Confederation of Indian Industry

Future cities
What it takes to build one

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1. Introduction

By 2050, two-thirds of the world's population are expected to live in cities. While this has a positive impact, such as innovation, wealth creation and economic competitiveness, it also has a negative side, including demographic issues like aging population, immigration issues, economic aspects like polarization of incomes, social divisions because of issues like heterogeneous social demands, digital divide, and environmental impacts generated out of energy inefficiency, waste generation, and pollution.

The cities need to look for strategic review process keeping in mind their goal, their priorities, and future needs so that a roadmap may be devised in order to take advantage of the opportunities and minimize the threats of urbanization to become city of the future.

Cities require strategic planning to consider ways to innovate and prioritise options that is key for their future. This planning process should be participatory with the citizens with a central aim to define a sustainable action plan that will make the metropolis future ready. Large cities should look for more avenues of innovation to improve efficiency and sustainability of their services. Also, they should promote communication and ensure that residents and businesses are involved in this process.

Each city is unique and has its own needs and opportunities. So it must design its own plan, set its priorities, and be flexible enough to adapt to changes. Such well-planned cities generate numerous business opportunities and possibilities for collaboration between the public and private sectors. All stakeholders can contribute, so an ecosystem must be developed that will involve the public at large, businesses, government, and educational institutes and other relevant stakeholders.

Finally, it must not be forgotten that the human factor is fundamental in the development of cities. Beyond technological and economic development, it is the public that holds the key for cities to go from "smart" to "wise." That is the goal to which every city should aspire: that the people who live there and their leaders use all their talent to achieve progress.

2. *Future city – Challenges and opportunities*

Urbanization in India is occurring at a breakneck pace. According to PwC reports, by 2025 India is estimated to house 63 cities with a population of 1 million or more, as against 43 such cities in 2011.

With ever-increasing population, the citizen's demand for basic amenities such as water, energy, infrastructure and clean environment is increasing correspondingly. The accelerating trend of urbanisation is straining city resources. A large part of the eastern region population now lives in urban areas. People migrate to urban areas for better employment opportunities, healthcare and educational facilities as well as improved liveability and a higher standard of living. To make cities in India future ready, we need an integrated approach to modernize city infrastructure, and leverage technology to improve efficiency and capacity of city services. Smartness in a city lies in integration of the core city sub systems and enabling seamless service delivery. Digital master plans have to be fitted into city master development plans.

Today, majority of the cities are characterised by strained infrastructure which manifests itself in terms of power cuts and water shortages, high cost of living, and unaffordable real estate resulting in urban sprawl and slums, high volume of traffic resulting in pollution and delays. As a result, cities are plagued with the problems of air pollution, waste management, poor water and electricity supply, ageing infrastructure, resource scarcity and traffic congestion.

According to BSBK Limited, "metropolitan planning and management is most critical need to ensure sustainable urbanisation. Cities face a common challenge—effective coordination, infrastructure development, and service delivery across multiple jurisdictions. This is particularly difficult in developing countries, which often lack the necessary legal, institutional, and governance apparatus to undertake such coordination." Further, some of the challenges that may arise are discussed below:

Retrofitting existing legacy city infrastructure to make it future ready: The most important issue is to determine the existing city's weak areas that need utmost consideration, e.g. 100% distribution of water supply, sanitation and housing. As per the World Cities Report 2016, housing accounts for 70% of land use in most cities and, by 2025, additional affordable housing will be required to accommodate 1.5 billion people. To meet this demand, public-private cooperation must address the cost of construction and retrofit by unlocking

the land potential and leveraging technologies, leading approaches and emerging business models.

Financing future cities: One needs to see how these projects will be financed as the majority of project need would move through private investment or through PPPs (public-private partnership).

Three-tier governance: Successful implementation of future city solutions need effective horizontal and vertical coordination between various institutions providing various municipal amenities as well as effective coordination between central government, state government and local government agencies on various issues related to financing, sharing of best practices and service delivery processes.

Providing clearances in a timely manner: For timely completion of the project, all clearances should ideally use online processes and be cleared in a time-bound manner.

