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CHALLENGES AND OPPORTUNITIES FOR RE-IMAGING INDIA'S URBAN FUTURE THROUGH SMART CITIES

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1. INTRODUCTION

Global Urbanization rate are alarming very rapidly. The proportion of people living in the urban areas is increasing continuously. Across the globe, cities account for most of our carbon emissions and energy use. While cities cover 3% of the earth's land surface, they create more than 70% of all carbon emissions, mainly from buildings, energy and transport. They also consume 78% of the world's primary energy. Currently, 54% of all people live in cities – a percentage that is projected to rise to 68% by 2050 (*UNDESA, 2019*). As the population grows, so does new construction, resulting in even higher energy consumption and carbon emissions. For the world's growing urban populations, the "new normal" must mean better and sustainable places to live and work, and ways to travel, for all – not just a privileged few *(Barbara Norman and Peter Newman, 2021)*[1]. Cities can use the plan to make more "inclusive, resilient, sustainable, and safe" settlements, as SDG 11 requires (*SDG, 2030*).

The India's urban population reached about 420 million or 33% of its total population in 2015. This is expected to almost double to 800 million by 2050, with close to 400 million more people living in towns and cities by 2050, one in every two Indians. By 2031, 75% of India's national income is expected to come from cities and the majority of new jobs will be created in urban areas (*Tewari, M., Godfrey. N., et al*). In 2020, the most crucial problems witnessed in India's urban sector were the growing informality — in the form of slums and unorganized economic activities — along with violations of development norms, deterioration of air and water quality, depletion of natural resources, traffic and transportation inadequacies, mismanagement of solid and liquid waste, erratic electricity supply, waterlogging, loss of heritage and culture, lack of rural-urban integration, growing intolerance, and violence and crime (*Rumi Aijaz, 2021*).

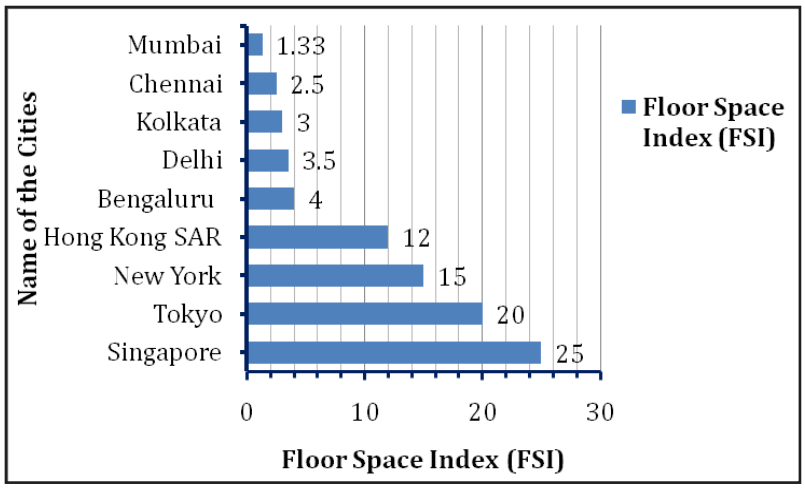
The Hon'ble Prime Minister, Government of India, Mr. Narendra Modi's call for re-imaging of urban planning and development to make cities and towns healthy and liveable. Metropolitan cities are engine of economic growth. But they strived by unplanned or inadequately managed urban spatial expansion, in combination with unsustainable production and consumption patterns and a lack of capacity of public institutions to manage urbanization, can impair sustainability due to urban sprawl, pollution and environmental degradation. One of the challenges for Indian cities is retrofit development; re-zoning and re-densification of old part of the cities with smart technologies.

2. PERMISSIBLE FLOOR SPACE INDEX (FSI) IN SELECTED CITIES

Rapid urban transmission in Indian mega-cities such as Mumbai, Delhi, Bengaluru Kolkata, and Chennai, etc., there is a challenge for spatial planners, policy makers and bureaucrats to decide densify and build cities vertically or go horizontal by forcing their residents to move out. This is often accompanied by the building up of the vacant lands as well as densifying the plots within

1 https://www.urbanet.info/reimagining-cities/

the city. Existing land use regulations and land market institutions play a powerful role in reducing the efficiency of land use in Indian cities. The six major urban agglomerations – Delhi, Mumbai, Kolkata, Bengaluru, Hyderabad and Chennai – had about 74 million inhabitants in 2011. Cities are continuously expanding in terms of geographical spread consuming agricultural lands for urban use. Presently, the major impact of current land regulations, such as overly restrictive Floor Space Indexes (FSI) or Floor Area Ratios (FAR) that promote low density in the amount of built-up floor space per unit of land area, especially in urban cores where there is high demand. The FSI is very low in Indian cities comparing with other global cities (Fig. 1).



