The Smart City Mission in India And Prospects of Improvement in The Urban Environment

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Abstract The skewed and rapid urbanization in developing country India has resulted in fissiparous and multipronged problems at different levels starting from city or perhaps regional levels to local or perhaps neighborhood in the lack of good urban planning and regulatory mechanism the urban environment adversely. Many issues that have been elevated in recent times are related to traffic congestion, reduction in the total amount of green cover, peri-urban settlement typology that has ultimately affected the natural ecosystem, and the surrounding areas' environment adversely. These prevailing issues will worsen over the coming decades as the urban population increases at a phenomenal rate, thus highlighting the urgency to take appropriate actions. The growing urban environmental crisis has even more aggravated because of the constrained budgets and inefficient institutional machinery without clarified responsibilities. India is a nation of diverse geographical and climate zones with most of the climate, geographical conditions, and ecosystems of the globe found in various regions of the nation. These factors also affect the design, quality, and development of the urban built and unbuilt environment. The previous studies highlighted the role of meticulous, coordinated. They planned the development of urban cities and centers that are also self-sustaining and ecological to solve existing and upcoming challenges. The Smart City Mission launched by the Government of India is deemed the solution and emerging planning strategies to tackle and mitigate the issues of unregulated growth and rapid urbanization of the city currently and realize the objectives of the sustainable future. The unregulated urbanization with no due consideration to the ecosystem has turned into a significant source of deterioration of the quality of urban environment, a recurring and emerging disaster like urban flooding, etc. And a significant cause of global climate change. This paper attempts to assess and evaluate the significance of smart city projects and missions in planning and developing cities that could deliver a much better urban environment and help achieve the goal of environmental resilience in the nation.

Keywords: Smart City Mission, Sustainable Development, Urban Environment, Urban Planning.

1 Introduction
The massive urbanization in developing countries like India brings about opportunities for economic growth and development; on the one hand, it also brings many accompanying problems. Hence the process of urbanization itself is sometimes blamed for contributing to climate change and other global
environmental burdens [1]. The large-scale and rapid urbanization have further led to chaos in the absence of adequate urban planning and management [2]. Additionally, major metropolitan cities' massive population explosion put a burden on already stressed water and sewer infrastructure, existing transportation systems, and overburdened housing stock [1]. Resulting in unplanned growth problems, illegal squatters, and settlements that pose a significant challenge to the quality of the urban environment [2]. Constantly deteriorating environmental conditions are as well a reality in various metropolitan cities across the county, and millions of additional city dwellers have the possibility of further exacerbating a predominantly horrific condition [3]. The many cities throughout the Indian sub-continent have alarmingly high rates of carbon dioxide and other greenhouse gas emissions. They are anticipated to rise more quickly in a couple of decades; thus, terribly degrading the ecological conditions and exhausting all of the natural resources of and around the city [4].

By the year 2050, globally, approximately two billion more everyone is anticipated to have shifted to urban areas; that speaks volumes about the impending challenge for cities. India's urban population currently totals around 410 million people, which is 32 % of the total population and is anticipated to reach 814 million (50%) by 2050. The three of Indian cities are among the most populous globally, Delhi with the population of 25 million, Mumbai with 21 million population and Kolkata with the 15 million population having the positions 2nd, 6th and 14th respectively in the world scenario [5]. The country has explosive and highly skewed urban population growth with a large chunk concentrated in million-plus cities and likely to grow further [6]. The intransient increase is liable to create demand for the building stock for residential and non-residential purposes, [2] and putting pressure on already deteriorating institutional, physical, economic, and social infrastructure. The limited critical resources and infrastructures have created challenges for healthy food, freshwater, energy supply [7], adequate housing, and transportation issues for the increasing population in urban spaces, thereby affecting the urban environment.

The high outgrowth rate of human activities and urbanization are changing physical land, urban geometry, and urban fabric in many of the developing countries [8]. The spatial growth massive Indian cities do not comply with any urban model like the concentric zone model, multi nuclei model, or perhaps sector scheme model because of heterogeneous land use. The green belt is dealing with many alterations as a result of conflicting demands of land for residential and industrial development. For instance, Pune city is going through a large-scale land-use change and lack of basic amenities to provide lands for industrial growth [9].

The increase in Indian megacities such as the Delhi NCR region has resulted in massive demand for energy, transportation, and housing that are leading to excessive emission of greenhouse gases. The majority of Indian cities are experiencing health problems. Increasing is a vital issue on notable routes like in Delhi, Modinagar, Mumbai, Noida, Bangalore, Guru gram, and numerous other cities. The cities are under pressure because of budget constraints, economic restructuring, climate changes, and unemployment. To enhance the urbanization and to bring about the modification with the help of sustainable development missions like early warning weather system, enhancing using public transport, waste management, and energy efficiency were the main ones that beheld because of lots of barriers like insufficient local government bodies, deficiencies in the planning and implementation stages of these projects. Lots of other conditions also occurred, including land acquisition and land use management, irregularity in transferring the money for the projects, etc. [10].

