

## Smart cities –a step towards Sustainable urbanization

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### Abstract

Urbanization involves major shifts in the ways people work and live, and offers unprecedented opportunities for improved standards of living, higher life expectancy and higher literacy levels, as well as better environmental sustainability and a more efficient use of increasingly scarce natural resources. Urbanization in the emerging economies like India is taking place at an accelerated rate . Cities offer the lure of better employment, education, health care, and culture .Cities accommodate nearly 31percent of India's current population. However, with 2/3rds of GDP already generated in India's cities and rural to urban migration patterns accelerating, the country faces a critical challenge: managing this rapid urbanization in a way that enhances the livability of India's urban spaces .Urban growth in cities of India is uneven where some are growing faster than others. Current restructuring of urban areas to prepare themselves for the growing global economic demands and providing better infrastructural facilities for smooth functioning of neo-liberal agenda had changed the direction and tasks of urban planning. The Smart Cities Mission is an innovative and new initiative by the Government of India to drive economic growth and improve the quality of life of people by enabling local development and harnessing technology . Globally, the notion of smart cities is not new. There are multiple ideas, definitions and approaches to smart cities .This paper focuses on rapid and sustainable urbanization through smart cities in India .

Key words ; Smart city , Urban Growth , Indian cities ,smart economy

### Introduction

A city is an economy of agglomeration; it provides various advantages and opportunities. That is why we all flock to the cities in search of a better future. However, there would be limits beyond which things would become very difficult to sustain. "India cities are among the greatest things we have", Charles Correa, world -famous architect had said. Globalization, trade liberalization and technological changes altering the relations of production, distribution and consumption, has very substantial effects on city development.

Today, India is nearly 31 per cent urban with 2/3rds of GDP already generated in India's cities .The accelerating rural to urban migration, the country faces a critical challenge .The country struggles with a number of significant barriers that continue to hamper the development of urban infrastructure: complex leadership structures, land valuation challenges, capability gaps, and funding shortfalls .We also need to address the problems of drinking water ,housing , good infrastructure, solid waste disposal, flood management, storm water and sewerage system .We have to manage urban decay, traffic gridlock and a deteriorating quality of life for the citizens.

According to the report on 'India's Urban Awakening' by McKinsey Global Institute, in the next 20 years, India will have 68 cities with a population over one million – up from 42 today. That is nearly twice as many cities as all of Europe. Most cities in Europe and America were established

in the 19th century when there was easy availability of land, gas and water. India is a late starter and is far more crowded and complex. Therefore India requires a far more efficient and sustainable solution for servicing urban areas and can reap the benefits by using technology.

India is giving shape to its futuristic smart cities - world-class, self sustainable habitats with minimal pollution levels, maximum recycling, optimised energy supplies and efficient public transportation. India isn't the only country jumping on the smart cities bandwagon. New cities are popping up in countries like South Korea, the United Arab Emirates, and China. Cities in the past were built on riverbanks," Modi said in a June speech. "They are now built along highways. But in the future, they will be built based on availability of optical fiber networks and next-generation infrastructure." The Indian government is realizing the challenges arising out this issue and the vision of '100 Smart Cities' Programme is a step in that direction. Against this backdrop, this paper focuses on rapid and sustainable urbanization through smart cities in India .

Historically cities have usually been responsible for their own economic destinies. City authorities built walls and gates to protect their citizens, built the means to supply water and dispose wastes, developed city markets (and regulation) , merchant lodgings, ports and some land routes ,and erected the grand city monuments (government centres and temples ) to embody architecturally the power and prestige of the city. The rise of modern state increasingly smothered urban self-government . In the 19<sup>th</sup> century colonial empires of the European powers, it was cosmopolitan cities of extraordinary size that constituted a global imperial economy –Alexandria , Bombay ,Singapore, Hong kong Shanghai, Lagos and Buenos Aires. The city borrowed on foreign banks to forge linkage to other cities and penetrate hinterlands-as Bombay drove the first road up the Ghats to the Deccan interior of India , the first railway to connect the city and the Gangetic basin .Although India had long series of historical changes followed by uneven development of urban centres during different kingdoms, the colonial processes reinforced it in different ways and urban centres served as places of economic growth and socio-cultural development.

