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From Perception to Action: How Behavioral Change Influences Policy Implementation Success

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Abstract
As one of the oldest cities in the world, Varanasi holds immense cultural and religious significance for Hindus, Buddhists, Jains, and Sikhs, situated along the sacred river Ganga. Known for its rich traditions and spiritual heritage, Varanasi is also a bustling urban center facing modernization pressures. The Smart City project aims to balance heritage conservation with sustainable development, enhancing infrastructure while preserving Varanasi's historical identity. This study explores the impact of behavioral change on policy accomplishment within Varanasi's Smart City initiative, part of India's 2016 Smart Cities Mission. Further, paper examines how initiatives promoting cultural pride, environmental responsibility, and active citizen engagement foster positive behavioral shifts among residents, vital to the success of smart city policies. By evaluating these behavioral drivers, the study highlights how engaging citizens in heritage preservation and urban sustainability strengthens the policy outcomes in a city where tradition meets modernity.

Keywords: smart city; citizen perception; behavioral change; policy implementation

Introduction

The rapid expansion of urban areas worldwide marks a significant socio-economic shift, often described as urbanization. Defined broadly, urbanization refers to the migration of populations from rural to urban regions, a process that reshapes land use, infrastructure demands, and environmental dynamics (United Nations, 2019). This migration leads to both opportunities and challenges: cities must innovate to provide essential services while navigating complex pressures on their resources, environment, and infrastructure (Avtar et al., 2019; Goel & Vishnoi, 2022). This balancing act is particularly evident in the effort to integrate growth with sustainability, as urban expansion often strains ecosystems, contributes to pollution, and escalates resource consumption (S. Das et al., 2024; Seto et al., 2012). Sustainable urbanization thus calls for systemic approaches that accommodate economic and population growth without degrading environmental quality.

One transformative model developed in response to these pressures is the smart city. Smart cities deploy advanced digital technologies, particularly information and communication technologies (ICTs), to enhance public service efficiency and quality, promoting a higher standard of urban life. (Bibri & Krogstie, 2017) explain that smart cities aim to address core urban challenges through real-time data and connectivity, optimizing sectors such as transportation, healthcare, waste management, and energy use.

By leveraging data-driven solutions, smart cities strive for operational efficiency, inclusivity, and resilience, which together enhance environmental sustainability and social equity. These digitally integrated cities also support transparency in governance, streamline resource allocation, and adapt quickly to evolving urban needs (D. K. Das, 2024).

Heritage cities represent a unique intersection of urbanization and cultural preservation. These cities are defined by their historical and cultural importance, often containing architectural, cultural, or natural sites of heritage value. UNESCO, 2015 characterizes heritage cities as locations with a unique blend of tangible and intangible heritage assets that contribute to a city's identity and legacy. However, heritage cities face a dual challenge: they must modernize to meet contemporary urban demands without compromising their historical integrity. As such, the modernization of heritage cities requires strategic planning and specialized policies that support the conservation of significant cultural sites, prevent physical deterioration, and ensure that urban development aligns with cultural values (Bosone et al., 2021; Nocca, 2017).

In addressing the needs of growing urban areas, sustainability emerges as a foundational concept. Sustainability, as articulated by the Brundtland Commission (1987), encompasses the capacity to meet present needs without compromising future generations' ability to fulfill their needs. This principle emphasizes a balanced approach to development, integrating economic growth with environmental stewardship and social inclusion. Sustainable urban development focuses on reducing environmental impacts, promoting renewable resources, and fostering socio-economic equity, establishing an ethical framework for cities to manage finite resources responsibly (UN Habitat, 2020). In urban contexts, sustainability is also linked to resilience, encouraging cities to build adaptive capacities against climate risks and resource scarcity (Koutra et al., 2022).

The intersection of urbanization, smart cities, heritage conservation, and sustainability presents a complex yet vital framework for modern urban planning. As cities grow and evolve, they increasingly embody elements of each paradigm: they must be equipped with digital solutions, sensitive to historical heritage, and committed to sustainable practices. Additionally, understanding the importance of behavioral shifts and citizen perception in policy implementation emerges as a key objective in this framework. When policies resonate with residents' values and daily experiences, cities are more likely to see successful adaptation to new initiatives. This integrated approach not only enhances urban livability but also fosters cities' ability to support diverse communities, protect cultural assets, encourage active citizen engagement, and adapt to global challenges.