1.1 The Urban and Environmental challenges India

In the water sector, urban India's situation is no different, with about 8% of urban households still requiring travel more than 100 meters to access drinking water. In the power and electricity sector, urban India remains short of 100% access to electricity. At present, 93.9% of urban areas are using 24 hours of electricity. The low waste collection efficiency in the urban areas ranges from 70 to 90%, and only less than 30% of waste is being segregated. Even in large cities, only 20% of wastewater is treated due to
less sewerage treatment. The mobility sector in Indian urban areas shows that public transport accounts for only 22% of transport in India, and just 20% of cities have a city bus service [5]. The previous research and studies have signified the role of meticulous, coordinated, and planned development of urban cities and centers that are also self-sustaining and ecological to solve existing and upcoming challenges. The concept of a smart city in India has been one such step towards integrating current development trends, essential resources, and critical infrastructure, which has been researched for over a decade now but gained momentum after the formation of a new central government in 2014. In June 2015, the Ministry of Urban Development (MoUD) launched the "Smart Cities Mission" to tackle urbanization's bulging issues in India. The present Indian government developed a scheme that constitutes the construction of hundred smart cities across the nation. The Union Ministry of Urban Development is the body responsible for the smart city development, which identified 67 indicators for Smart City Mission under various themes of urban planning distributed under the sustainability dimensions like Economy and Equity, Environment [11]. A parallel dimension of Implementation tools specifies indicators to enforce the principles and strategies of Smart City and sustainable development. The smart city mission's concept is usually to foster a self-efficient and well-planned area within the premises of the city, which could serve as an ideal space to inspire and enhance the effectiveness of another locality of the city. Five years of duration has been estimated for the implementation of the smart city programs. The state will get financial benefit from the government from 2017 to 2022 for the execution of the smart city development, and we can see the work progress until 2022. Although, urban development should be prioritized over the smart cities missions in India to create a foundation for more development of major towns and cities along with other selected cities that are to be converted into smart cities [12].

This study aims to help decision-makers and city planners determine city eligibility in a multidimensional way and create evaluation criteria for the city selection process to meet the smart city mission [13]. India is a culturally diverse nation with 29 states and 7 union territories, so one city has been selected from each state to cover the entire country. Indian City's residents have their perspective of theirs of the smart city, based on their needs, which constitutes the infrastructure and services of their desire and as per the ambition theirs. On the other hand, the federal government has its private agenda and plan to create a self-efficient and smart locality within the city and redevelop existing unplanned low areas. Then just a city could become a smart city in the sense that is real. Presently the Indian government's aim and plan will be to create hundred smart cities along with rejuvenation of other 500 cities under the mission of AMRUT (Atal Mission of Urban Transportation) and rejuvenation. For this program, a budget of 98,000 Crore has been passed by the Cabinet of India. From this total budget, 48,000 crore amounts are reserved for the smart city development program, and the spare 50,000 crores is meant for the execution of AMRUT mission across the nation.

Smart development has been identified as a sustainable worldwide solution to the existing urban planning issues, whose principles aim to provide a better quality of life and advertise livable communities. However, the concept is vague to define, as no universal definition exists. The sole reason for the concept to be vague is the number of dimensions in which it is represented and therefore, the concept needs to be standardized to scale development worldwide. Before implementing any of the decisions, we need to understand a few of the essential terms and concepts associated with the current scenario. The concepts are Sustainable Development, Smart Growth, and Smart City. Each of the above concepts has to be carried out in a very sustainable manner. The concepts stated above are the fundamental pillars for creating a better place of living. However, it should be observed and analyzed that these concepts attain their sustainability with their principles and strategies regarding urban planning. Sustainable development is the ability of humanity to ensure that every person's needs are met daily without compromising the ability of the future generation to fulfill their own needs. Sustainable development is a three-dimensional process which includes the economy, environment, and equity. The second concept is the Smart Growth concept.
The planning, design, development, and revitalization of cities, towns, suburbs, and rural areas to create and promote social equity, a sense of place and community, and preserve natural and cultural resources. It enhances ecological identity over both the short and long term. It improves the quality of life for all by expanding, in a fiscally responsible manner, the range of transportation, employment, and housing choices available to a region. Smart Cities also help in maintaining the ecological balance in the nearby surroundings. The physical development choices affect the quality of the planet in a metropolitan system through increasing urbanization, industrialization, infrastructure deficiency, indiscriminate use of natural resources, etc. The spatial parameters such as urban sprawl, population density, urban green spaces, and infrastructure provisions are vital for optimal environmental provisions in a metropolitan system. The Urban Environment and area have a limitation and threshold beyond which it does not remain conducive to healthy development and growth of the urban ecosystem and the damage can be irreversible and severe. [14]

