Analyzing the Progress and Effectiveness of the Smart City Initiative in India: A Comprehensive Review

*Dr. Mamta Choudhary

Abstract

One of the main initiatives of the Central Government of India, launched on June 25, 2015, is the Smart City Mission (SCM). By "smart," we mean more efficient, sustainable, and livable for all city people. Digital City, Wireless City, or Future City are additional terms for smart cities. This study paper's primary goals are to identify the different elements and characteristics of smart cities, assess the performance and status of smart cities now, and identify the difficulties in establishing smart cities in India. Secondary sources of data form the foundation of the entire investigation. According to the report, Tamil Nadu and Uttar Pradesh are making the most of the Smart City Mission's top funding. A sustainable future depends on smart cities, and this mission is a positive start. But transforming a city into a smart one is a process that takes time. One of the Central Government's dream projects, it should be completed by 2030.

Keywords: Infrastructure, Sustainable Development, Mobility, Digital City, Technology

Introduction

Migrating from rural to urban areas is happening faster and faster all around the world. Approximately 70% of the global population—including those in India—will reside in cities and towns by the year 2050. Since gaining its independence more than 75 years ago (Azadi ka Amrit Mahotsav), India has improved the standard of living and services available to its people. One of the premier initiatives of the Central Government of India, the Smart City Mission (SCM) was launched on June 25, 2015, by the Ministry of Housing and Urban Affairs (MoHUA) with the goal of developing 100 cities. The program's objectives are to promote economic growth and enhance the standard of living for urban residents in areas such as e-governance, the provision of clean drinking water, transportation, entertainment, safety and security, municipal service delivery, and water management. Digital technology is employed in a smart city to raise the standard of living and quality of life for its people. When a city is developed sustainably and inclusively for all urban residents to maintain a high standard of living, through the use of ICT-based technologies in particular, and by intelligent management practices, the city is considered smart. We define smart as a city that is more efficient, sustainable, and pleasant for all city inhabitants to live in. While the phrase "smart city" was first used in the 1990s, town planners, academics, administrators, urban geographers, regional planners, economists, and others have just recently begun to fully explore and elaborate on this notion in the mid-2010s. Future City, Digital City, and Wireless City are alternate terms for Smart

Cities. Modern definitions of smart cities include visions, manifestos, or promises that seek to define the ideal, sustainable city shape for the twenty-first century. The Indian government's new and creative effort, the Smart Cities Mission, aims to raise living standards and spur economic growth. Millions of Indians would benefit from smart and transparent e-Government and easy lifestyle improvements if 100 smart cities were established. Better disaster management, decreased poverty, and improved infrastructure in the chosen cities are all benefits of this fantastic effort. Sustainable cities, smart cities, urban ICT, sustainable urban development, sustainability and environmental issues, etc. are some of the five different components from which the concept of the smart city derived.

A comprehensive framework for creating smart cities in India was researched by **Joshi, Saxena, and Saksham (2016).** The idea of "smart cities" is the only way, the academics agreed, to address the issues brought on by rapidly increasing urbanization and population growth. By ensuring the best possible use of scarce resources, smart cities are a futuristic concept that improve efficiency, sustainability, and livability. The abbreviation {SMELTS} stands for six significant pillars that researchers found can support the success of the smart cities proposal. Examining these pillars in depth will help the government realize the management consequences and attain smart governance. They emphasized that moving away from technology and toward more established, intelligent systems that optimize resource use is the only way to address the main problems associated with smart cities, including project scale, numerous aims, social hurdles, technological and economic challenges, climate distortion, and many more.

Varghese Paul (2016) examined the idea of smart cities in the context of India's fast urbanization in his paper "Exploring Other Concepts of Smart Cities within the Urbanizing Indian Context." He emphasized the ongoing challenges with development in Dholera, the first smart city envisaged in India. Noting that the first smart city is already going through teething issues, Paul described the smart village plan put out by Dr. A. P. J. Abdul Kalam. The local community was not given enough information or trust about Dholera's status as a Special Investment Region (SIR), he pointed out, which caused problems for the Dholera green field plot. Paul highlighted that the government had to concentrate on more focused answers and anticipate future problems rather than attempting to tackle more expansive ones.