### Review of Literature

Smart and Smart (2003) found that the rapid growth of cities after 1800 was possible because with industrialization cities became centers of production.Sato (2005) analyzed the relationship among urbanization, fertility rate determination, and economic development. The urban sector is assumed to have better opportunities for education and more human capital-intensive production technology than the rural sector. Ravallion et al. (2007) found that the urbanization process has played a quantitatively important, and positive, role in overall poverty reduction, by providing new opportunities to rural out-migrants. Martinez-Vazquez et al. (2009) found a U-shape relationship between the level of urbanization and poverty .Chandrasekhar, and Montgomery (2010) found that substantial percentages of urban Indian households live in housing that falls well short of meeting basic needs, especially in non-notified 'slum' communities, although officially they live above the poverty line. Report UN-HABITAT, 2010, is a reminder that the Asia-Pacific region remains host to 505.5 million slum dwellers – over half of the world's slum population – and this is a major challenge for Asian cities (Dahiya 2012). Behind Asia's abundant slums is the problem of poor urbanization of poverty. Mohanty (2010) found that in the process of rapid urbanization in India, the failure of the rural poverty alleviation programs has led to migration of the poor from rural to urban areas. As the poor migrant laborers have low educational and technical skills, they end up in low-paying jobs. Ferré et al. (2011) found an inverse relationship between poverty and city size using data from eight developing countries (Albania, Brazil, Kazakhstan, Mexico, Sri Lanka, Thailand, Kenya and Morocco). Poverty was both more widespread and deeper in very small and small towns than in large or very large cities. Cali and Menon (2013), using data on Indian districts from 1983 to 1999, found that urbanization has a significant poverty-reducing effect in the surrounding rural areas.

Smart city is a “booming” phenomenon, which is still ambiguous in literature. In order to achieve the objectives established in the Kyoto Protocol, the Smart City concept was born. Although the term smart city has appeared since 1998 (Van Bastelaer 1998), it is still emerging. There are a range of conceptual variants such as Digital City and Intelligent City (Hollands, 2008). Anthopoulos and Fitsilis (2013) has performed an extensive review on smart city technological evolution and resulted in a corresponding classification with regard to the ICT that is installed in urban agglomerations. Neirotti et al. (2014) has provided two classification domains for smart city theory with regard to the exploitation of tangible and intangible urban assets, Lee et al. (2014) introduce their framework for smart city analysis, which is rather economic oriented and consists of seven dimensions: urban openness, service innovation, partnerships formation, urban proactiveness, infrastructure integration, and governance.

### **Evolution of Urban Development Framework in India**

Since independence, the trajectory of India's urban policy domain can broadly be divided in three phases. The 1<sup>st</sup> to 3<sup>rd</sup> Five Year Plans had a fragmented approach towards urban development. These three Plans were marked by efforts towards housing provisions, slum clearance and rehabilitation. The next three Plans (4<sup>th</sup> to 6<sup>th</sup> Five Year Plans) initiated a significant departure in policy; from slum clearance to slum improvement and up gradation. Emphasis was given to balanced regional development and development of small and medium towns, while containing the growth of metropolitan cities, making land available for provisioning of services and urban poor housing, and control of land prices. The 7<sup>th</sup> to 12<sup>th</sup> Plan accompanied India's economic liberalization, and the urban sector reflected this policy shift. Some key developments during this period included the opening-up of the sector to private participation, participatory approach in city planning, strengthening the link between urban growth and economic development and employment generation. In the Eleventh Plan government launched multiple schemes to facilitate urban renewal and development; Jawaharlal Nehru National Urban Renewal Mission (JNNURM); Urban Infrastructure and Governance (UIG); Basic services to the Urban Poor (BSUP); Urban Infrastructure and Development Scheme for Small and Medium Towns (UIDSSMT); and Integrated Housing and Slum Development Programme (IHSDP). The launch of three mega urban schemes in India during 12<sup>th</sup> Plan, i.e., Smart Cities Mission, Atal Mission for Rejuvenation and Urban Transformation (AMRUT), and Housing for All in urban areas, will set in motion the process of urban transformation to enable better living.

