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The Role Of Smart City Mission In Tourism Development And Sustainability In Agra

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Abstract:
In Agra, a city rich in history and renowned for its iconic sites such as the taj mahal and Agra fort, this research investigates the impact of the smart city mission (SCM) on tourism development and the promotion of sustainability. Although Agra attracts millions of tourists annually, it faces challenges including pollution, traffic congestion, outdated infrastructure, and inadequate urban services, all of which negatively affect both residents and visitors. This study explores the implementation of SCM strategies aimed at tackling these issues and improving the overall travel experience through digitalization, intelligent infrastructure, sustainability efforts, and community involvement. The aim of this study is to assess the tangible impacts of supply chain management (scm) strategies on the tourism services and heritage conservation in Agra. Additionally, it examines visitor satisfaction, compares Agra's progress with that of other smart heritage cities, and identifies best practices along with policy recommendations for the advancement of sustainable tourism. The results are expected to be highly beneficial for policymakers, urban planners, and tourism stakeholders who seek to align smart city goals with heritage preservation and inclusive urban development.

Keywords: smart city mission, tourism development, sustainability, Agra, urbanization, technology integration, cultural heritage

Introduction

Background of Agra as a tourist destination

Agra, a popular tourist destination in Uttar Pradesh, India, is well-known for its historical significance and architecture from the Mughal empire. The city's most well-known landmark is the taj mahal, a UNESCO world heritage site. From 1556 to 1658, Agra was the capital of the Mughal empire, leaving behind a wealth of historical landmarks and architectural wonders. The primary palace of Mughal rulers, the Agra fort is a collection of red sandstone forts from the 16th century that exhibits Mughal architecture. Emperor Akbar's abandoned city of Fatehpur Sikri is a prime example of Mughal architecture and urban design. Additionally, Agra is home to numerous cathedrals, mosques, and temples that draw pilgrims and religious tourists. The city's scenic attractiveness and historical significance are enhanced by its location near the Yamuna river. Agra attracts tourists and individuals who enjoy art with its handicrafts, leather items, and marble inlay work. Together with Delhi and Jaipur, Agra is a part of India's golden triangle tourism circuit. It is simple to reach by air, rail, and road from major Indian cities.

History

Agra is mentioned as Agrabah, a forest close to Mathura, in the renowned Hindu epic Mahabharata. Raja Badal Singh, a Sikar war Rajput monarch, did, nevertheless, found Agra by 1475. After establishing Agra as his capital in 1501, sultan Sikander Lodi was vanquished by emperor Babur at the battle of Panipat in 1526. When Agra was ruled by Akbar, Jehangir, and shah Jahan between the middle of the 16th and the 17th century, it reached its peak in popularity. Additionally, the taj mahal was being built during this time. Agra

was taken over by jat emperors in 1761, who also plundered some of the city's most exquisite shrines. The Marathas ruled there in 1770, but the British took control in 1803. Following the 1857 uprising, Agra was left on its own and Allahabad was given administrative province status by the British. At this point, it began to grow into a centre for heavy industry. Agra is becoming a location that everyone should visit.

Tourists visit places in Agra

- Taj mahal
- Fatehpur Sikri
- Agra fort
- Sikandra – the tomb of Akbar
- Chini ka rauza
- swami bagh Samadhi
- Itmad-ud-daulah tomb
- Mariyam's tomb

Overview of smart city mission

The Indian government started the project known as the smart city mission (scm) in 2015. Its aim is to make cities in India more sustainable and friendly to people by renewing and retrofitting them. The mission's goal is to improve selected cities in all areas by combining technology, infrastructure, and governance. The goal of this program is to make cities that have the basic infrastructure, a clean and sustainable environment, and a high quality of life for their residents by using "smart" solutions. In the beginning, 100 cities were chosen through a competitive process. Each city had to create a smart city proposal that explained its vision, plans, and methods to get money.

The scm emphasizes the use of digital technology to improve governance, service delivery, and mobility in cities as well as to development based on specific areas, such as greenfield development, upgrading, and redevelopment. With India's increasing urbanization, the scm represents a shift to inclusive and sustainable growth through innovation and citizen engagement.

The objectives of the smart city mission encompass:

1. Organizing effective urban mobility and public transportation.
2. Providing sufficient water supply and sanitation services.
3. Enhancing waste management practices.
4. Encouraging affordable housing and environmental sustainability initiatives.
5. Improving digital connectivity and electronic management.
6. Fostering citizen-centric and economically useful management.

Research objectives

- To learn how the smart city mission contributes to sustainable and intelligent travel.
- To evaluate the actions taken by Agra's government agencies as part of the smart city mission.

Review literature

Eiko wataya and rajib shaw 2024

This section highlights the distinctive strategies used in India's smart city mission program, which was created and put into action for urban revival and redevelopment. The ministry of housing and urban affairs (mohua) is in charge of overseeing the India smart city mission program, a national initiative started by the Indian government in 2015 with the goal of fostering urban sustainability. Bhubaneswar and nagpur were chosen as case studies from this initiative. While nagpur is an inland city in the country's center, bhubaneswar is a coastal city on the country's east coast. Different kinds of risks are present in both cities.