Using an emphasis on the infrastructure development required for smart urban development, **Parishwad and Trishubh (2014)** examined the ranking of smart cities in India. In order to construct smart cities, they emphasized the necessity for standards-specific factors unique to India. In addition to comparing smart city development globally, the researchers examined significant service delivery projects in India. Urban development, they found, is a multifaceted process that necessitates taking into account various aspects and parameters. To meet the demands of its rapidly growing urban population, India must use ICT to construct massive infrastructure. Benchmarking against other cities and learning from more successful instances can be accomplished with the help of smart city characteristics and ratings.

With an emphasis on the mission's main elements, benefits, and drawbacks, **Soni Nupur (2020)**

Analyzing the Progress and Effectiveness of the Smart City Initiative in India: A Comprehensive Review

Dr. Mamta Choudhary

34.2

examined and evaluated the Smart City Mission in India. She outlined the fundamentals of smart city development and clarified the potential advantages of integrating intelligent technology into everyday life. Nupur further pointed out that the ongoing gathering, tracking, and measuring of data might be viewed as a privacy invasion and that these technologies would not solve fundamental urban issues. She noted that as smart cities guarantee social, environmental, and economic sustainability, urban people will start to seek intelligent cities with sustainable surroundings and improved quality of life. Smart cities will become the norm in all major cities globally by 2030.

India's smart city development and advancement were covered by **Kunkulol, Waghmare, and Ashish (2016)**. According to them, the current government prioritized creating strong infrastructure because urbanization was growing more quickly. By giving solution providers the ability to meet existing circumstances, the researchers presented potential for the smart cities initiative, which will complement the efforts of the Indian government. The concerns of what, how, where, when, and conditionality of smart cities were prioritized after towns were selected based on economic standards and geographic inclusivity. They studied the phases of smart city implementation in India, including GIFT City, Wave City, which is based on IBM, Lavasa City, and Palava City, and the salient characteristics of these cities that fall under the purview of bilateral technological cooperation. Additional evidence of India's transformation into a desirable investment destination was the Varanasi Kyoto Agreement. The utilization of public-private partnerships (PPP) and contemporary management techniques is imperative for the triumph of such undertakings, they deduced. For cities interested in an inclusive and practical development process, they recommended creating a smart city valuation framework.

Indian context-specific obstacles to the growth of smart cities were studied by **Rana, Luthra, and Mangla (2018)**. Economic, technological, social, legal, and ethical are the six main categories into which they divided the 31 obstacles to the establishment of smart cities. They gave the obstacles related to smart cities top priority in order to assist policymakers in enhancing sustainability in the Indian setting. With the use of DE MATEL/Fuzzy and Grey Techniques, these barriers might be further assessed to determine their causal connections. Use of proven theories and models to investigate different facets of smart cities is necessary to prevent opposition from stakeholders and government workers.

Remote sensing's involvement in India's development of smart cities was investigated by **Badnakhe, Rushikesh, and Biswal (2017)**. Specifically, they concentrated on smart-on-smart monitoring in the areas of governance, waste management, safety, transportation, energy, and healthcare—all crucial elements for building smart cities in India. It was contended that the effectiveness and capability of city services may be enhanced by utilizing technology and updating the infrastructure of the city. The use of sophisticated sensing can be very beneficial in applications such as water distribution systems, electricity, health monitoring, and more. But interdisciplinary cooperation is necessary, and that will be difficult.

The procedures, deficiencies, and state of Indian smart city development were investigated by **Ahmed and Shalbbya (2020).** The government policies, problems, and deficiencies that hinder the

Analyzing the Progress and Effectiveness of the Smart City Initiative in India: A Comprehensive Review

Dr. Mamta Choudhary

34.3

development of smart cities in the face of growing population densities were examined. The structure of smart cities appears fine on paper, but it is not practical, they observed using publicly available documentation as a qualitative study instrument. They presented the findings from the five iterations of the chosen cities mission and divided them into categories including smart growth concerns, greener production methods, and gaps that impact smart cities, like those related to politics, economy, society, and services. The implementation of current methods will inevitably face obstacles; nevertheless, the development of smart cities can be aided by increasing public participation at every level and engaging PPP alliances in dynamic consultation.

