# CHALLENGES & OPPORTUNITIES OF BUILDING SMART AND SUSTAINABLE CITIES IN INDIA

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## Abstract

*A smart and sustainable city is any urban area which uses technology to enrich the quality of life for residents while also reducing environmental impact and promoting economic development. These cities are designed to be resilient and adaptable to the challenges of the 21st century, such as rapid urbanization, population growth, and climate change. In India, the government has introduced a Smart Cities Mission which encompasses developing of 100 smart cities across the country. Implementing smart city initiatives can help improve the survival, resurgence and sustainability of Indian cities in the digital age. Moreover, this paper presents a comprehensive analysis on the need, importance, challenges and opportunities of sustainable smart city concept with a view focusing on the future of India.*

## Introduction:

A smart-sustainable city is a city which utilizes technology and data to enrich and enhance the efficiency and sustainability of its infrastructure and services, while also promoting the well-being of its residents. The purpose of a sustainable smart city is to reduce the environmental impact of urbanization, enhance the quality of life for residents, along with creating a more resilient and equitable community. This includes improving infrastructure, transportation, and services such as healthcare and education, as well as using data and technology to make city systems more efficient and responsive to citizens' needs. Implementing smart city initiatives can help improve the survival, resurgence and sustainability of Indian cities in the digital age.

One of the key features of a smart-sustainable city is the usage of data and technology to make city systems more efficient as well as receptive to citizens' needs. This includes using sensors and other data-gathering devices to monitor traffic, air and water quality, and other aspects of the city's structure. The data collected is subsequently analysed to identify problems and opportunities, and to make decisions about how to improve the city.

Another important aspect of a smart-sustainable city is the use of digital platforms along with various tools to engage citizens in decision-making and

problem-solving. This includes using social media, mobile apps, and other digital tools to gather feedback and input from residents, and to involve them in the design and implementation of city projects and programs.

A sustainable city, on the other hand, is an urban area that is designed to be environmentally friendly and to promote long-term environmental, economic and social sustainability. This includes incorporating green infrastructure, such as parks and gardens, promoting sustainable transportation, and using renewable energy sources. Additionally, sustainable cities also prioritize waste management, water management and also ensuring that it's inclusive and equitable for all of its citizens.

Smart and sustainable cities are interdependent, a smart city relies on a sustainable infrastructure, and a sustainable city needs a smart infrastructure to ensure its long-term viability. In India, the government's Smart Cities Mission is focused on the development 100 smart and sustainable cities across the country, which can act as a model for other cities to emulate, helping in the overall development and sustainability of the country.

Smart and sustainable cities are going to be the prospect of India's urban development. They are designed to be resilient and adaptable to the challenges of the 21st century, while also promoting long-lasting environmental, economic and social sustainability. With the right policies, strategies and technology, cities can be transformed into smart and sustainable cities that provide improved quality of life for residents and promote economic growth.

**Smart and Sustainable Cities on A Rise in India**

The development of sustainability and smart cities in current times is a trend that has been driven by several factors. One of the main drivers has been the increasing awareness of the effect of our activity on the environment and our obligation to reduce this impact. The concept of a "smart-city" implies usage of technology in a way to improve the competence and sustainability of a city, like using data and analytics to optimize traffic flow and reduce energy consumption.

In India, as of 2021, there are 100 smart cities that have been selected under the Smart Cities Mission, a flagship program initiated by the Indian government in the year 2015. The program targets to set up 100 smart cities across the country by using technology and data to improve the living ability, workability, and sustainability of urban areas. Out of 100 cities that have been selected under the Smart Cities Mission, seven have made significant progress with many projects accomplished. The mission will end in mid of the year 2023. Bhopal, Surat, Udaipur, Bhubaneswar, Indore, Varanasi, and Ahmedabad have completed around 70-92% of their projects.

The Smart Cities Mission is being implemented in three phases. As of 2021, the first phase of the program is complete and 20 cities have completed their smart city plans. The second phase of the program is underway, and 27 cities have completed their smart city plans.

The smart cities are selected based on the smart city proposal (SCP) score, which is determined based on the city's vision, strategy, implementation plan, and financial viability. The smart city proposal score is calculated through the Ministry of Housing and Urban Affairs (MoHUA), and the cities with the highest scores are selected for the program.

According to the ministry of housing & urban affairs data, more than 3,000 projects have been proposed under the smart city mission, worth more than Rs. 2.5 lakh crore, out of which around 1,800 projects have been completed or are under implementation. These projects range from smart transportation solutions to waste management, energy efficiency, and affordable housing.

Recently, the Ministry of Housing and Urban Affairs (MoHUA) systematized a series of events and conferences to explore ideas, innovations, and partnerships for the impending route of smart urban development in India. The conference focused on 5 sub-themes including re-imagining public open spaces, digital-governance, climate smart-cities, innovation, and smart finance. This conference aims to share the learnt knowledge and data from one smart cities or town to the others in India.

However, the implementation of smart cities is still in its initial stage in India, therefore the real impact of these smart city mission on the lives of the citizens is yet to be seen. The implementation and the successful accomplishment of the smart city mission will not only be determined by on how well it is implemented, or how it is maintained, but will determined by how well it is integrated with other urban development programs.

## Objective:

1. To analyse the current scenario of smart and sustainable cities in India
2. To find out the factors that are responsible for the rise of smart & sustainable cities in India
3. To identify challenges & opportunities in building resilient cities in India

## Research Methodology:

The present research paper is prepared mostly with the support of secondary data and sources like journal articles, magazines, conference proceedings, past literature, government reports, newspapers, and other related information data source. According to the objective of this study, all the data which has been collected is analysed and the research is designed in a description manner.