Asrifan,a.,et.al 2024

This research talks about eco-smart cities and how they contribute to smart technology and sustainable urban tourism. In order to foster innovation, resource efficiency, and sustainable growth, it places a strong emphasis on ecological principles and smart technological infrastructure. The chapter addresses the impact of eco-smart cities on managing urban tourism and offers research and solutions. In order to clarify how eco-smart communities may leverage smart technology to support tourism, this chapter offers a thorough assessment of the scientific literature.

Samancioglu,e.,et.al 2024

By examining the connection between smart tourism and sustainability through a thematic literature analysis, this study seeks to illuminate the role of sustainability in tourism in terms of smart technologies.

He, hongman & ye, wenyu & feng, shuang. (2023)

The idea of smart tourist cities has surfaced as a result of the recent, explosive growth of smart tourism technology including cloud computing, big data, internet of things apps, and social networking services. Additionally, there is a growing body of research on the subject of smart tourism city building. Based on citespace v and vosviewer 2020 platforms, this study summarizes the literature research in the topic of smart tourism cities using bibliometric techniques. The research literature on the clever building of a city's six tourist components is also compared in this study.

Mishra,s.et.,al 2023

The research explores the potential of smart infrastructure in the context of smart cities and its impact on the development of sustainable tourism. This section offers a detailed overview of the literature and investigates the possible cross-linkages of smart cities and tourism development, taking into account the significant contribution of smart infrastructure in enhancing tourism experience while minimizing the ecological footprints and the degradation of tourism products. It also seeks the challenges, prospects, and successes achieved in the application of smart infrastructure in smart cities as a strategy for sustainable tourism development. The results have important messages for academic, policy, and business actors interested in using smart technology for sustainable tourism.

Sarji,et.,al 2023

This research seeks to investigate recent literature on smart city and smart tourism, analyzing their contributions to attaining sustainable and competitive tourism via innovative design. The research outlines the connection between smart cities and tourism, detailing the present state and possible expansion of tourism in asia via smart cities. Recent research indicates that smart cities are vital for enhancing tourist destinations. Intelligent tourist cities emerge from the intersection of smart and tourist cities, utilizing technology to enhance life quality, urban services, and address social, cultural, and economic demands.

Vaziri,m.et.,al 2022

Over the previous century, and especially in the last ten years, the metropolitan population has grown rapidly, creating a unique backdrop for tackling environmental issues. Many strategies have been explored to address these problems, with the idea of a "smart city" emerging as a crucial remedy. A smart city is a neighbourhood that has been planned with smart living areas, smart surroundings, and effective transit. Modern technologies are employed in smart cities to better monitor, control, and optimize energy use. This study reviews pertinent theoretical underpinnings and investigates the urban environment within the framework of a smart city. Then, using text analysis, important metrics and variables related to smart cities have been found, along with relevant frameworks that help make these ideas more understandable.

Prasun agarwal and bipin kumar 2022

This essay's example of Agra smart city limited demonstrates the governance framework in place for carrying out and overseeing the mission. A thorough examination of the Agra special-purpose vehicle case's tendering procedure clarifies the vendor management procedure. This covers the selection, payment, and distribution of vendors.

Research gap

Finding a correlation between smart cities and sustainability has been the subject of studies that have identified gaps in the literature. These gaps have been filled with recommendations for icts (information and communication technologies), waste management strategies, and efficient transportation and water and electricity supply. Studies that have already been done on the subject of smart cities, tourism, and sustainability have been done extensively, but none of them include Agra as a research site or examine how smart cities and sustainability in tourism relate to each other to maintain the sociocultural dynamics of tourism. This has led to an increased interest in this area of study concerning both smart cities and the popular tourist destination of Agra.

Research methodology

This study's secondary data came from relevant research articles found on reputable government websites and in journals. Statistics on the measures that have been taken so far can be found on the Agra smart city mission's official website. Researchers can also find complete guidelines for the projects that are eligible for consideration under the mission on the ministry of housing and urban affairs' website.

Tourism in the city

Smart cities mission– objectives	Efforts of Agra smart cities limited	Motivation to tourism development & sustainability
Adequate water Supply	Water atm, water quality monitoring system, Providing 24x7 water supply to abd area's.	Basic need of tourism & Cleanliness
Improved sanitation	Progress under swatch bharat abhiyan improve sanitation, Development of e-toilets/self-cleaning automatic public toilets.	Need of a tourist and nudge to Keep the place clean.
Solid waste management	Door to door collection of solid waste with segregation, established of the agencies for collecting municipal solid waste management system under smart city mission.	Need of the area and nudge to Tourists to keep the place clean.
Efficient urban mobility & public transport	Operation of e-rickshaw, parking lot development nearby at sanjay palace because this area is called of it hub of Agra, construction of metro station, formulating and implementing urban design guideline for area around the monuments. Revival and beautification of the existing 48 Asi sites providing power supply with smart grid and smart metering, developing smart health centre, electric vehicle's charging station in various parking locations.	Reduces carbon footprint in tourism
It connectivity	E-ticketing and queue control at monuments, construction of command & control building, installation of wi-fi hotspots like railway station and robust optic fibre network with wi-fi spots across the city	Promotes better connectivity to ensure the marketing, accessibility & research activities in tourism.
Sustainable environment	Pollution control in Yamuna river by trapping wastewater, water quality monitoring system, protection from pollution and pedestrian zones close to historical sites.	To motivate to contribute to the achievement of sustainable development goals.
Safety & security of the residents	Construction of integrated command & control centre building, CCTV and surveillance system	Attract more tourists.
To improve the quality of tourism destinations	Conservation of step wall, renovation of ghats & waterfronts, Yamuna river front development, design, develop of adventure zone, development of heritage walk, beautification and streetscaping of Fatehabad road, organizing local festivals	The attraction for the tourists