Study goals:

This study paper's primary goals are to:

1. Identify the different elements and characteristics of India's smart cities.

2. To assess India's smart city performance and situation at the moment.

3. To learn about India's smart city implementation issues.

Research Methods and Database:

Secondary sources of data form the foundation of the entire study project. A variety of newspapers, journals, books, and other publications, as well as the Indian government's Ministry of Housing and Urban Affairs, were the sources of the data.

Table 1.1: Phase-Wise Selected Smart Cities in India	
1st Phase of Smart City Selected (20 Cities, January 2024)	Bhubaneswar, Pune, Jaipur, Surat, Kochi, Ahmedabad, Jabalpur, Visakhapatnam, Solapur, Davangere, Indore, New Delhi, Coimbatore, Kakinada, Belagavi, Udaipur, Guwahati, Chennai, Ludhiana, Bhopal
2nd Phase of Smart City Selected (13 Cities, May 2024)	Chandigarh, Bhagalpur, Faridabad, Lucknow, Raipur, Ranchi, Dharamsala, Warangal, Panaji, Agartala, Imphal, Port Blair, New Town (later withdrawn)
3rd Phase of Smart City Selected (27 Cities, September 2023)	Amritsar, Kalyan, Ujjain, Tirupati, Nagpur, Mangalore, Vellore, Thane, Gwalior, Agra, Nashik, Rourkela, Kanpur, Madurai, Tumakuru, Kota, Thanjavur, Namchi, Jalandhar, Shimoga, Salem, Ajmer, Varanasi, Kohima, Hubli-Dharwad, Aurangabad, Vadodara
4th Phase of Smart City Selected (30 Cities, June 2024)	Thiruvananthapuram, Naya Raipur, Rajkot, Amravati / Vijayawada-Guntur, Patna, Karimnagar, Muzaffarpur, Puducherry, Gandhinagar, Srinagar, Sagar, Karnal, Satna, Bengaluru, Shimla, Dehradun, Jhansi, Pune-PCMC, Bilaspur, Pasighat, Jammu, Dahod, Thoothukudi, Tiruchirapalli, Tirunelveli, Tiruppur, Aizawl, Prayagraj, Aligarh, Gangtok
5th Phase of Smart City Selected (10 Cities, June 2024)	Erode, Saharanpur, Moradabad, Bareilly, Silvassa, Itanagar, Diu, Kavaratti, Bihar Sharif

---

Analyzing the Progress and Effectiveness of the Smart City Initiative in India: A Comprehensive Review

Dr. Mamta Choudhary

Total Selected Smart City : 100

Parts of a Smart City:

Smart buildings include: affordable housing, particularly for the impoverished; green building; albedo control; housing quality; and the availability of ICT infrastructure.

An attractive natural setting, reduced pollution, environmental preservation, sustainable resource management, smart wireless cable, and sustainable development are all components of a smart environment.

Smart energy includes solar power, smart grid technology, smart electric metering, gas distribution, renewable energy sources, effective solid waste management, energy consumption control, and an adequate supply of electricity.

Public safety, healthcare, education, smart traffic control systems, lowering the crime rate, adequate clean water supply, water resource management, smart medical treatment, smart disaster management, citizen participation, citizens' safety and security, especially that of women, children, and the elderly, are just a few examples of smart public services and IT communication. Provide women's empowerment, the best medical care and educational opportunities, strong IT connectivity and digitization, and artificial intelligence.

Smart transportation includes things like improved walkability and cycle paths, electric cars, CNG-powered vehicles, sustainable, innovative, and safe transportation systems, and local accessibility.

Intelligent governance encompasses various aspects such as electronic birth and death certificates, building plan approval, utility bills, property tax, e-procurement, personnel management, good governance, particularly e-government, accountability, transparency, and opportunities for government participation.