## Review of Literature:

(Sinha, 2016) The article discusses the government of India's project on Smart Cities, which is aimed at transforming growing cities into smart cities for a better standard of living for the growing population and to keep the economy growing. The author emphasizes the importance of this project for future generations and the need to ensure liveable smart cities for them.

(Aman Randhawa, 2017) The article addresses the problem of rapid urbanization in India's Tier-1 cities and its negative effect on quality of life. The government's initiatives, including the Smart City concept, aim to address these issues but the study shows that the current implementation lacks consideration for the environment which is crucial for sustainable city development.

(Shruti, 2019) This paper reviews frameworks for smart & sustainable cities and finds a gap amongst smart cities and environmental sustainability. The Ministry of Urban Development in India has proposed smart city guidelines with 14 environmental indicators. The paper highlights the need for a framework for smart & sustainable cities in India and suggests a four-step framework: indicator selection, benchmarking, assigning weights, and development of a sustainable smart cities environmental index. The framework targets to make sustainable smart cities achievable in India.

(Dwivedi1, 2019) Research identifies and prioritizes barriers to smart city development in India and aims to improve sustainability for policymakers. 31 barriers were found through literature review and confirmed by experts, categorized into six categories: Economic, Governance, Social, Environmental, Technology, and Legal or Ethical. This study determines the importance of these barriers and can help the government address them for successful smart city initiatives in India.

(Ms Sushmita Chakraborty, 2020) The research article centres on the notion of Smart Cities and the different views on it by various practitioners. It also discusses the six magnitudes of Smart Cities that encompasses various technology, like the Internet of Things. The author concludes that India, being under the governance of Prime Minister Mr. Narendra Modi, is making an investment to create 100 new Smart Cities. The goal is to improve the economy and reduce global warming while providing a better standard of life for the citizens of India.

(Praharaj, 2021) The article presents a statistical breakdown of the Smart Cities Mission's sectoral focus and budget allocations, revealing a bias towards digital urban renewal projects. This focus on "smart cities" results in social divergence and redevelopment. The article provides important lessons for urban planning in ICT-driven urban regeneration, while a examining the question of inclusion and sustainability in smart city initiatives.

**Research Findings:**

**Challenges & Opportunities in building resilient, smart & sustainable cities in India:**

**Challenges:**

**1.Financing and funding:** Building resilient, smart & sustainable cities in India requires significant investment in infrastructure and technology. Sourcing funding and financing for these projects can be a major challenge.

**2.Lack of integration and coordination:** Developing sustainable smart cities in India requires coordination and integration across multiple sectors and levels of government. This can be difficult to achieve due to the complex nature of urban development and the lack of clear lines of responsibility.

**3.Limited capacity and expertise:** Developing sustainable smart cities in India also requires specialized knowledge and expertise in areas such as urban planning, technology, and sustainability. Limited capacity and expertise within government and other organizations can make it difficult to put into action sustainable smart city projects effectively.

**4.Data and Privacy concerns:** Collecting, managing, and using of data is of great significance in the aspect of developing these smart and sustainable cities, but it can also raise concerns about privacy and security. Ensuring that data is collected, stored, and used in a way that respects individuals' privacy rights is important to gain acceptance of the smart city initiative.

**Opportunities:**

**1.Economic development:** Building sustainable smart cities in India can create new jobs and business opportunities in areas such as construction, technology, and renewable energy. This can help to drive economic growth and reduce poverty.

**2.Global leadership:** India has a large population and a rapidly growing economy, and developing

sustainable smart cities can serve as an example for other developing countries in how to create livable, efficient, and sustainable urban environments. This can help India to become a leader in the global push for sustainable development.

**3.Innovation and technology:** Developing sustainable smart cities in India can also create opportunities for innovation and the using of various technologies, such as the development solutions, data integration, new age construction, smart and ethical usage of data and analytics to improve urban planning and management in order to build these smart cities.

**4.Attracting foreign investment:** Developing sustainable smart cities can also attract foreign investment and help to boost the country's international reputation.

In order to fully leverage these opportunities, it is important to have a strong collaboration between the government, private sector, and citizens is essential for the successful development and implementation of sustainable smart city projects.

**Conclusion:**

Smart and sustainable cities are both very crucial for building resilient cities in India's future. Smart cities can assist in decreasing the effects of climate change by decreasing greenhouse gas emissions and improving overall efficiency, while sustainable cities can help to protect biodiversity and ecosystems, and reduce waste and water consumption.

Sustainable smart cities are of paramount importance in India, particularly in light of the country's rapidly growing population. Urbanization in India is projected to accelerate in the coming decades, with the majority of the populace is

estimated to settle in urban areas by the year 2050. This presents significant challenges for the country in terms of providing adequate housing, transportation, and public services for its citizens. Sustainable smart cities offer a solution to these challenges by using technology and data to increase the efficiency and the living ability of urban environments, making them more resilient and able to accommodate population growth.

Nevertheless, the execution of the smart & sustainable cities mission in India is definitely pose its own challenges. One of the leading challenges is the lack of infrastructure and the funding needed for these initiatives, as well as the lack of capacity and expertise among local governments and other stakeholders. Moreover, there is a deficiency in data as well as the knowledge about the impacts that the new smart and sustainable cities would have, which makes it difficult to measure and evaluate their effectiveness.

To overcome these challenges, the Indian government needs to invest in building of smart and sustainable cities, and provide training on capacity building and overall development for local governments and other stakeholders. This can be done by providing funding and technical assistance for smart city initiatives, and by creating a knowledge platform to share information and best practices among stakeholders. Additionally, the Indian government needs to work with the private sector, government bodies, non-government organizations, and international organizations to build resilient cities which are smart and sustainable for the future of India.

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