According to the information on the website, it appears that the authority is taking the necessary steps to guarantee that the goal of smart cities is realized as a practical urban settlement, but there are still a lot of unfinished projects in this area.
The table formulated above makes the clarity to understand the correlation between features of smart cities & the concept of sustainable tourism development.

Findings

The city's cleanliness has improved thanks to the swatch Bharat scheme. The local government installed e-toilets at popular tourist destinations like taj mahal, red fort, Sikandra, Fatehpur Sikri, and other monuments. Additionally, the cleanliness of bus stops and railway stations has been improved, enhancing the quality of visitors' experiences visiting these places. The city has been made more beautiful by the removal of trash from surrounding retail establishments and the clearing of debris and algae from the Yamuna river.

The tourism destinations now have a more appealing appearance thanks to heritage rejuvenation initiatives like the preservation of step walls, renovation of ghats and waterfronts, development of the Yamuna river front, and design, development, and management of parks like taj nature walk, Mughal garden, Subhash park, Paliwal park, etc.

The goal of smart city is to clean up tourist destinations, and one way to do this is by capturing and purifying waste water. The city is now able to monitor the water quality in the city thanks to the installation of water quality monitoring systems.

Conclusion

Specifically focusing on Agra, a city where heritage and modern urbanization converge in a unique way, the comprehensive study plans to explore the relationship between sustainable tourism practices and the objectives of the smart city mission. The study highlights how features of smart cities like digitalization, smart infrastructure, sustainable development, and structures of governance boost both urban revitalization and the quality of the visitor experience.
The study shows that urban intelligence, when matched with sustainability goals, encourages a more effective, inclusive, and enticing tourism ecosystem by analysing Agra's smart city initiatives, including the installation of e-toilets, electric vehicles, smart roads, real-time tourists' information systems, and improved waste management. Infrastructure, cleanliness, safety, and accessibility have all improved noticeably as a result of these efforts, and these developments are essential for both domestic and foreign travel.
The study further highlights the growing importance of ict tools in tourism management, such as digital stands, augmented reality heritage tours, and e-ticketing, which have not only boosted service delivery for local authorities but also helped tourists to have self-guided experiences. These new innovations show that, when guided by sustainability principles, heritage tourism and technological advances can coexist and develop.
The findings also show that when government projects under the smart city mission are carried out responsibly, with involvement of stakeholders, and with a long-term outlook, they considerably speed up sustainable development. The research provides a framework for understanding how local urban strategies can support global sustainability agendas by comparing Agra's initiatives with the more general sustainable development goals (sdgs).

Scope for future studies or research

This study looks into how the smart city mission has been helping to promote sustainable tourism in Agra, but there is a lot of area for more research to expand on these findings and look into unexplored areas. Potential methods for future research include:

long-term impact assessments: because many smart city projects are either in progress or have just been introduced, future research could focus on long-term research that evaluate their long-term impacts on urban living standards, environmental quality, and tourism sustainability.

Comparative analysis with other cities: to discover best practices, barriers, and the possibility of replication of successful models, research could compare Agra with other heritage cities in India or elsewhere that are involved in smart city initiatives (like jaipur, Varanasi, or Kyoto).

Views of the local community: there is a chance to carry out comprehensive qualitative research that focuses on the opinions of locals, vendors, and business owners in order to determine the ways in which smart tourism methods affect their means of basic needs, interaction, and cultural expression.
Sustainability measures and indicators: more research is necessary to determine how particular sustainability metrics—like waste production, carbon emissions, and tourist carrying capacity—are evaluated, tracked, and improved in smart tourism zones.

Tourist behaviour and expectations: future studies could look into how smart measures are affecting travellers' expectations, digital habits, and awareness of environmental issues, as well as how these aspects affect travel planning.

Studies on policy and governance: these studies can evaluate how well tourism departments, local governments, and tech companies coordinate policies. It might also assess how citizens participate in tourism-related smart city governance procedures.

Technology-driven innovations: as technologies such as the use of artificial intelligence, big data virtual reality (vr), and the internet of things (IOT) continue to develop, future studies might examine their potential and current limitations in promoting sustainable tourism in Agra.

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