A smart city's characteristics include:

1. Intelligent Electronic Governance

2. Wide Boulevard

3. Intelligent Traffic Management

4. The Smart Mobility Aspect (the Foot across the Bridge with Escalator and the Underground Sub-Way)

5. Intelligent Public Spaces and Parking Structures

6. WiFi Accessible

7. Street Light with Sensor

Analyzing the Progress and Effectiveness of the Smart City Initiative in India: A Comprehensive Review

Dr. Mamta Choudhary

34.5

8. Smart Parking;

9. Urban Green Belt;

10. Barrier-Free Roadway

11. Management of Solid Waste

12. Wireless Technology

13. System for Intelligent Business Management

14. Ingenious and significant application of public-private partnerships

15. Using Technology for Security and Safety

16. Intelligent Power

17. Ingenious Yet Cheap Structures

18. By reducing greenhouse gas emissions, smart cities offer a number of environmental benefits.

19. Underground Drainage and Sewerage Systems

20. Subterranean Electrical Wires and Cables

Obstacles facing the Smart City Mission:

- Inadequate Communication among the Federal, State, and Local Governments
- Corruption
- Absence of adequate city administration as defined by a master plan or city development plan
- The public's lack of cooperation and technical limitations
- Building 100 Smart Cities is the Government of India's dream ambition, but it is not an easy one.
- Year after year, low budget
- The general public's ignorance of the idea of a smart city
- Public data security and safety (Hackers).
- Human migration in the direction of cities
- Proliferating suburbanization and urbanization
- Lack of a robust development framework; numerous urban area policies and projects
- Intersecting authorities
- The funding issue

Analyzing the Progress and Effectiveness of the Smart City Initiative in India: A Comprehensive Review

Dr. Mamta Choudhary

34.6

Conclusion

In conclusion, a variety of issues affect many Indian cities, including poor governance, resource scarcity, air pollution, traffic congestion, and overcrowding. Urban residents' quality of life is impacted by these problems, hence solving them is essential. The Smart City Mission offers a workable answer to these urgent issues. This effort attempts to change urban environments by utilizing technology, encouraging public-private partnerships, and putting in place contemporary management techniques.

But becoming a smart city is a process that takes time. It takes careful preparation, strong execution, and consistent work over an extended period of time. The Smart City Mission's relevance in the larger development goal is reinforced by its alignment with several government initiatives, such as Made in India, Clean India, and Digital India.

Smart cities are essential to a sustainable future because they provide a means of raising living standards, protecting the environment, and fostering economic growth. Even if developing smart indicators and providing digital services to urban dwellers are the main priorities, it's important to understand that the process of developing a smart city is just as important as the final product.

*Associate Professor
Department of Geography
Government College
Jaipur, (Raj.)

References

1. Hoque, A. (2018). Quality of Housing Environment and Health Status Among the female bidi workers: A Micro level study of Indian Villages, Annals of Valahia University of Targoviste, Geographical Series, Vol. 1, April, pp. 1-9.

2. Singh, K., Sharma, N., Gunna, P. (2017). Smart Cities in India: Key Areas and Challenges Case Study of Chandigarh City, International Journal in Management and Social Science (IJMSS), Vol. 4, Issue 1, pp. 386-396.

3. Siddqui, S.H., Afzal, F., Hoque, A. (2017). Assessment of Irrigation Extension and Development in Uttar Dinajpur District of West Bengal: A Block Level Analysis" Asian Profile, International Journal of Canada, Asian Research Service, Vol. 45, No.5. pp. 421-435.

4. Taufique, M., Hoque, A. (2019). Mouth-watering traditional cuisines of India: A Study of Cultural Geography, NSOU Open Journal, A Multi-Disciplinary Online Journal of Netaji Subhas Open University, Vol. 2, No. 2, pp. 23-30.

5. Taufique, M., Hoque, A. (2020). Open Defection and Poor Sanitation condition A serious menace to Human Health and Dignity: A Micro level study of Indian villages, International

Analyzing the Progress and Effectiveness of the Smart City Initiative in India: A Comprehensive Review

Dr. Mamta Choudhary

34.7

Journal of Trends in Scientific Research and Development (IJTSRD), Vol.4, Issue 3, April 2020.

6. Varghese, P. (2016). Exploring Other Concept of Smart- Cities within the urbanizing Indian context, Procedia Technology, Elsevier Journal, Vol. 24, pp. 1858-1867.

7. Parishwad,O., Singh, T. (2014). Analysing and Rating Smart City Development in India, Journal of Civil Engineering and Environmental Technology, Vol. 1, Number 6, pp. 54-59.

8. Kunkulol, M.K., Waghmare, A. (2016). Smart City Development and Progress Indian Scenario, International Journal of Current Research, Vol.8, Issue 7, pp. 34411-34315.