### **Main Challenges in Indian Urbanisation**

Indian cities- like cities in most parts of the world-are about conflicts and negotiations over amenities and resources: energy, land, water and increasingly even air. Quality of life in our cities is poor as the majority of citizens find it difficult to avail of sustainable livelihood opportunities and basic services. While the true scale of urbanisation is yet to unfold, Indian cities are struggling at the current levels. The main challenges as far as urbanization is concerned in India are:

### **Urban Poverty**

Urbanization does not necessarily result in a more equitable distribution of wealth and wellbeing. In many low and middle-income nations, urban poverty is growing compared to rural poverty. Specific aspects differentiate urban poverty from rural poverty. While urban residents are more dependent on cash income to meet their essential needs, income poverty is compounded by inadequate and expensive accommodation, limited access to basic infrastructure and services, exposure to environmental hazards and high rates of crime and violence. Therefore, urban poverty is not only income or consumption poverty although income or consumption poverty still occupies the most important place in the dimensions of poverty measurement. In addition to food and

shelter, human beings need education, health care, and a suitable living environment (Sen, 1985 and 1999). In our country, 25.7% of people in rural areas, 13.7% in urban areas according to the poverty line (i.e. about Rs 32 in urban areas and about Rs 26 per day in rural areas). But on the basis of the criteria laid down by an expert group of the Planning Commission led by Prof. S R Hashim, about 35 percent of urban Indian households live below the poverty line.

### Share of poorest quintile in national consumption

The indicator provides information about the distribution of consumption or income of the poorest fifth of the population. It is evident that, at all India level, the share of the poorest quintile in the total consumption is lower in the urban areas than in rural areas. During 1993-94 to 2011-12, in urban areas, the indicator showed a decline from 8.0% in 1993-94 to 6.97% in 2009-10, and then showed a slight improvement 7.1% in 2011-12. In rural areas, the share of poorest quintile steadily declined from 9.6% in 1993-94 to 9.1% in 2011-12.

**Table ;Share of poorest quintile in national consumption**

1993-94 (URP)		2004-05 (URP)		2009-10 (URP)		2011-12 (URP)	
Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
8.0	9.6	7.3	9.5	6.97	9.41	7.1	9.1

URP: Uniform Reference Period

Source: National Sample Survey Organization

### Affordable Housing

Housing is a basic service around which all others revolve. However, India lags significantly on this front. The urban housing shortage is around 18.78 mn dwelling units for the 12th Plan period. HPEC 2011 estimated that approximately 24 percent of India's urban population resides in slums. Census 2011 reported that 17.2% of urban households are located in slums. The percentage of slum households to urban households (slum reported towns) is 22.17%. Census recorded a 37.14% decadal growth in the number of slum households.

### Poor State of Basic Service Delivery

Inadequate coverage, intermittent supply, low pressure and poor quality are some of the key features of water supply in the urban India. During 2012, at all India level, 87.8 percent households had access to improved source of drinking water while 86.9 percent households in rural and 90.1 percent households in urban area had access to improved source of drinking water. According to the 2011 census, only 70.6 percent of urban population is covered by individual water connections compared with China (91%), South Africa (86%) and Brazil (80%). Duration of water supply in India cities is only between one to six hours. Only 21 percent of the waste water generated is treated compare with 57 percent in South Africa

The problem of sanitation is much worse in urban areas than in rural areas due to high population density and congestion. The sewerage network across cities is also very poor. According to 2011 census, about 13% of urban population defecate in the open, about 37% are connected by

open drains and 18% are not connected at all. The NSS 2012 revealed 43.4% of households at all India level had no latrine facilities. The NSS 2012 shows that 59.4% and 8.8% households in rural India and urban India respectively had no access to sanitation.

The air quality has also deteriorated sharply carrying with it concomitant health costs. The per capita emission levels in India's seven largest cities have been estimated to be at least three times than WHO standards. Highly inadequate and poor quality of urban roads and transport system lead to significant lags in productivity.

India is on the "brink of an urban revolution" with its population in towns and cities expected to reach 600 million by 2031, according to a new UN-backed report which pegged the gap in urban infrastructure investment in the country over the next 20 years. Addition of people to urban India over the next 20 years will put enormous stress on the urban system if not managed well. Left unattended, the risk from the ongoing deterioration in the quality of life in urban India will compromise productivity, deter investors and eventually curtail economic growth. This requires comprehensive development of physical, institutional, social and economic infrastructure. Development of Smart Cities is a step in that direction. The changing physical, economic, and technological environment across the globe necessitates smart cities, which help to enhance liveability, workability, and sustainability.

### Meaning of Smart City

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 smart city is the one which uses the medium of digital technology to upgrade performance by optimum utilization of resources. With integrated digital technologies playing a key role in such a process, a smart city aims to engage more effectively with its citizens by increasing efficiency, transparency and accessibility of public services. It is a city where Information and Communication technology (ICT) forms the core of administration and governance. Also, to what extent can this vision turn into a successful venture will largely depend on how actively the residents and visitors of the smart city will utilize the technologies implemented.