1.2 Smart City and Infrastructure.
The smart city as "a collection of smart computing technologies applied to critical infrastructure components and services as characterized in paper [15]." Smart city development facilitates an intelligent, interconnected, and sustainable urban system using ICT, data analytics, mobile devices, actuators, sensors, and modelling to enhance operational service and decisions deliveries. Many advances have been expected from smart cities development, such as improvements in governing process, optimization of natural resources, public facilities, and quality of life. The categorizing of smart cities has taken place by keeping the entire population in mind. A smart city should involve a mix of industrial centers and businesses, state capitals, cultural and tourism centers, and port cities. However, the Indian Smart Cities Mission is a strategic response to resolve the urbanization issues that could ultimately help improve the overall quality of the urban environment [16]. Adequate connectivity and interlinking of the road system are vital elements in the development of a smart city. The smart city policy envisages the use of state-of-the-art technologies as ICT, cyber security, Rapid Transit System (RTS), etc. To improve the amount of security, time utilization, energy preservation, etc. The development of India's smart cities should focus on improving core urban infrastructure that includes housing facilities, water supply, transportation etc. Using the smart technological advancements in improving the core infrastructure to improve the efficiency with small investments. Several of the technologies which are useful in creating a smart city are:

1.2.1 Transit Management Systems. Transit Management System provides information that is accurate about the position and adequate safety and security of passengers. Transit Management System increases public transport by the daily commuters, enhances operating efficiency, service reliability, and response to service disruptions. The user or passenger may have the best to utilize the information at home, schedule information, work, operational information. On account of a transit office, the clients may get information about appearance/takeoff times. A case of the Transit Management System is an immediate vehicle location (AVL). Advanced technology gives the establishment for vehicle tracking. Automatic vehicle location gives data concerning the constant real-time situation of a car, which is utilized to check schedule commitment and give explorers info relating to transit vehicles [17].

1.2.2 Emergency management system. Emergency management system is identified as a discipline that deals with risk, risk management, and mitigation. This system deals with the natural hazards that often happen in the natural surroundings due to hydrological, volcanic, geological, seismic, meteorological, mass movement or any other natural processes and that pretense a danger to human systems and populations. Emergency management and info system (EMIS) provides the environment to monitor and compute the information and decision support systems, making decision-making much more comfortable at the time of crises in the transportation system. In case of emergencies, it is critical to monitor the transportation system and services, supply, or perhaps transferring of individuals towards a safe location is a priority. Study shows the various models and analyzing techniques changed with time.
in the emergency management system [18].

The area-based development in the infrastructure would also prove very beneficial for ex. Retrofitting, city renewal (redevelopment), city extension (greenfield development) and pan city concept (using modern technology solutions to the existing city infrastructure); which will transform existing deteriorating areas into better planned ones and develop new areas to accommodate the expanding populations in urban areas. The above development in carried out at improving physical, social, economic, and institutional infrastructure within thy city. The above-stated systems help a great deal in improving the traffic conditions within the city. Not the transportation system but the promotion of sustainable and green technology and the actions taken because of its further advancements should be monitored regularly because it is all understood that nature is the really major part of our imagination and life of life with no nature is impossible. For this, we have to find the answer to the following questions:

1. What is the job of green spaces/nature in our ecosystem?
2. Just how much significance is given to the dynamics in the Indian smart city development scheme and what exactly are the statistics of the needed green area for a sustainable society?

The solution to the above-stated questions lies totally in Planned Green technology and green infrastructure. An urban transport procedure should likewise empower the requirement for developing "green technology", e-rickshaws, cycle, bikes, such as electric-powered cars and walkers to go within the city or perhaps nearby areas. In order to serve this purpose, ultimately, the city needs to be constructed with everything pre-planned. These concepts are defined as the interconnected chain of urban components, constructing spaces and environments to reduce the rate of disasters, radical climate change, improve air quality, heat reduction, and provide soothing psychological impacts. These influences of green spaces and green infrastructure are essential for human survival. Therefore, by promoting the green technology, we bring down environmental degradation on the bare minimum.

2 India’s ongoing smart city project

2.1 GIFT or Gujarat International Finance Tec-City

GIFT is a worldwide financial and IT center, located centrally in Gujarat and situated between Ahmedabad and Gandhinagar. 886 acres of land, situated alongside a water body, is dedicated for the project construction, which is in progress, with 2 towers of 29 floors each being already completed. The estimated budget for its construction is about 12 100 billion INR. GIFTCL (Gujarat International Finance Tec-City Company limited) is a combined venture that's undertaking the GIFT project [19].