Capacity building programme: Building capacity for future cities is not an easy task. In terms of funds, only around 5% of the central allocation may be allocated for capacity building programs.

Reliability of utility services: For any future city in the world, the focus is on reliability of utility services, whether it is electricity, water, telephone or broadband services. Future 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.

The real challenge before the government is building inclusive future cities for all residents, regardless of whether they are rich or poor. According to ICRA, “Indian cities require huge amount of investment in basic infrastructure like water supply, sanitation, roads and solid waste. However, the municipalities lack internal capacity to conceptualise, design or execute complex projects which are bankable. In most of the cases, municipalities do not prepare or publish audited accounts. Their information systems too are weak. This is going to be a huge bottleneck if they want to access external funds from financial markets to fund their capital expenditure requirements.”

These challenges are propelling cities across the eastern region to explore smarter ways of management. Governments are creating strategies for future city transformation in order to improve operational efficiencies, maximize environmental sustainability efforts, and create new citizen services.

With the recent announcement of 98 smart city aspirants by the government, India has taken concrete steps towards the smart city transformation. As per the mission guidelines for smart cities released by Ministry of Urban Development, a clean and sustainable environment will be a significant feature. The three pillars of sustainable economic advancement, political participation and social emancipation are the core foundations of a smart sustainable city. A model city must have an open and responsive government that involves citizens in decision-making and a robust governance structure with a single nodal agency. Additionally, the city must have open data that is accessible to all, a robust model for city functioning and supportive regulatory systems that foster the culture of innovation and inclusiveness. Moreover, the involvement of the private sector sets up new benchmarks for making cities smart and sustainable through funding, entrepreneurship and innovation.

Engaging citizens in governance

Citizens choose a government, and all governance policies, laws and regulations are ideally supposed to be focussed on them. However, very often, inputs and ideas are not sought from citizens, and decisions are made by a few elected representatives. Those decisions may or may not reflect the pulse of the people. With the advent of the smartphone revolution, social media proliferation, a dynamic media industry and instant connectivity, people are becoming increasingly aware as well as keen to voice their opinions and do their bit for society by sharing their inputs with policy-makers.

Participatory governance focusses on the democratic engagement of citizens to improve citizen participation in governmental policies. It also involves seeking ideas from people for the betterment of cities. Participatory governance provides a platform for citizen-government interaction that bolsters the concept of democracy as well as improves service delivery and inculcates social inclusiveness.

Further, public-private cooperation is required to build sustainable urban transformation agendas. The public and private sectors must create a structured process to engage relevant stakeholders, either through informal consultation or formal engagements, to drive cities towards social, environmental and economic sustainability, while enhancing urban equity, quality of life, social services, resiliency, trust, integrity, innovation, cohesion and inclusiveness.

Opening up data for transparency and service delivery

Management of data has become considerably important, particularly from the purview of governance. The data can be related to the environment, weather, transport and traffic, statistics and finance. Open data helps in ensuring transparency across systems, driving the participation of citizens in governance and improving service delivery by leveraging data for the welfare of people at large. Additionally, open data facilitates coordination among multiple departments and increases the visibility of city coordinates for the delivery of services.

Active involvement of the private sector

Businesses are expected to usher in new and innovative technological solutions and services. Large global players, need to invest in R&D and develop standardised yet customisable solutions that can be replicated and scaled up around the world. Not just large global companies but also innovative start-ups and local players will play a critical role. Many businesses have mastered the art of collaboration and can utilise this experience in creating platforms that bring together various stakeholders to deliver the much-needed integrated solutions. Public-private partnership (PPP) has been hailed as the preferred route for developing smart and sustainable city projects around the world. Substantial evidence establishes that the strategic role played by the private sector is assisting cities in realising their smart and sustainable objectives.

Tapping innovative financial sources

The Indian government's smart city initiative has specified several possible funding sources—both conventional as well as innovative. Besides central and state funding, the list includes possible funding from multi-lateral and bilateral development agencies, pooled municipal debt obligation facilities, municipal bonds, real estate investment trusts and infrastructure investment trusts.

