

Stages and Challenges in Implementation of Smart City Project, Udaipur

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Abstract:- Developing a city as a smart city does not mean entail changing all its infrastructural facilities to an extent that the very face of the city appears changed. Nor does it lead to an automatic revamping of connectivity or by building up a new city in place of the old. The concept of smart cities is seen to differ from city to city and is focused on providing facilities that make the city noticeably more clean, convenient and, therefore, likable. The core of the Smart City Mission is made up of factors like safety, security, cleanliness, improved water supply, improved connectivity through better transportation, and peace. It is felt that while these facilities promote tourism in a sustainable manner, they contribute immensely in overall development of the entire area as well. The study attempted to highlight key technical and managerial phases and challenges likely to be encountered while developing and implementing the Smart City Project in the city of Udaipur, Rajasthan. This research used descriptive research design to collect secondary data, primarily, from the internet (government and other websites) to propose an approach that could be considered by Udaipur Smart City Limited for implementing the Smart City project and dealing with multiple challenges that the project is likely to face.

Keywords:- Smart City, Security, Transportation, Water Supply, Urban.

I. INTRODUCTION

A smart city is a city that uses technology and data to improve the quality of life for its residents in a manner that is sustainable and adds to the efficiency of various processes and services[1, 2]. The smart city planner endeavours to apply technology to improve quality of life in modern day cities that are facing growing problems caused by a multitude of reasons[3, 4]. The infrastructure of smart cities aims at collective development addressing the needs of social, physical, economical and institutional infrastructure making these appear as the four pillars of infrastructural development.

In 2015, the Indian Ministry of Urban Development introduced the Smart City Mission (SCM) statement and guidelines[5, 6]. They four strategies to develop cities they put forth are given below[7]:

- *Retrofitting: Identify and make existing built-up areas of over 500 acres live able as well as efficient;*
- *Redevelopment: To replace existing built-up areas over 50 acres based on a new layout plan*
- *Greenfield development: New development around cities in vacant areas of over 250 acres*
- *Pan-City Initiative: Applying smart solutions to various urban infrastructure sectors.*

The core purpose of Smart mission is to catalyse economic development and, at the same time, improve the quality of life of people through application of contemporary technologies in daily life[8]. As far as implementation of the Smart mission goes, it also involves updating outdated infrastructure and leads to transforming existing slums into better planned residential areas augmented by new development around the city to accommodate fast growing urban population[9]. Greater the inclusivity in development, higher is the overall standard of health, hygiene and life as a whole. Smart cities provide added avenues for employment and provide for increased income for the poor. For the Smart mission, overcoming challenges confronting various urban areas (eg. sanitation, water supply, mobility, transportation, electricity housing, energy and environment) present opportunities that need addressing to permit the population to thrive and progress in the years to come[10, 11].

The decision to apply the concept of Smart City was taken based on a thorough examination of the needs and potential of cities to imbibe the concept. Government of India announced the list of 20 cities selected for development as smart cities in the first round of the Smart City Programme. These 20 were selected from a total of 97 competing cities that were assessed on a predefined criterion. Based on scoring carried out done by the panel of experts, the top 20 cities were selected for funding in the financial year (2015- 16). Since the launch of the mission several regional workshops and camps have been organized by Urban Ministry to familiarize the stakeholders at the local as well as state level with the concept of smart cities and on how the mission is to be implemented within the framework of their limitations. Udaipur, an ancient city located in Rajasthan, is among the country's most popular tourist destinations and popularly called the city of lakes on

account a large number of lakes in the city. This was one of the top 20 cities and the need for improving Udaipur's infrastructure can not be over emphasized given the fact that its economy is largely driven by tourists from within and outside India. This paper describes the main features of Smart City mission and attempts to explain the challenges in Udaipur City.

II. RESEARCH METHODOLOGY

This research focused on analysis of secondary data available on governmental websites and relevant research articles published in journals of repute. The research also involved referring to the website of the Ministry of Housing and Urban Affairs for detailed guidelines about the projects to be considered under the smart city mission[12, 13] and the governmental website of Udaipur smart city mission. All these websites provided information on measures taken so far and planned in the near future.

III. RESULTS AND DISCUSSION

Citizen priorities were decided based on the outcome of sample surveys conducted in these camps and workshops. Figure 1 shows these priorities in Udaipur in order of diminishing order.