9. Afzal, F, Hoque, A. et.al. (2017). Socio-Economic and Cultural Disparity: A Study on Gender Gap in Mirzapur Village of Aligarh District in Uttar Pradesh, India International Journal of Scientific Research and Development (IJSRD), Vol.5 Issue 03, pp. 85-89.

10. Mane, S.R. (2012). A Systematic overview of India's Smart City Mission, International Journal of Engineering Research and Technology (IJERT), Vol. 9 Issue 3, pp. 554-559.

11. Aishwarya, N., Chellasamy, A., et. al. (2021). Smart City-Far and Near Dream in Indian Context, International Journal of Computer Applications, Vol.174, No.12, pp. 25-31.

12. Soni, N. (2016). Smart City: A Review and Analysis of India, International Journal of Computer Engineering and Application, Vol. 10, Issue 7, pp.41-46.

13. Gurway, S.P. (2022). Smart Cities-Technological Challenges and Implementation Issues: An Indian Perspective, International Journal of Advanced Research in Science, Communication and Technology (IJARSCT), Vol. 2 Issue 1, pp. 435-443.

14. Taufique, M., Hoque, A. (2017). Tribal Labour out Migration in Malda district of Malda of West Bengal (India): A Spatial Analysis, International Journal of Scientific Research and Development (IJSRD), Vol. 5 Issue 2, pp. 845-849.

15. Ansari, N., Sharma, A., Hoque, A. (2021). Socio-Economic Status and Health Risk Among the Carpet Workers: A Study of Bhadohi City, International Journal for Scientific Research and Development (IJSRD) Vol. 8 Issue 11 pp. 164-168.

16. Taufique, M., Hoque, A. (2021). Current Scenario of Sericulture Production in India: A Spatio-Temporal Analysis, International Research Journal of Education and Technology (IRJEdT), Vol. 02, Issue, 04, pp. 12-23.

17. Taufique, M., Hoque, A. (2017). Assessing the Role of MGNREGA in Alleviating Rural Poverty: A Study of Malda District, West Bengal, The Geographer Journal, AMU Geographical Society, Vol. 64 No. 1, pp. 119-126.

18. Taufique, M., Hoque, A. (2017). Role of Technology on the development of agriculture in Malda district of West Bengal (India): A Geographical Analysis, International Journal of Scientific

Analyzing the Progress and Effectiveness of the Smart City Initiative in India: A Comprehensive Review

Dr. Mamta Choudhary

34.8

Research and Development (IJSRD), Vol.5 Issue 03, pp. 413-416, 2017.

19. Hoque, A., Khan, D. (2017). Role of World biggest anti-poverty programme MGNREGA in reducing rural migration in Malda district of West Bengal (India), The Bengal Geographer Journal, University of North Bengal,Vol. 6 Issue 2, pp. 18-27.

20. Taufique, M., Hoque, A. (2018). Status and Performance of Sericulture in West Bengal: A Geographical Analysis, Asian Profile, International Journal of Canada, Asian Research Service, Vol. 46, No. 2, pp. 181-193.

21. Taufique, M., Hoque, S., Hoque, A. (2020). Status and Performance of MGNREGA scheme in Malda district, West Bengal (India): A Case Study, Asian Profile International Journal, Canada, Vol. 48, No. 04, pp. 319-336.

22. Taufique, M., Hoque, A. (2017). Tribal Labour out Migration in Malda district of Malda of West Bengal (India): A Spatial Analysis, International Journal of Scientific Research and Development (IJSRD), Vol. 5 Issue 2, pp. 845-849.

23. Taufique, M., Hoque, A., et al. (2020). Open Defection and Poor Sanitation condition A serious menace to Human Health and Dignity: A Micro level study of Indian villages, International Journal of Trends in Scientific Research and Development (IJTSRD), Vol.4, Issue 3, April 2020.

24. Taufique, M., Hoque, A. (2017). Role of Technology on the development of agriculture in Malda district of West Bengal (India): A Geographical Analysis, International Journal of Scientific Research and Development (IJSRD), Vol.5 Issue 03, pp. 413-416, 2017.

Analyzing the Progress and Effectiveness of the Smart City Initiative in India: A Comprehensive Review

Dr. Mamta Choudhary

34.9