Significance of Behavioral Shifts in Policy Implementation

Behavioral shifts among citizens are essential for the successful implementation of urban policies, particularly in culturally rich and complex environments like Varanasi. In smart and heritage cities, where traditional values coexist with modern urban needs, fostering community engagement and compliance is crucial for long-term viability. Policy makers have come to understand that infrastructure alone does not ensure policy success; instead, policies must resonate with the cultural values and daily lives of residents to foster meaningful and sustainable behavioral adaptation.

Urbanization has reshaped cities globally, with the United Nations predicting that over 68% of the world's population will live in urban areas by 2050 (United Nations, 2019). This trend has spurred the rise of smart cities, which address urban challenges using data-driven and technological solutions to enhance efficiency and sustainability. As (Bibri & Krogstie, 2017) suggest, smart cities are built to optimize resources and support a high quality of life, yet in heritage cities like Varanasi, urban modernization must carefully

balance technological advancement with the preservation of cultural integrity. (Benita et al., 2019) highlights that modernizing traditional urban spaces requires sensitivity to historical aesthetics and local values to prevent cultural erosion, which can only be achieved by fostering positive behavioral shifts.01

Theories of behavioral change, such as (Ajzen & Manstead, 2007; Godin et al., 1993) Theory of Planned Behavior (TPB), underscore that behaviors are shaped by attitudes, social norms, and perceived behavioral control. In urban contexts, citizen attitudes toward policies—whether in waste management or heritage conservation—determine their likelihood of supporting these initiatives. Research by (Singh & Christmann, 2020) indicates that involving citizens in planning and feedback processes enhances their sense of ownership and accountability. When policies align with citizen values, residents are more likely to engage with them actively, from maintaining public cleanliness to respecting heritage sites.

In Varanasi, perception plays a significant role in policy engagement, as residents' beliefs and attitudes shape how they respond to initiatives. Projects like Ghat Revitalization reinforce cultural connections, aligning policy objectives with community values, thereby fostering proactive engagement. This alignment of individual behaviors with policy goals ensures that urban policies are embraced, supporting Varanasi's transformation into a sustainable and culturally vibrant city. Fig.1 represents how citizens perceive changes towards smart cities and ICT, while keeping their values and culture aligned.

Figure:1 Citizen perception towards smart city and ICT

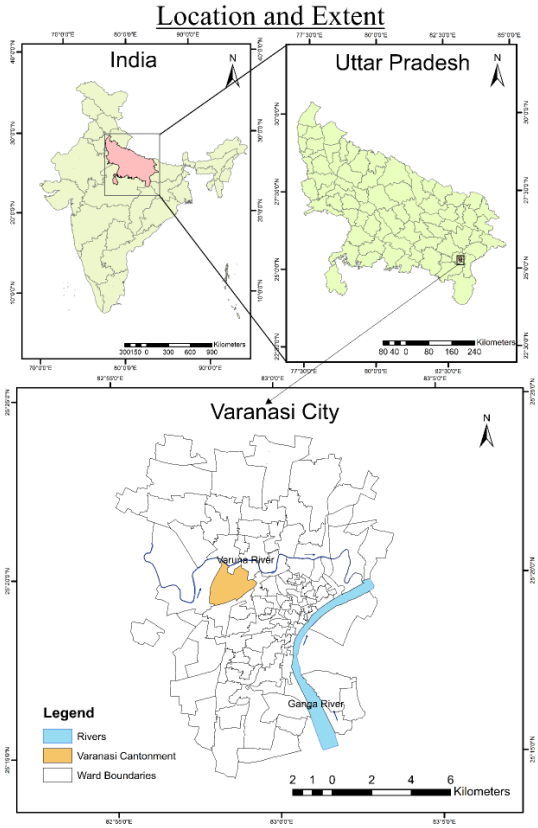
Source: Prepared by authors based on perception theories

Study Area

Varanasi, situated in the state of Uttar Pradesh, India, is one of the prominent cities included in the national Smart City Mission since 2016 (NNVNS, 2019). Renowned for its rich historical heritage, the city attracts a large influx of tourists due to its cultural significance and the revered Ganga River. Uniquely, the Ganga flows from south to north in Varanasi, with the famous ghats, or riverfront steps, lining the left bank of the river.