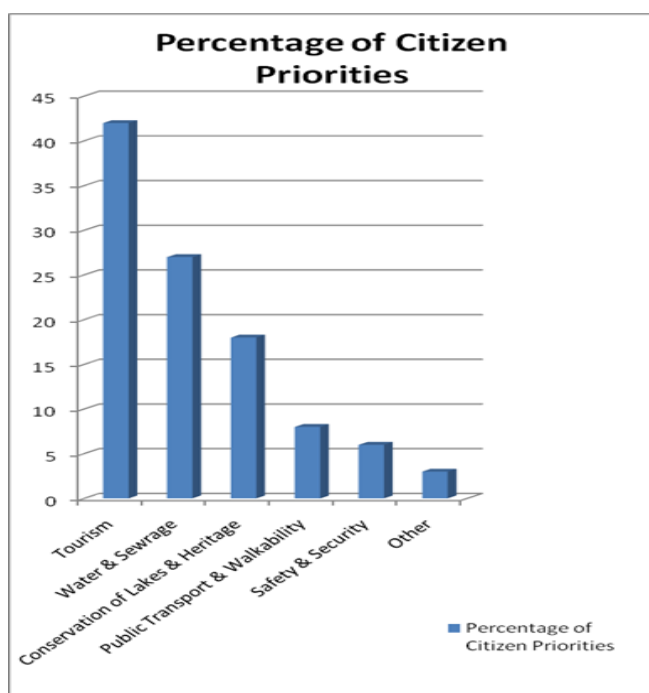


Fig 1 Citizen Priorities Graph

- The above figure reflects the high level of concern of common public towards tourism. 44 % of citizen give their preference to tourism and wish for sustainable local art promotion and uplift of livelihood of artisans. Administration support and motivation plays a significant role to boost the tourism in Udaipur city.
- Second order of higher preference caters to water and sewerage facilities. 26% of common public polled for it and holds the view that proper treatment and disposal of waste effluent from domestic and industrial waste.

- Conservation of lakes and heritage is the next preference to the local citizens. 18% of the common public discloses the view that our heritage is to be protected and the renovation of old city especially our historical monuments like ancient temples, haveli's and antique infrastructure to be renovated.
- With the change of technology the next preference given by the public for transportation and walkability, where they put forward more emphasis on E- Rickshaw and pedestrian pathway.
- Education, health, safety and security were the other priorities of the citizen in promotion of the smart city.



Fig 2 Fields Cover in Smart City Projects in Heritage Segment

- Conservation and redevelopment works of Brahmipole, Surajpole, Navlakha Mahal at Gulab Bagh, Kishanpol, Hathipol, Delhi Gate, Udaipole, Rampole, Chandpole, Sattapole retaining their traditional look.
- Conservation and redevelopment work of fortification wall for Naipulia to Swaroop Sagar Pal, Kishanpole Jal Burj, Udaipole to Kishanpole, Gangour Ghat to Dhobi Ghat, Brahmipole to Chandpole
- Conservation and development works of heritage façade, lighting and signage's for historic bazaar in the walled city, Udaipur



Fig 3 Work of Fortification wall

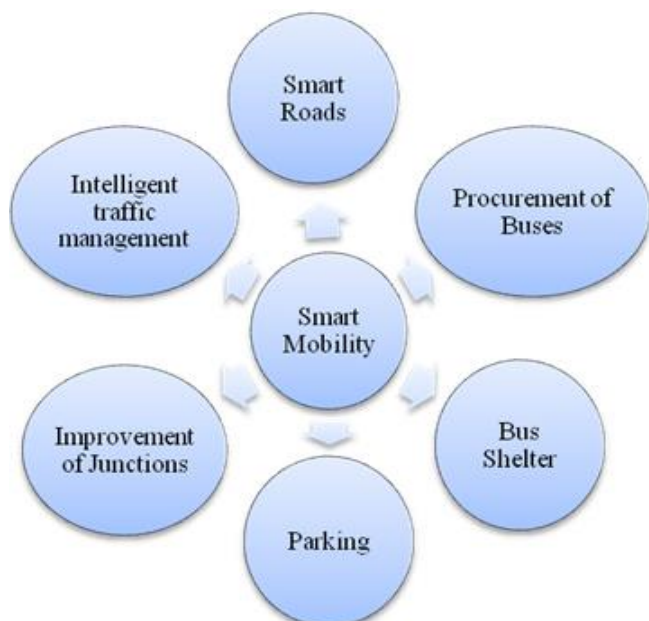


Fig 4 Fields Cover in Smart City Projects in Smart Mobility Segment

- Operation and management of Bus Services for better connectivity within the city
- Development of 50 Bus Queue Shelters in the city of Udaipur
- Multilevel parking at Chandpole, PWD Garage, Nadakheda owing to the growing traffic in Udaipur
- Six-level overground puzzle parking system with operation and maintenance at Surajpole
- Junction improvement at Surajpole junction