For specific needs, depending on the nature of investment required, cities may be able to tap a few other funding sources. Smart and sustainable projects centred on climate change mitigation and adaptation may access the Green Climate Fund (GCF) of the United Nations Framework Convention on Climate Change (UNFCCC). Recently, the National Bank for Agriculture and Rural Development (NABARD) was accredited by GCF as an implementing entity for undertaking climate change related projects in India.

Integrated approach in both planning and execution

A governance model with clearly defined leadership roles needs to be established to work around the complex city administrative structure. Cities may establish a nodal agency that will work together with city officials and policy-makers, in order to ensure that municipal strategies and urban planning targets are completely aligned with the city's overall smart and sustainable vision. This agency will be able to drive active collaboration and can serve as the single window for all stakeholders.

Institutional factors for achieving sustainable cities:
- Good governance
- Planning
- Legislation and policies
- Financing
- Public and private cooperation
- Education, training and development

The future city concept can be looked upon as a framework for implementing a vision of advanced and modern urbanisation. This vision envisages achievement of three goals, social equitability, economic viability, and environmental sustainability.

The inclination to adopt the smart city model is driven by the need to surpass the challenges posed by traditional cities. Overcoming these critical challenges in a systematic manner is crucial for cities, exploring a shift towards sustainable city development measures among all stakeholders: citizens businesses and the government. The quality of delivery from the foundational elements of traditional cities is enhanced by leveraging technology.

However, merely investing in improving a city's infrastructure is not sufficient. Projects that primarily focus on expanding capacity are not necessarily the most effective way of serving community needs, and neither are they sustainable in the long-term. Absence of a viable business model and oversight will challenge the economic feasibility as well as the effectiveness of such investments. Such projects will require a constant inflow of funds and assistance from the government as well as external agencies, and will still not ensure quality. Smart cities have an integrated system for collecting, measuring, collating, broadcasting city data and making it easily accessible to stakeholders for efficient, effective development, governance and management.

Opportunity landscape

In India, the urban population currently constitutes more than 30% of the total population and contributes approximately 60% share in India's GDP. It is projected that in the next 15 years, urban India will contribute nearly 75% of the national GDP. There is an immediate need for cities in the country to get smarter so as to deal with large-scale urbanisation and find new ways to manage complex processes, increase efficiency and improve the quality of life for citizens.

The government is increasingly focussing on the creation of various future cities to address rapid urbanisation, which brings major implications for businesses as they refocus their offerings, marketing and distribution models towards an increasingly urban customer base. With promising prospects for smart cities in India and an array of benefits for city stakeholders, smart solutions are expected to further drive growth in conventional engineering and design services as well as new services.

Here is a framework for future cities which can be considered:

- **Centralized command and control center**

A command and control center, also known as a situation room, centralizes the monitoring, control, and command of a city's overall operations. This is a command center to analyse the collected data from data grid and sensors and to allow seamless and mass distribution of critical instructions, notifications, and alerts.

- **Intelligent lighting**

Intelligent street lighting systems use cutting edge IoT-enabled solutions to help cities create more energy saving and safer urban environments through reduced CO_2 emissions and light pollution thus increasing liveability and overall safety.

- **Intelligent utilities**

The introduction of intelligent utilities like smart grids, smart meters and new ways of generating and transporting energy driven by the IoT are dramatically changing the scenario both in tapping new energy sources and in improving user experience. Smart water and electricity monitoring are helping save money by giving people more control over their home utilities, while efficient waste management are keeping cities cleaner.

- **Future ready governance**

Future ready governance enables easy two-way interaction with citizens, using technology to facilitate and support better planning and decision making for eliminating delays and frustrations in interactions with government. It is about transforming the ways that public services are delivered.

- **Intelligent traffic system**

Intelligent transport systems (ITS) are applications of advanced sensor, computer electronics and communication technologies which aim to provide innovative services relating to different modes of transport and traffic management and enable various users to be better informed and make safer, more coordinated, and 'smarter' use of transport networks.

- **Smart bus & bus shelters**

GPS-enabled buses with fleet tracking and smart bus shelters with intelligent display are enabling cities to improve the rider experience, reduce traffic congestion and road accidents and lessen the impact a fleet of buses has on the environment.

