establishing principles and strategic frameworks to guide connected device and Internet of Things (IoT).

Seoul

Seoul is known for incorporating cutting-edge technology in every phase of city life. Its Online Electric Vehicle (OLEV) gathers power magnetically from electric strips buried below the road's surface as it travels, eliminating the need for long-term recharging. For the disabled and elderly, the Uhealthcare service provides telehealth check-ups and medical consultation through remotecontrolled medical equipment and smart devices. Smart work centres equipped with groupware and tele-conferencing systems allow 30% of government employees to work closer to their homes. A cluster of developments with a similar focus has been undertaken around Seoul.

Singapore

Singapore is the world's first Smart Nation with one of the highest mobile and broadband penetration rates in the world. Its Smart Nation Platform brings together data from a nationwide sensor network. Ready-made Above Ground (AG) boxes are being deployed to supply power and connectivity to sensors, reducing the need for unnecessary groundwork. Its 3D "Virtual Singapore" model that allows city planners to test-bed concepts, analyse traffic and pedestrian flows and run simulations such as crowd evacuations during an emergency. 98% of government services are accessible online. There are several citizen-centric mobile apps for transport, health and municipal services.

However, cities become smart only when they are able to address their complex challenges holistically. In this regard, they should go beyond technology and make use of assets and information at the local level to prepare a development strategy that addresses environmental, urban, social, and economic aspects.

Source: http://ww2.frost.com/news/press-releases/frostsullivan-global-smart-cities-market-reach-us156-trillion-2020, http://www.enterpriseinnovation.net/article/top-smart-citiesworld-today-676169304, http://www.enterpriseinnovation.net /article/look-dubais-smart-city-initiatives-1141254266, http://www.iadb.org/en/topics/emerging-and-sustainablecities/international-case-studies-of-smart-cities,20271.html







The Environmental Information System acronymed as ENVIS was implemented by the Ministry of Environment & Forests by end of 6th Five Year Plan as a Plan Scheme for environmental information collection, collation, storage, retrieval and dissemination to policy planners, decision makers, scientists and environmentalists, researchers, academicians and other stakeholders.

The Ministry of Environment and Forests has identified Consumer Education and Research Centre (CERC), Ahmedabad, as one of the centers to collect and disseminate information on "Eco-labelling and Promotion of Eco-friendly Products". The main objective of this ENVIS Centre is to disseminate information on Eco products, International, and National Eco labeling programs.

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