Everything from a smart city's governance to its public transport network, water distribution and waste-disposal systems would use technology to provide better services to residents and make efficient use of resources. Smart Cities can be identified along six main dimensions (Giffinger, R et al, 2007) : Smart Economy - Innovation and Competitiveness ; Smart Mobility- Transport and Infrastructure ; Smart Environment - Sustainability and Resources ; Smart People - Creativity and Social Capital ; Smart Living - Quality of Life and Culture ; Smart Governance - Empowerment and Participation .

Modernizing the cities will also attract huge public private investment and create new opportunities for jobs. The smart cities mission seeks to ensure basic infrastructure services to enable a decent quality of life in urban pockets and a clean and sustainable environment and adoption of smart solutions. Officials claim smart cities mission seeks to fetch the benefits of urban development to the poor through promotion of public transportation and enhanced access to public spaces. The improved urban environment under the mission will give fillip to economic activity which in turn benefits the poor through increased employment and livelihood opportunities. The benefits of smart cities would be ;Increased opportunity for domestic investors and foreign investors; Huge FDI as a result of investor friendly policies ; Higher GDP contribution from smart cities ; Cost reduction due to adoption of smarter initiatives ;Creation of crores of jobs and ;Annual revenue generation for government .

The National Conclave on Building Smart Cities organised by GOI in September 2014 had stressed on the following three key aspects for smart cities: Competitive (attracts investors and

residents), Sustainable (social, financial and environmental) and Capital Rich (human and social). Experts say India's smart cities should have a plan for economic growth, rather than only on technology implementation. "Each Indian smart city should develop or update a strategic plan for growth, one that has clear goals toward job growth and productivity, economic inclusion, and sustainability and resilience," says Brookings Institution, a think tank.

Cities around the world, including in developed countries like the U.K. and the U.S. and Japan, are working toward smartening up their existing infrastructure, while China and Korea have created brand new smart cities. Some Indian states are already experimenting with creating new cities with "smart" elements. These include the Gujarat International Finance Tec-City, or SmartCity Kochi, in the southern Indian state of Kerala.

Approaches to developing Smart Cities Broadly, two approaches can be adopted for developing smart cities – a) brownfield approach which involves upgrading existing cities to make them smarter. b) greenfield approach which involves creating a new smart city within or in the vicinity of an existing town or urban centre. This approach has been adopted on a small scale by some States in India . Number of cities that are nominated for Smart city & AMRUT in India respectively so far are like this: A&n (1&1), Andhra Pradesh (3&31), Arunachal Pradesh (1&1), Assam(1&7) ,Delhi(1&1),Karnataka(6&27),Kerala (1&18),Uttar Pradesh(13&54), WB(4&28) Maharashtra (10&37)etc. Year 2015 began on a futuristic note for India, When India signed three agreements with the US for developing smart cities in Ajmer, Allahabad and Visakhapatnam, with the government saying that the agreements would make significant contribution to building such cities in the country. French President Francois Hollande offered his country's assistance in the development of at least three smart cities -- Chandigarh, Puducherry and Nagpur.

### Conclusion

Governments have created strategies for smart city transformation in order to improve operational efficiencies, maximise environmental sustainability efforts, and create new citizen services. The inclination to become a smart city is driven by the inspiration to surpass challenges posed by traditional and conventional cities. Overcoming these critical challenges in a systematic manner is critical for cities inspired to shift towards more sustainable measures among all stakeholders.

Indeed, the vision of '100 smart cities' will give a huge boost to economic growth , but at the same time, India must not forget its socio-economic challenges such as rural-urban gap, class differences etc. A nation can only progress if it takes its population along. Unlike many countries that are grappling with aging population and rising dependency ratios , India has a young and rapidly growing population –a demographic dividend . but India needs thriving cities if that dividend is to payout . Lastly, while it is a true that Technology can be considered as an enabler of many things, but we must not forget that a city nurtures people from all diverse backgrounds and communities has a soul to it. Can a smart city strive for both of these factors?

Few suggestions are made to successfully implement government's vision of creating successful smart cities in India ; Focus on the 4 P's: Public-Private-People Partnership ;Integration of organizations, government bodies, and the citizens. Active participation by state governments; Strengthen big data initiatives; Resource maximization; Make citizens smart by informing them and creating awareness; and Create flexible and shared spaces for community development.

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