- **Smart parking**

Smart parking involves the use of low cost sensors, real-time data and applications that allow users to monitor available and unavailable parking spots.

- **Smart solid waste management**

Smart solid waste management with innovative integrated solutions like door to door RFID tags to monitor waste collection, smart bins and real-time vehicle tracking for garbage transportation help in removing household and commercial garbage, and dispose of it in an environmentally and economically sound manner.

- **Intelligent surveillance**

City intelligent surveillance includes city-wide camera and video system to help boost security, prevent crime, and control traffic. Linked with the centralized command and control center, city surveillance plays a vital role in assisting public safety and law enforcement organizations to monitor, manage, plan and execute the real-time management tasks effectively.

3. Clean and green cities – Creating liveable cities

It is projected that 40% of world population will be living in urban cities by 2030. Figures for India are even higher and are projected to be more than 50%. Though cities have problem, however the solutions also lies within the cities. For example, without proper waste management, solid waste causes severe pollution, spreads diseases and generates greenhouse gas emissions. It can also lead to urban flooding, which endanger lives and compromise livelihoods particularly for the poor and marginalized. Despite this, managing solid waste remains a low priority for most Indian cities, especially when compared to other sectors such as transport, water, and health services. Though in India, the present per capita generation of waste is only 300–400 gm/capita for medium cities and between 400–600 gm/capita for large cities, this is going to increase with the present trend of urbanisation and consumption patterns. Based on information available with the PwC team, the waste generation of Class I cities has been estimated to be around 80% of the total waste generation of the country.

According to the Indian Constitution, the responsibility for solid waste management is under the purview of the state government and the urban local bodies (ULBs). The rules designate ULBs as solely responsible to manage solid waste in their area and direct that they be responsible for the management of municipal solid waste within their territorial area and be responsible for the implementation of the provisions of these rules, and for any infrastructure development for collection, storage, segregation, transportation, processing and disposal of municipal solid wastes. Currently, waste management is one of the pressing issues that GoI is dealing with under its flagship programmes such as the Smart City Mission and the Swachh Bharat Mission. However, the waste management challenge is too big for the government alone to solve. It is the need of the hour for businesses to be involved. One of the large groups, through radical resource efficiency ensures waste is managed at every stage in the hierarchy. The group is also piloting GSM-enabled, solar-powered garbage compaction bins. These not only signal for a pick up when they are full, but also optimise the route of the waste collection vehicle.

Another large company has collaborated with a non-profit company to collect waste from door-to-door in five cities and segregate the waste at source. As a result, 80% of the waste is recycled and only 20% goes to the landfill. A cement company tied up with a non-profit to launch an award-winning waste management and cleanliness drive in Tamil Nadu.