3. RE-IMAGING URBAN FUTURE IN SMART CITIES IN INDIA

The present urban challenges are climate change, population growth, demographic change, urbanization and resource depletion imply that the World's great cities need to adapt to survive and thrive over the coming decades. There is an increasing interest, therefore, in the role that information and communications technologies could play in transforming existing power-hungry metropolises into low-carbon cities of the future (Box 1). The Government of India have been selected 100 Smart Cities, the Smart Cities Mission aims to develop cities that provide core infrastructure and apply 'smart' solutions to give its citizens a decent quality of life to its citizens, and a sustainable environment. The Smart Cities Mission has been allocated Rs. 6,450 crore in 2021-22, which is an annual increase of 42% over the actual expenditure for 2019-20 shown in Table 1.

Table 1: Status of Smart City Projects (as on January, 2021) (in Rs crore)

Project status	No. of projects	% of projects	Cost	% of cost
Total Proposed	5,151	-	2,05,018	-
Tendered	788	15%	35,309	17%
Work orders issued	2,441	47%	1,06,187	52%
Completed	2,187	42%	35,413	17%

Sources: Unstarred Question No. 1020, Ministry of Housing and Urban Affairs, Rajya Sabha, February 10, 2021; PRS.

A smart city should enable every citizen to engage with all the services on offer, public as well as private, in a way best suited to his or her needs. The emerging patterns for smart cities are reform linked programme with GIS, GPS, GPR planning, cloud computing, big data analytics and virtual studio with computerized data center etc. Smart cities are envisioned to have sustainable infrastructure to enhance residents' comfort at the same time ensuring environmental safety. Smart city prioritizes transportation and accessibility, enhances social services and sustainability, and allows its residents a voice. The most important goals of a smart city are to enhance coverage efficiency, lessen waste and inconvenience, enhance social and financial quality, and maximize social inclusion. But Smart city is not a tailor-made solution, it needs to capture any regions and its

citizen's aspirational goals. It has to access the needs and respond to the diversity of socio-cultural-environmental aspects.

Box 1: Will smart cities be equitable cities?

For more on migration, integration, and the role of cities, see People on the move: Global migration's impact and opportunity and Europe's new refugees: A road map for better integration outcomes, McKinsey Global Institute, December 2016. A smart city is not automatically an equitable city unless its leaders take care to make it so. Some critics assert that the entire push to make cities smart is mainly about making life more convenient for the affluent. Young and digital-savvy populations are natural users of these technologies, but older and poorer demographic groups on the wrong side of the digital divide may be left out of the benefits—and left feeling that they have little say in the direction their city is taking. But cities cannot be truly smart without broad adoption. Being inclusive is not only a social goal but also a driver of results, since the benefits of smart systems multiply as more people use them.

Several global agencies have efforts under way to create standards and guidelines for inclusive city design, such as the Smart Cities for All tool kit launched in 2017 by G3ict, an initiative launched by the UN Global Alliance for ICT and Development. The initiative proposes global standards on digital inclusion, a model procurement policy drawing on international accessibility standards, and a database of smart technology initiatives bridging the digital divide.

Source: McKinsey Global Institute (MGI) (2018)

4. CHALLENGES FOR REIMAGING URBAN FUTURE IN INDIA

4.1 Technology for Urban Development

A digital revolution is currently underway; technology permeates every aspect of our society including urban planning and development. Currently, Under the Smart Cities Mission (SCM) about 100 cities is under implementation stage. The mission aims "to drive economic growth and improve the quality of life of people by enabling local area development and harnessing technology, especially technology that leads to smart outcomes. Few biggest technologies challenges that are shifting economic landscape in urban areas such as Artificial Intelligence, IOT, Block Chain, Cyber security, Machine learning and Building automation etc and these smart applications playing very important role in reimaging urban futures in Megacities in India.

4.2 Future Mobility

The challenges of future mobility in reimaging urban India mainly focused with Electrical vehicles, Public transit, NMT, Public Bike sharing, Rapid rail system etc. Vehicle plays a vital role in our economic and social prosperity. Urban transport emerges as one of the chief contributors to the high-carbon growth associated with India's urban centres. Road Transport is the largest CO_2 emitter in transportation sector. Smart city technologies can stretch transit investment, helping cities get more out of their existing assets or embedding intelligence into expansions and new assets. Adding IoT sensors to existing infrastructure can help crews perform predictive maintenance on equipment, fixing problems before they turn into breakdowns and delays.