The site is divided into two zones:

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The site is divided into two zones:

a. Special Economic Zone (SEZ)-This zone is further segregated into processing and non-processing units
b. Domestic Tariff Zone

An exclusive high-level community will provide a platform for the trades through the globe. This futuristic smart city is planned to accommodate the following features: [19]

1. Steady electricity supply of 1000 MV and the cables will run underground to create an unmistakable skyline.
2. Supply of natural gas through a pipeline system to the built-infrastructure, which is a cost-effective and advanced technique
3. Recycling and reuse of waste water in automated landscaping systems.
4. Provision of District cooling i.e., the centralized cooling system has been opting
5. Garbage transportation is managed through automated sucking pipes, at a quick speed of 90Km/h, will run below the ground.
6. Plasma Gasification is used for the waste treatment.
7. Amalgamation of multi-way of transportation system like metro, highway, helipad, pod-cars, Etc. Walk to work idea has been incorporated in the city designing and planning.
8. Continuous portable water supply in the built-structure.
9. The site is chosen in a way to have easy and fast access to the airport and also to the capital of the country through intelligent transportation system (i.e., National Highway NH-8).
10. Intelligent building services are incorporated in the built infrastructure to minimize the energy consumption
11. Proper provision of information and communication technology in the sector in the form of strong internet connection, large bandwidth, CCTV provision, novel mobile apps, e-governance, Etc.

2.2 Benefits of GIFT
It is less and safe pollution causing transit system. It is proper connectivity with the airport and nearby metro cities (New Delhi and Mumbai). Ample parking is offered and it assures steady services supply and guaranteed quality, cost reduction in services, provision of ten lakh job opportunities, and residence to 50,000 inhabitants. It is a chance for the fast setting of trade. There is a hope on GIFT that it becomes global business center in the future since it contains impressive urban planning (Perfect place of the website with robust connectivity with the airway and metro cities, ‘A’ grade infrastructure, trade-oriented rules, and regulations) [19]. The comparison of GIFT with the other recognized financial centers across the globe is shown in the Table 1. GIFT is more extensive in terms of the parameters land square, construction scale, green belt, and height compared with the other recognized financial centers across the globe such as Paris, Tokyo, London, and Pudong.

| Land Area (Square Kilometers) | Paris (La defense) | Tokyo (Shinjuku) | London (Dock Yards) | Pudong (Lujiazui) | GIFT |
|-------------------------------|-------------------|------------------|---------------------|-----------------|------|
| Construction Scale (in million square meters) | 2.5 | 1.6 | 1.1 | 4.5 | 8.5 |
| Greenbelt (in thousand square meters) | 40 | 120 | 50 | 363 | 1183 |
| Height (meters) | 200 | 250 | 250 | 490 | 410 |

Source: http://www.giftgujarat.in/concept

The GIFT city is a "Concept Based Development" with the area's division into following Zones:
  a. Commercial Zone: It comprises the office towers and related spaces.
  b. Residential Zone: It comprises high rise apartments along with other residential units
  c. Various zones: It comprises the restaurants, hotel, recreational and cultural spaces, Etc.

The breakage percentage of the entire site land use is as Commercial (28 %), Residential (4 %),
Social Facilities (5 %), Utilities (5 %), Transportation (24 %), Green Area (34 %). Out of 673 acres site, a large portion is awarded to green spaces and is kept open, making ecofriendly atmosphere. Additionally, Smart city development mission should include strategies like City improvement (retrofitting), which allows the related authorities to improve further the infrastructure and smart technologies that are now being implemented within an existing urban space. City renewal (redevelopment) strategy consists of replacing the existing built-up area with a completely new layout with numerous uses, increased density, and enhanced infrastructure. City extension strategy signifies the enhancement of citywide infrastructure by utilizing technology, info and data [12].

3 Conclusion
As discussed earlier in the paper, the principles related to smart city development throughout the years are Smart Growth and the present slanting concept of Smart City. Smart City concept centers on giving the primary fundamental infrastructure services and utilities to urban settlements with the mix of advanced innovation with a good action plan to enhance the quality of living in the urban areas. This idea has been viewed as the final fate of sustainable development in the field of urban planning. The concept has no norms at the world level, and changes are made based on various places' needs. As a developing country, India has seen quick urbanization essentially in its major urban cities, and the effect has unfavorably influenced the living quality in these urban communities [20]. Different activities have been taken up by the government of India to deal with urban development issues. In India, the idea of "100 Smart Cities Missions" has been created to remove and eradicate the issues that have occurred because of rapid urbanization in the main urban towns and cities in the nation. This paper also discusses the smart city GIFT under construction in the Gujarat state, with many smarter city development projects usually approved to proceed in the building stage in the future.

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