

## THE SMART CITY CONCEPT IN GUNUNGKIDUL REGENCY AND ITS IMPACT ON THE TOURISM SECTOR

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### Abstract

*The application of the Smart City concept has become an innovative solution in increasing the efficiency of urban management and the tourism sector. Gunungkidul Regency, which has great natural tourism potential, is starting to adopt this concept to increase tourist attractions and provide a better experience for tourists. This research aims to analyze the influence of Smart City implementation on the tourism sector in Gunungkidul Regency, with a focus on aspects of Smart Governance, Smart Economy, Smart Mobility, Smart Environment, Smart People and Smart Living. The research method used is a qualitative descriptive approach with literature study and analysis of secondary data from various sources such as government reports, scientific articles and digital media. The research results show that the implementation of Smart City has had a positive impact on the tourism sector, especially in increasing access to tourist information, improving the transportation system, increasing tourist comfort and safety, as well as encouraging local economic growth through the digitalization of tourism businesses. However, there are still several challenges in its implementation, such as limited digital infrastructure, low public digital literacy, and the need for large investments in technology development. Therefore, collaboration is needed between the government, the private sector and the community in optimizing the implementation of Smart City to support sustainable tourism growth in Gunungkidul Regency.*

**Keywords:** Smart City, Tourism, Gunungkidul, Digitalization, Local Economy

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### INTRODUCTION

Gunungkidul Regency is one of the leading tourist destinations in the Special Region of Yogyakarta, renowned for its natural beauty. This region offers a variety of tourist attractions, ranging from exotic white-sand beaches such as Indrayanti Beach and Drini Beach to more adventurous nature tourism like Jomblang Cave and the Ancient Volcano of Nglanggeran. These natural riches make Gunungkidul a magnet for both domestic and international tourists. However, despite its significant tourism potential, the management of the tourism sector in Gunungkidul still faces several challenges, including suboptimal infrastructure, limited accessibility to tourism information, and constraints in digital marketing (Marlina., 2016; Adinugroho, 2017; Badrudin et al., 2024).

Gunungkidul is famous for its abundant natural tourist spots, for example, beautiful beaches, limestone caves, and hills that attract visitors from Indonesia and other countries. The idea of a smart city was created to meet the need for a city that is good to live in, safe, cozy, eco-friendly, and able to handle climate change and disasters. This plan uses the best parts of the area, like its location, money-making opportunities, and traditions, and it also uses modern tech and ways to communicate (Damiasih & Yunita, 2017). One place in Indonesia that could use the smart city idea is the Gunungkidul area in Yogyakarta.

With technological advancements, the Smart City concept has emerged as a potential solution for improving tourism management in Gunungkidul Regency. A Smart City is a technology-driven urban management concept that utilizes information and communication technology (ICT) to enhance public service efficiency, community welfare, and environmental sustainability. This concept encompasses various aspects, including smart governance, smart mobility, smart economy, smart environment, smart people, and smart living. In the context of tourism, the implementation of the Smart City concept can enhance the tourist experience through digital technology applications in tourism information services, intelligent navigation systems, tourist data management, and digital-based marketing (Anindra et al., 2018; Anthopoulos, 2015; Damiasih & Yunita, 2017).

Currently, Gunungkidul Regency has begun implementing several Smart City elements, such as integrating digital technology into public services, expanding internet networks in various tourist destinations, and utilizing social media and digital applications for tourism promotion (Deti et al., 2023). The Gunungkidul Regency Government is also collaborating with various stakeholders to develop technology-based systems that support the tourism sector. For example, they are developing tourism applications that provide comprehensive information about destinations, travel routes, entrance ticket prices, and tourist reviews. However, the implementation of the

Smart City concept in the tourism sector of Gunungkidul remains suboptimal and requires further improvements to achieve a more significant impact (Conoras & Hikmawati, 2018; Dyah Indriyaningsih Septeri et al., 2024).

One of the main challenges in implementing the Smart City concept in the tourism sector is the limited digital infrastructure, particularly in remote areas where major tourist attractions are located. Some tourist destinations in Gunungkidul still have minimal internet access, making it difficult for visitors to obtain information or share their experiences in real time. Additionally, a lack of human resources skilled in technology management poses another challenge. Many tourism business operators, such as homestay owners, food stall vendors, and tour guides, have yet to fully understand how to utilize digital technology to enhance their business competitiveness.

On the other hand, the implementation of the Smart City concept in the tourism sector presents a great opportunity for regional economic development. An integrated digital system allows for broader and more effective tourism promotion, attracting more visitors. Moreover, digitalization in the tourism sector can improve visitor convenience through digital payment systems, online ticket reservations, and app-based tour guide services. These advancements benefit not only tourists but also boost the income of local communities who rely on the tourism sector.