The National Urban Transport Policy of India, 2006 clearly lists out the role of NMT as a last mile connector for the urban transport systems and as an independent mode for short distances (*NUTP, 2006*). Cities are being designed in a way that amenities and most services are within a 15-minute walking or cycling distance, creating a new neighbourhood approach. Cities work towards offering digital, clean, intelligent, autonomous and intermodal mobility, with more walking and cycling

spaces, where transport is commonly provided as a service. The Ministry of Housing and Urban Affairs, Government of India has already come up with various initiatives such as 'transport4all', 'cycle4change' and 'streets4people' etc.

4.3 Urban Infrastructure

Cities around the world face daunting infrastructure challenges, but smart city technologies change the nature and economics of infrastructure. Technology reduces the physical and transaction costs of gathering information on usage patterns. Smart city applications become more effective when paired with low-tech measures and complementary policy moves. The challenges are Network, 5G, Utilities, Energy - solar power, Smart Lighting etc. and invest in infrastructure – physical, energy, digital and telecoms – that supports effective transformation.

4.4 Community Development

Social inclusion should be a key pillar of urban growth and development for the cities of the future, bearing in mind the three building blocks identified by World Bank: spatial inclusion (providing affordable housing, water and sanitation), social inclusion (expanding equal rights and participation) and economic inclusion (creating jobs and offering citizens opportunities for economic development). Many digital tools now exist to help residents engage with their government, access job training and opportunities, and make personal connections with one another. These areas have great possibilities for creating a sense of belonging in the impersonal environs of a city, but they are relatively underdeveloped. Unemployment is also a loss of productive potential. Recent data suggests that unemployment rose to 6.1% in 2018. The self-sustainability, employability and governance at community level playing very crucial role in reimaging India's urban future.

4.5 Safety and Security

Cities are leveraging artificial intelligence (AI) to ensure safety and security for their citizens while safeguarding the privacy and fundamental human rights. Employment, policy, funding and governance - Cities strive to promote awareness of the importance of data privacy and preparedness for the impact of cyber-attacks since data will be an important city commodity. The various data flows and exchanges between network components and the IoT should be subject to effective risk management in assessing and responding to threats within smart cities. There is challenge for big data analytics and management in smart cities are comprised of a significant number of different sensors, interaction devices, network access points, specialized hardware and software.

5. OPPORTUNITIES

- Smart city technologies can make daily commutes faster and less exasperating. Cities that deploy smart mobility applications could cut commuting times by 15–20 percent an average;
- Using technology to transform urban environments in a more meaningful way will require new thinking about governance. Technology is only as effective as the entity that puts it to work;
- To adopt right pattern of urban development for drawing on urbanist principles, such as better land-use, urban design, transport planning, and housing policies and practices, will make the vision of net zero carbon cities that much easier to realize – requiring fewer EVs, heat pumps, building retrofits, batteries, and solar panels to achieve the same result;
- The opportunity is to create a net-zero integrated energy system in cities. This system can seamlessly facilitate near-constant interactions between energy infrastructure, buildings and electric vehicles;

- Clean electrification makes the entire systemic efficiency concept ignite, moving the biggest energy-using sectors in cities – buildings and mobility – to the electricity vector, while supporting the development of renewable; and
- The combination of efficiency, clean end-use electrification, active energy management, integrated design and digital technologies can significantly reduce building energy consumption and emissions.

6. CONCLUSIONS

The discourse on re-imagining India's urban future should not be limited only to population size, but must also encompass governance, planning and management. Digital solutions are only one part of the full tool kit for making a city great. But they are the most powerful and cost-effective additions to that tool kit in many years. Smart technologies on their own cannot solve all the bad planning of the past, severe housing shortages, or the absence of fundamental infrastructure and essential services. City government has a dual role to play. It has to execute some intelligent solutions on its own, and it has to orchestrate and enable the evolution of a broader ecosystem. There is a need for major urban infrastructure initiatives to encourage more compact, efficient urban forms, in part by removing biases against compact forms. Given the scale of India's anticipated urban growth, there are immense challenges but also a tremendous opportunity to get India's urban process right to enable a more robust, resilient and inclusive prosperity. On the other hand the digital revolution is offering an unprecedented window of opportunity to improve the lives of millions of urban residents today and tomorrow. But there is no guarantee that the rapid diffusion of new technologies will automatically benefit citizens across the board.

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