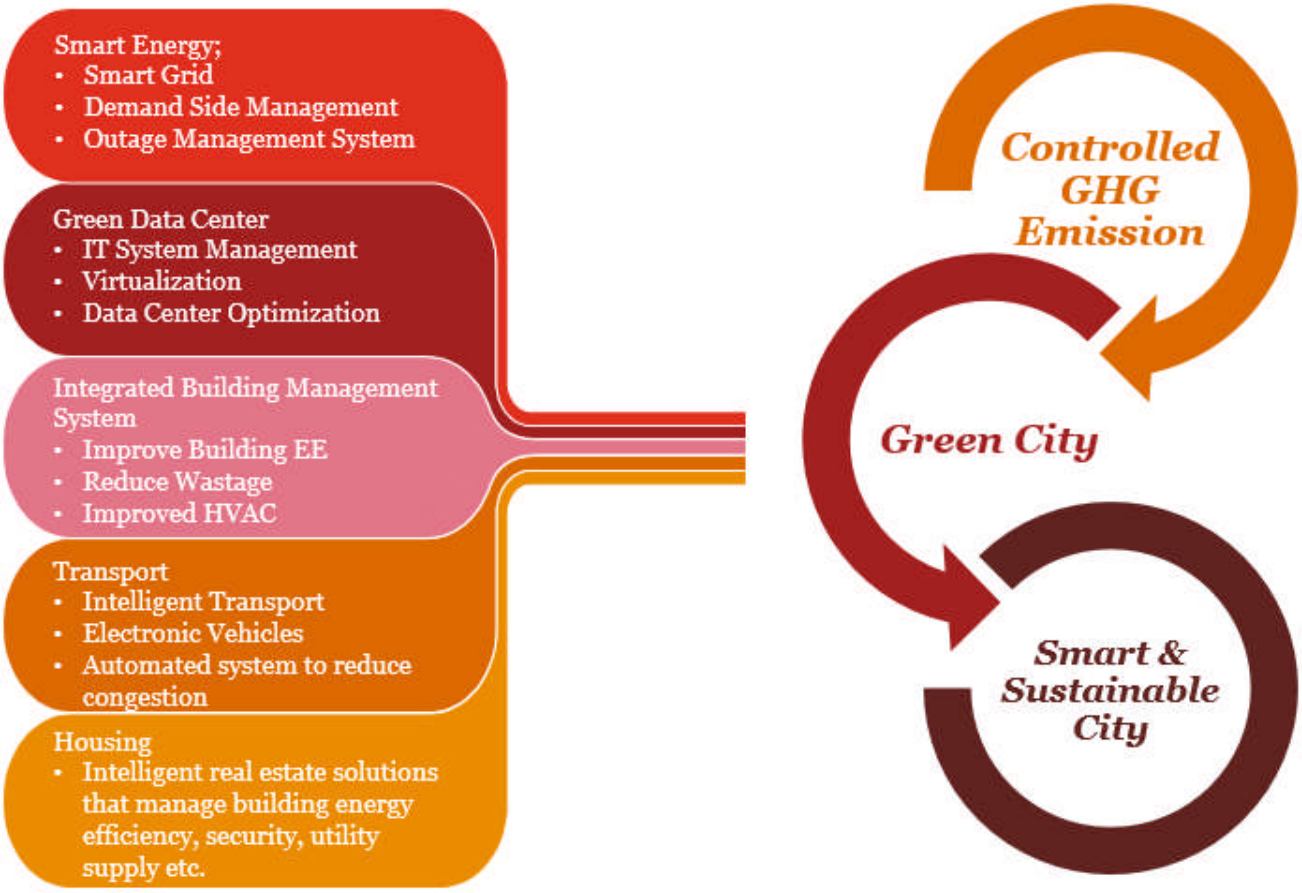
Case study

According to a PwC report on Waste Management, Pune reacted to its waste management challenges in a non-conventional approach. Pune is a fast-growing industrial and educational hub and the second largest ULB in Maharashtra. Similar to many upcoming cities, Pune also faced a major deficit in the demand and supply gap in its waste management services due to mismatch in population growth and argumentation of services. Pune Municipal Corporation's (PMC) approach towards waste management evolved in a comprehensive manner with careful selection of appropriate technology, working conditions and establishment of a 'social license' between the community and other service providers.
The city adopted both centralised and decentralised waste treatment methods wherein 73 TPD of waste is treated through biomethanation, generating 400 kWh of electricity daily which is used for street lighting, saving valuable energy charges to the tune of 137.9 lakh INR per annum. The biomethanation plants generate good quality manure which is fed to the public gardens resulting into savings to the tune of 46.2 lakh INR per annum. Nonetheless, PMC avoids daily transportation of almost 73 tonnes of waste to the Urali- Devachi site for disposal, saving 153.00 lakh INR annually.

To help provide a way forward for city planners, Asian Development Bank (ADB) is helping five Asian cities explore how they can better manage their solid waste. Here are five lessons learned that can be applied to other cities in the region.

- *Opt for technology within your budget*
- *Improve waste collection, haulage efficiency*
- *Fix landfill use*
- *Introduce public-private partnerships*
- *Implement long-term awareness-raising campaigns*

Further, it can be noted that ICT is a major catalyst in reducing GHG emission.