The success of Smart City implementation in the tourism sector also heavily depends on government support and collaboration with various stakeholders, including the private sector and local communities. The Gunungkidul Regency Government must continue to develop policies that support the digitalization of tourism, including providing technological infrastructure, enhancing digital literacy among tourism business operators, and fostering technology-driven innovations in tourism services. Furthermore, partnerships with technology companies and digital platforms can help accelerate the digital transformation of Gunungkidul's tourism sector.

But, this research does not yet talk in detail about the natural social things, like how well the community knows about using digital tools, how prepared small businesses are to start using technology, and how local people help make changes in community growth. These social things are very important for a smart city to keep going, especially when talking about tourism that involves the local community. If we look at it from the view of how new social ideas are created, we can see how local people start and grow new ways to fix different social problems by working together and changing how they use technology. Also, the Technology Acceptance Model gives us a way to understand what makes small businesses and the public ready and willing to use technology, including if they think it will help them, how easy it is to use, and if they have support from others. This way, we can better study the problems and chances in using digital tools that are pushed by the community getting involved.

Based on the background above, this study aims to analyze the implementation of the Smart City concept in Gunungkidul Regency and its impact on the tourism sector. Additionally, this research seeks to identify the challenges faced in implementing this concept and explore potential solutions to maximize its benefits for the development of tourism in Gunungkidul Regency. Therefore, this study is expected to provide valuable insights for local governments, tourism business operators, and the public in supporting technology-driven tourism development in Gunungkidul Regency.

## **RESEARCH METHODS**

The research uses a way of looking at things with a case study to see how the Smart City idea is being used to manage tourism in Gunungkidul Regency. This method was picked because it helps us really understand what's going on by looking at information that's already out there, without talking to people directly. The information used comes from many papers and articles, like official papers from the Gunungkidul Regency government, including rules, plans, and yearly reports about Smart City and tourism. Also, papers from experts and school articles that talk about the Smart City idea, ways to help tourism grow, and how they are used in different places are important. Reports from groups that study technology and tourism are also key sources of information (Hafizha et al., 2023; Herdiyanti et al., 2019).

Other things used are official websites from the government and groups like the Gunungkidul Tourism Office and the Ministry of Tourism and Creative Economy, which give new information about Smart City and tourism in the area. Online news and articles that talk about plans, projects, or new ideas related to Gunungkidul's Smart City efforts are also looked at. The ways of getting information include looking at articles, papers, and what's online. Looking at articles means checking expert papers that explain the Smart City idea and how it's used in tourism. Looking at papers means checking government rules and reports about how Smart City is being used in Gunungkidul. Looking online means finding information on government websites, social media, and tourism sites that show new technology in the local tourism area (Nisa, 2019).

The way of looking at the information follows a way of describing things with three main parts: making the data smaller, showing the data, and making conclusions. Making the data smaller means picking the important

information and getting rid of data that doesn't help the study as much. Showing the data means putting the information in order so it's easier to understand. Conclusions are made based on how the Smart City idea and tourism management are related in Gunungkidul Regency, including the problems faced when using it. While this way is good for understanding ideas like Smart City, it has limits because it doesn't have real-life interviews or seeing things in person. To make the data more believable, information from trusted articles and papers is used, with clear rules for picking sources based on how relevant, recent, and reliable they are from schools or groups (Putri et al., 2023).

The study is supported by an idea that connects Smart City with growing tourism in the area, using ideas about technology and ways to keep tourism going for a long time. This idea gives a clear path, making the study not just a description but also an analysis. Because of this, the way of doing things is stronger for being scientific and gives a full understanding of how Smart City is used in Gunungkidul's tourism management.

## **RESULTS AND DISCUSSION**

### **The Smart City Concept in Gunungkidul Regency**

Gunungkidul Regency is an administrative region located in the Special Region of Yogyakarta, with its government center in Wonosari. The total area of this regency reaches 1,485.36 km<sup>2</sup>, accounting for approximately 46.63% of the total area of the Special Region of Yogyakarta. Wonosari itself is situated in the southeastern part of Yogyakarta City, approximately 39 km away. In addressing various regional challenges and issues, a comprehensive, inclusive, effective, and efficient strategic approach is required. One of the concepts implemented in regional management and development is the Smart City, which leverages Information and Communication Technology (ICT) to connect, monitor, and manage various resources optimally, aiming to enhance public services and support sustainable development (Wulandari & Priyastiwati, 2022).

The Smart City concept is no longer just a technological trend but represents a fundamental transformation that extends across various sectors of life, including tourism. The integration of ICT in urban development not only creates operational efficiency and improves residents' quality of life but also opens revolutionary opportunities in how tourism is experienced and managed. The relationship between Smart City and tourism is symbiotic, where smart technology plays a key role in enhancing the visitor experience, optimizing destination management, and promoting sustainable and responsible tourism (Yandri et al., 2020).