Fig 5 Fields Cover in Smart City Projects in ICT Segment

- Design and Installation of SCADA in utility networks water distribution system
- Senior Citizen helpline
- Water Quality Monitoring System
- Digitization and microfilming with e-cataloging of ancient documents

- SITC of surveillance system at Balicha and Titardi plant with 2 year operation and maintenance
- Providing and selection of Master System Integrator for the Udaipur city and implementation of IT solutions including E-governance, development of apps.
- construction of Command & Control Building, Installation of around 500 Wi-Fi hotspots



Fig 6 ICT Facilities in Udaipur

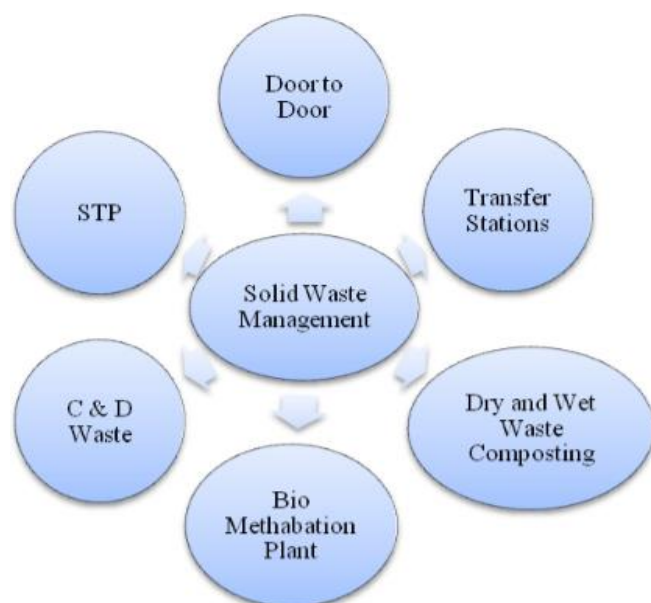


Fig 7 Fields Cover in Smart City Projects in Solid Waste Management Segment

The bio-methanation plant is situated within the premises of Madri fire station, with a capacity to produce about 200 units of electricity and 250 to 300 kg of compost per day by processing approximately 2 tons of organic waste.



Fig 8 Biomethanation Plant in Udaipur

- Conservation of Step Wall, Renovation Waterfronts,
- Ayad River Front Development and Design,
- Develop & Manage adventure zone at the Manikyalal Verma Udhyan Park.
- Under Smart City mission the Trapping & treating waste water that pollutes the Lake Pichola has also helped to clean this tourist destination clean.
- The installation of Water Quality Monitoring Systems has enabled the city to have check the quality of water in the city[14, 15].
- Development of Open Air Gymnasium
- Setting up Smart Class Rooms in Government Schools of Walled City Area Udaipur
- Redevelopment of Government Schools and Anganbaries in the municipal area, Udaipur



Fig 11 Open Gymnasium Near Fateh Sagar

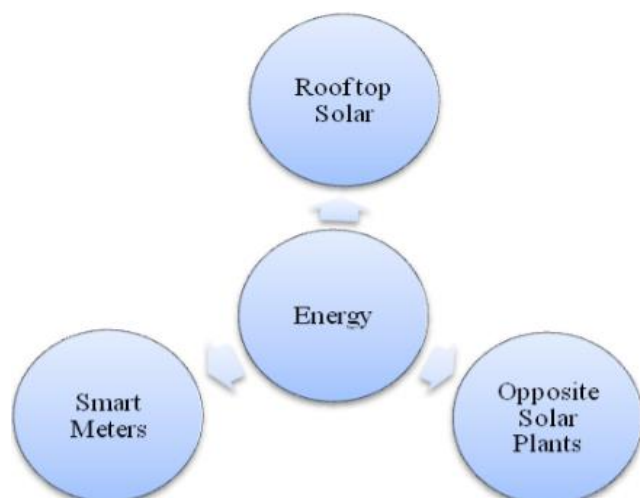


Fig 9 Fields Cover in Smart City Projects in Energy Segment

- Installation of Solar roof top in government buildings in the walled city area
- As part of the Udaipur Smart City Program, the Nagar Nigam of Udaipur has decided to provide extra 10 % of subsidy to homes going for roof-top solar power plants.