Covering an area of 146 square kilometers and located at an elevation of 80.71 meters above mean sea level, Varanasi is divided into 8 municipal zones and 100 wards to manage its urban framework. The population of the city is approximately 1.64 million, with a metropolitan area that exceeds 2 million people. The gender distribution is relatively balanced, with 53% males and 47% females, while the city boasts a literacy rate of 79.27%. However, Varanasi also faces urban challenges, as about 25.2% of its population resides in slum areas. Fig. 2 represents the location and extent of Varanasi city.

Figure:2 Location map of Varanasi city



Source: Prepared by authors using ARC GIS

Materials And Methods

The materials and methods for this research encompassed a comprehensive analysis of policy frameworks and citizen perceptions to evaluate the effectiveness of smart city initiatives in Varanasi. The study involved reviewing official policy documents, project reports, and implementation plans to identify gaps and challenges in execution. Additionally, site observations and case studies of specific projects, such as heritage site revitalization and waste management systems, were conducted to correlate policy intentions with on-ground realities. These components collectively provided a robust foundation for understanding the interplay between governance strategies and public engagement in urban policy implementation.

Smart City Vision and Policy Analysis: Varanasi City

1. Key Objectives and Vision

The Varanasi Smart City initiative (Smart City Varanasi, 2019) focuses on creating a city that is both livable and touristic. The mission emphasizes conservation alongside modernization, seeking to balance

these aims through inclusive urban planning. Each project phase is designed to uphold Varanasi's historical value while addressing contemporary needs, from sanitation to mobility.

2. Key Strategic Pillars

The Varanasi Smart City initiative is structured around six core pillars, each addressing a different aspect of urban life.

Suramya Kashi: This pillar prioritizes the cultural and architectural restoration of Varanasi's historic sites, such as temples and riverfronts. By creating spaces that respect cultural heritage, this initiative fosters a shared responsibility among residents to preserve these areas.

Nirmal Kashi: Emphasizing environmental sustainability, this pillar includes projects for solid waste management, water conservation, and urban greening. The availability of smart dustbins and public awareness campaigns encourages citizens to engage in responsible waste disposal, supporting environmental goals.

Surakshit Kashi: This component aims to enhance public safety through CCTV monitoring and emergency response systems. By increasing safety, the initiative encourages citizens to use public spaces confidently, fostering a sense of community trust and cohesion.

Samunnat Kashi: Through skill development centers and health services, this pillar supports economic empowerment. Providing regulated vending spaces also reduces street congestion, making Varanasi more visitor-friendly and fostering a sense of organized growth.

Ekikrit Kashi: Focused on e-governance and transparency, Ekikrit Kashi seeks to improve access to public services via smart cards and apps, ensuring that citizens can engage with the city's resources efficiently.

Sanyojit Kashi**:** This pillar addresses urban mobility by implementing e-rickshaws and developing multi-modal transportation hubs. Sustainable transportation systems are expected to shift citizens' transportation preferences towards eco-friendly options.

3. Strategy and Approach

Varanasi's approach combines Area-Based Development (ABD) for targeted improvements with Pan-City Solutions to enhance city-wide infrastructure. The ABD model allows for focused redevelopment, particularly in heritage zones, where preserving architectural character is essential. The Pan-City Solutions integrate city-wide ICT systems to streamline services and improve urban management.

4. Notable Projects and Their Impact on Citizen Behavior

Projects under the Varanasi Smart City initiative aim to enhance residents' quality of life and reshape behaviors:

Integrated Smart Solutions: These include Command and Control Centers, intelligent traffic management, and CCTV monitoring. By providing real-time information on city conditions, these solutions encourage responsible behavior, such as safer driving and compliance with waste management protocols.

Ghat Revitalization and Facade Restoration: By restoring Varanasi's iconic ghats, this project reinforces local identity and pride. Residents and tourists alike are more likely to respect these rejuvenated spaces, promoting a collective sense of heritage conservation.

Urban Revitalization and Junction Improvement: Upgrading junctions and improving road safety encourages safe mobility, reducing traffic congestion and making public spaces more accessible.

Heritage Conservation and Behavioral Adaptation: Through heritage-focused projects, citizens are encouraged to develop a shared sense of responsibility toward their city's cultural assets. For example, restored sites like ghats foster respect and pride among residents, reducing vandalism and enhancing community participation in maintenance efforts.