4. Transport Infrastructure – Nerve of future city

The infrastructure sector primarily comprises electricity, roads, telecommunications, railways, irrigation, water supply and sanitation, ports and airports, storing facilities, and oil and gas pipelines. Lack of or poor-quality, outdated infrastructure constrains both economic growth and quality of life. Logically, richer cities have better infrastructure as their population is able to pay for it: more mass transit coverage and better public transport systems; greater air transport capacity; more hospital beds, as well as more libraries per capita; better and speedier adoption of technology; a higher quality of living and more green space; and a much richer, more open and inclusive—generally, a much more dynamic—cultural environment. India is at an infrastructure crossroads. The potential to tap into international markets and bring in new sources of capital and expertise, and improve delivery capacity, has never been greater. India will invest as much as Rs3,96,135 crore in creating and upgrading infrastructure in the next financial year, finance minister Arun Jaitley said in his fourth budget speech.

According to a PwC report, India will require investment of USD 1 trillion over a period of next 5-7 years to meet the Infrastructure and housing demand. While approximately 70-80% of the demand will be from housing, the balance will be from Smart City projects, Infra-linked real estate projects like airports, railways and urban transport and the development of industrial corridors. Efficient and reliable urban transport systems are crucial for India to sustain high economic growth.

According to IBEF, India has the second largest road network across the world at 4.7 million km. This network transports more than 60% of all goods in the country and 85% of India's total passenger traffic. Road transportation has gradually increased over the years with the improvement in connectivity between cities, towns and villages in the country.

As cities sprawl, the share of non-motorised transportation reduces drastically creating increased reliance on private modes of transport. Urban design that fosters walking and cycling is under threat as sprawl based urban design is becoming the norm in big cities. The plans for new extensions and townships are still based on low-density, segregated land use with wide roads. India's transport infrastructure will grow at higher rates over the next five years on account of a string of measures, including increased spendings on road and rail projects, said BMI.

The road transport and highways ministry is seeking a budgetary allocation of Rs 86,000 crore for the next fiscal year to fund its highway expansion plan in line with the government's plans to boost public spending and create more construction sector jobs.

The amount sought from the finance ministry is almost Rs 29,000 crore, or about 50%, higher than what the roads ministry had received in the last budget. Most of this grant would be used for the government's programme to construct. The roads ministry has a target of constructing 10,000 km of highways this fiscal. Road construction pace has picked up this year to reach an all-time high of 27 km per day, which the ministry expects could be raised to over 30 km a day in the next couple of months as construction clearances for several new projects have already been received.

About CII

The Confederation of Indian Industry (CII) works to create and sustain an environment conducive to the development of India, partnering industry, Government, and civil society, through advisory and consultative processes.

CII is a non-government, not-for-profit, industry-led and industry-managed organization, playing a proactive role in India's development process. Founded in 1895, India's premier business association has over 8,300 members, from the private as well as public sectors, including SMEs and MNCs, and an indirect membership of over 200,000 enterprises from around 250 national and regional sectoral industry bodies.

CII charts change by working closely with Government on policy issues, interfacing with thought leaders, and enhancing efficiency, competitiveness and business opportunities for industry through a range of specialized services and strategic global linkages. It also provides a platform for consensus-building and networking on key issues.

Extending its agenda beyond business, CII assists industry to identify and execute corporate citizenship programmes. Partnerships with civil society organizations carry forward corporate initiatives for integrated and inclusive development across diverse domains including affirmative action, healthcare, education, livelihood, diversity management, skill development, empowerment of women, and water, to name a few.

The CII theme for 2017-18, **India Together: Inclusive. Ahead. Responsible** emphasizes Industry's role in partnering Government to accelerate India's growth and development. The focus will be on key enablers such as job creation; skill development and training; affirmative action; women parity; new models of development; sustainability; corporate social responsibility, governance and transparency.

With 66 offices, including 9 Centres of Excellence, in India, and 10 overseas offices in Australia, Bahrain, China, Egypt, France, Germany, Singapore, South Africa, UK, and USA, as well as institutional partnerships with 344 counterpart organizations in 129 countries, CII serves as a reference point for Indian industry and the international business community.

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