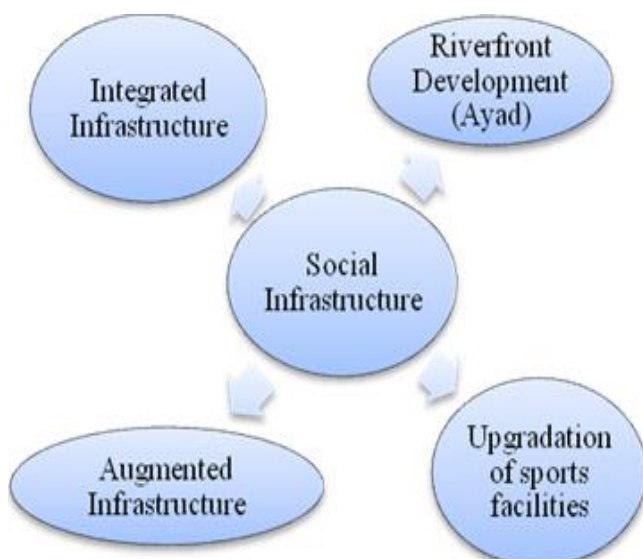


Fig 10 Fields Cover in Smart City Projects in Social Infrastructure Segment

Following challenges were faced in developing and implementation during smart city projects [11, 12]:

- **Retrofitting Existing Infrastructure:** The challenge lies primarily in studying the complete urban area and discovery out the areas where retrofitting can be executed. This is so because there are areas where the constraints caused by prevailing congestion or limitations of available space prevent required changes. Further, retrofitting the areas with historical importance or those that have any heritage value may require an altogether different approach so as to retain their ethnic looks and also complete the task of transforming the city into a smart one.
- **Technical constraints and Technological Obsolescence** is a bigger challenge now-a-days.
- **Integration of latest technologies:** Integrating various smart city technologies such as IoT, big data, and artificial intelligence is a complex task that requires inter-departmental coordination and cooperation besides highly specialized skills in their successful implementation.
- **Coordination in Three Tier Governance:** There is a need for better coordination among the center, state and local bodies to get the best benefits of the Smart mission since data must flow seamlessly across boundaries and

be updated in a manner there is consistency across departments. Governance practices are influenced by numerous internal and external forces.

- Lack of standardization: More efforts are required to understand the working conditions of local government officials and elected representatives so that the best results can be obtained by suitably designing action steps that integrate well with present working.



Fig 12 Smart Class Rooms in Government Schools of Walled City Area Udaipur

- Resistance to change: The adoption of new technology by citizens inevitably requires readjusting to new processes and practices. As planners, it is important that efforts be made to address any resistance and skepticism that could slow down implementation of smart city initiatives.
- Data privacy: The collection and storage of data by smart city systems can raise concerns about privacy and data protection. It is important to ensure that the data is collected and used ethically and transparently.
- Lack of trained manpower: There is a shortage of trained manpower in the fields of technology and engineering, which is a major challenge in the implementation of smart city projects.
- Mismanagement of Solid Waste: Added efforts are required to segregate waste at source and their emergence as a challenge on account of large quantities involved. The processes designed for processing solid waste must take into account the possibility of recycling and mixing up of solid waste.
- Management of Water Supply: A huge water demand and supply gap, contamination of surface water bodies and ground water, unplanned colonies present a contrasting picture of major water inadequacies and present themselves as major challenges for planning of water supply system.
- Finance: Possession of the capitals and finances flowing for completion of the smart cities mission and later the maintenance of the technological developments in the smart cities can also be a challenge for Indian government. Unless the challenge is addressed, the benefits of Smart mission and smart cities could be short lived.

- Regulatory challenges: There is a need for a clear and consistent regulatory framework to ensure the seamless implementation of smart city projects and to prevent delays or confusion. While such regulatory is in place in some advanced countries, its actual shape and form in cities in India must be suitably customized to take into account unique features and requirements of Indian people and cities.