Environmental Responsibility and Sustainability: The Varanasi Smart City initiative's environmental policies emphasize waste management and green spaces. Visible, eco-friendly interventions like smart bins encourage proper waste disposal and greener practices. As a result, citizens gradually adopt a mindset of environmental stewardship.

Economic Inclusion and Community Empowerment: Skill development and support for local vendors create a structured economic environment where residents can thrive. Empowering citizens economically aligns individual livelihoods with city goals, promoting active participation in regulated economic activities.

Public Safety and Community Vigilance: By investing in public safety measures, the Surakshit Kashi pillar builds a safer city environment, promoting a sense of vigilance and community trust. Citizens perceive these spaces as safer, fostering greater use and care of public areas.

5. Citizen Perception and Behavioral Shifts: A Key Factor for Success

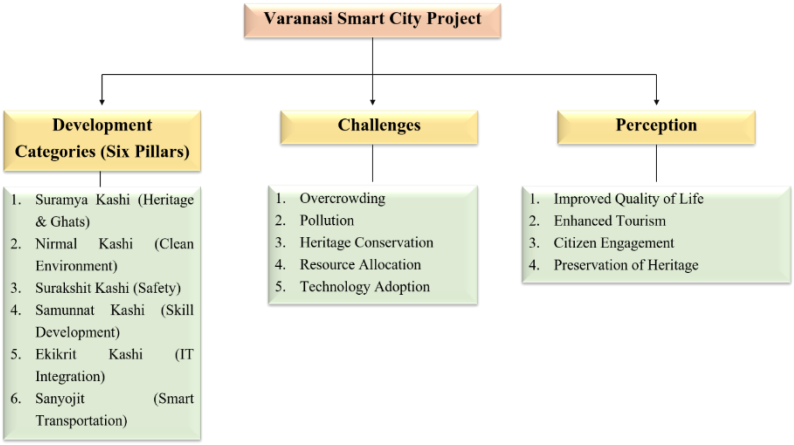
Despite the comprehensive planning and the initiatives outlined in the smart city report, ground-level realities in Varanasi divulge significant gaps in both citizen awareness and administrative commitment. Waste management efforts, for instance, face setbacks due to the lack of waste segregation at the household level and insufficient administrative enforcement. Issues such as traffic congestion persist, driven by irresponsible behavior, while ponds and water bodies continue to suffer from contamination, stagnant dirty water, unpleasant odors, and undiscerning waste disposal.

On a positive note, areas like the cantonment board showcase the benefits of active citizen participation and awareness. Events such as Banaras Giri have gained traction by promoting cleanliness, waste recycling, health awareness, creativity, and environmental education. These initiatives exemplify the transformative impact of community engagement, offering a replicable model to foster behavioral change and enhance the effectiveness of smart city policies.

Challenges and Gaps in Implementation

The implementation of smart city policies in Varanasi faces several significant challenges and gaps, undermining the effectiveness of the initiatives. While many projects have been proposed, a large number remain non-operational for extended periods, reflecting delays in execution. Despite allocated funding, implementing bodies often encounter bottlenecks and delays in the actual disbursement of funds, stalling progress further. Although sustainable infrastructure and projects have been designed as part of the Smart City Mission, their implementation often appears to be a mere formality, with insufficient efforts to address ground realities. For example, the rejuvenation of ponds, roads, and heritage sites has been undertaken, yet long-term maintenance and citizen cooperation remain major hurdles. People's willingness to adopt behavioral changes required to sustain these improvements is notably lacking, leading to the degradation of restored spaces, and negating the intended benefits of these urban development efforts. Fig. 3 is showing the developments, challenges, and perceptions towards Varanasi smart city project.

Figure:3 Components of Varanasi Smart city project



Source: Prepared by authors

Conclusion

The analysis underscores the potential of smart city policies in Varanasi to integrate technological innovation with cultural preservation. Effective governance mechanisms, such as sustainable urban infrastructure and heritage revitalization, highlight the positive impact of modernization on urban development. However, critical challenges remain, including delays in project execution, insufficient funding allocations, and inadequate citizen participation. Behavioral shifts in public perception and active engagement are essential to address these gaps. Strengthening ground-level implementation and fostering a balance between tradition and progress can ensure long-term sustainability. These improvements are imperative to align policy frameworks with the values and needs of the citizens.

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