IV. CONCLUSION

The plan of Smart City Mission is to renew the civic facilities of the area selected while preserving the lakes and heritage which would tie in with the grand strategic vision of boosting tourism in the city. The key metrics of liveability improvement like 24x7 water and power, 100% sewerage, accessible mobility solutions, inclusivity of basic services, etc. Therefore, the selection of area was done as per citizens' wishes to ensure that it provided maximum thrust to tourism while improving the service delivery to maximum number of residents that could serve as a model for the rest of the city. The information that is collected, reviewed and analyzed and presented provides the guidelines that can guide a city or a researcher about the role of smart cities in sustainable practices. The study does cover finding out the aspects of the efforts put by the government and challenges faced during execution of Smart City Mission in Udaipur. The smart city activities have different dimensions that target to improve the quality of different services to the citizen that are common to the needs of tourists. This study only covers the projects done under Smart City Mission in Udaipur city like ICT provision, Heritage, Solid Waste Management, and Social Infrastructure etc. and various challenges faced in this mission. Successful implementation of these types of projects is need of the hour for future growth of a nation like India that has the potential to emerge as a global leader.

REFERENCES

- [1]. Randhawa, A. and A. Kumar, *Exploring sustainability of smart development initiatives in India*. International Journal of Sustainable Built Environment, 2017. **6**(2): p. 701-710.
- [2]. Choudhary, S., et al., *Requirements of Solid Waste Management System in Savana Vegetable Market at Smart City Udaipur in Rajasthan*. International Journal of Engineering and Advanced Technology (IJEAT), 2020. **9**(3S): p. 26-29.
- [3]. Neirotti, P., et al., *Current trends in Smart City initiatives: Some stylised facts*. Cities, 2014. **38**: p. 25-36.
- [4]. Albino, V., U. Berardi, and R.M. Dangelico, *Smart cities: Definitions, dimensions, performance, and initiatives*. Journal of urban technology, 2015. **22**(1): p. 3-21.
- [5]. Gupta, K., W. Zhang, and R.P. Hall, *Risk priorities and their co-occurrences in smart city project implementation: Evidence from India's Smart Cities Mission (SCM)*. Environment and Planning B: Urban Analytics and City Science, 2021. **48**(4): p. 880-894.

- [6]. Choudhary, S., et al., *Requirements and Planning of Badliya Village for converting it into Smart Village Category in Banswara, Rajasthan*. International Journal of Engineering and Advanced Technology (IJEAT), 2020. **9**(3S): p. 40-44.
- [7]. Angelidou, M., *Smart cities: A conjuncture of four forces*. Cities, 2015. **47**: p. 95-106.
- [8]. Russo, F., C. Rindone, and P. Panuccio, *European plans for the smart city: from theories and rules to logistics test case*. European Planning Studies, 2016. **24**(9): p. 1709-1726.
- [9]. Cvar, N., et al., *The use of IoT technology in smart cities and smart villages: similarities, differences, and future prospects*. Sensors, 2020. **20**(14): p. 3897.
- [10]. Zavratnik, V., A. Kos, and E. Stojmenova Duh, *Smart villages: Comprehensive review of initiatives and practices*. Sustainability, 2018. **10**(7): p. 2559.
- [11]. Khansari, N., A. Mostashari, and M. Mansouri, *Impacting sustainable behavior and planning in smart city*. International journal of sustainable land Use and Urban planning, 2014. **1**(2).
- [12]. Praharaj, S., J.H. Han, and S. Hawken, *Urban innovation through policy integration: Critical perspectives from 100 smart cities mission in India*. City, culture and society, 2018. **12**: p. 35-43.
- [13]. Choudhary, S. and J. Sharma, *Surface Water Quality Trends and Regression Model through SPSS in Udaipur, Rajasthan*. International Advanced Research Journal in Science, Engineering and Technology, 2021. **8**(10): p. 153-160.
- [14]. Choudhary, S., et al., *Assessment of Drinking Water Quality and Efficiency of Water Treatment Plants in Udaipur, Rajasthan*. European Chemical Bulletin, 2023. **12**(3): p. 1175-1182.
- [15]. Choudhary, S., et al. *GIS Mapping for Distribution of Ground Water Quality in Udaipur*. in *IOP Conference Series: Earth and Environmental Science*. 2022. IOP Publishing.