In the digital era, modern travelers expect easy access to information, personalized services, and immersive experiences. Smart City meets these needs by providing integrated digital platforms that offer real-time information on tourist attractions, transportation, accommodations, and various events. Mobile applications, smart navigation systems, and personalized recommendations help tourists plan their trips more easily and efficiently while discovering hidden gems that match their interests. Technologies such as augmented reality (AR) and virtual reality (VR) further enrich the tourism experience by providing interactive and immersive visualizations of historical sites, museums, or natural attractions (Viola & Fitrianto, 2022; Wahid & Amalia, 2020).

Beyond enhancing the tourist experience, Smart City also enables more efficient and sustainable destination management. Sensors and data analysis are used to monitor crowd levels at popular tourist spots, manage visitor flow, and optimize public transportation systems to reduce congestion and improve accessibility. Smart parking applications assist tourists in finding parking spots easily, while video surveillance systems and predictive analytics enhance security in tourist areas. Additionally, smart technology plays a crucial role in natural resource management, emission reduction, and waste management, ensuring that tourism contributes to environmental sustainability (Syalianda & Kusumastuti, 2021).

Tourism promotion has also undergone a transformation thanks to Smart City initiatives. Targeted digital marketing campaigns, social media utilization, and strong city branding efforts help attract tourists from around the world. Demographic data and traveler preferences are used to create relevant and personalized messages, while digital platforms facilitate direct interaction with tourists and effective feedback management. Thus, Smart City is not only an intelligent tourist destination but also a powerful promotional engine that continuously innovates to capture global attention (Rochani, 2017; Supangkat et al., 2018).

In summary, the relationship between Smart City and tourism is a mutually beneficial partnership. Smart City provides the infrastructure and technology needed to develop smarter, more sustainable, and tourist-centered tourism. In return, tourism serves as an economic and social driver for Smart City development while contributing to the preservation of cultural heritage and natural environments. Through continuous innovation and collaboration, Smart City and tourism can create a brighter future for cities worldwide.

The vision of the Smart City initiative in Gunungkidul Regency aligns with the vision of the Regional Medium-Term Development Plan (RPJMD) 2021-2026, which is: *"To achieve the enhancement of the welfare of the people of*

*Gunungkidul with dignity by 2026.*" Meanwhile, the mission of Smart City implementation includes: *First*, Addressing strategic regional challenges through the utilization of information and communication technology. *Second*, Encouraging innovation to enhance the region's leading potential. *Third*, Developing cross-sector collaboration to achieve the vision of Gunungkidul Regency.

### Integration of the Smart City Concept in Tourism Development in Gunungkidul Regency

Gunungkidul Regency, part of the Special Region of Yogyakarta, has experienced significant development in tourism and infrastructure. With its extraordinary natural tourism potential, including exotic beaches, caves, and ecotourism-based attractions, Gunungkidul has become a favorite destination for both domestic and international tourists. However, challenges in tourism management, such as uneven infrastructure, limited information accessibility, and conventional governance, have encouraged the local government to adopt the Smart City concept in regional development (Damiasih & Yunita, 2017).

Gunungkidul Regency, with its natural beauty, cultural heritage, and tourism potential, faces developmental challenges such as limited infrastructure, accessibility issues, and economic disparities. The Smart City concept is relevant in addressing these challenges and realizing sustainable and inclusive development. Generally, a Smart City is an urban development concept that integrates Information and Communication Technology (ICT) to improve the quality of life, operational efficiency, economic competitiveness, and environmental sustainability. More than just technology implementation, Smart City focuses on solving urban problems, increasing community participation, and creating an innovative ecosystem (Kusumastuti & Rouli, 2021).



**Figure 1: Graph of the Increase in Gunungkidul Tourist Visits (2020-2024)**

Since its introduction, the Smart City program has had a positive impact, particularly in increasing tourist numbers. According to data from the Gunungkidul Central Statistics Agency (2024), the number of tourists has significantly increased between 2023 and 2024, reaching more than 3,100,000 visitors. This figure is much higher compared to the 2020-2021 period, which recorded just over 1,900,000 tourists. The decline in previous periods was due to the COVID-19 pandemic, which led to large-scale social restrictions (PSBB) and community activity restrictions (PPKM). Additionally, the success of this program was proven by the Smart City Innovation Award in the Smart Branding category, achieved through the Quick Wins Digital Market program initiated by the Tourism Office in 2023 (Dyah Indriyaningsih Septeri et al., 2024).

The Gunungkidul Regency Government has demonstrated a strong commitment to developing the tourism sector. After building various supporting infrastructures, the local government has now started designing the E-Tourism program. Kelik Yudiantoro, Head of the Informatics Services Division at the Gunungkidul Communication and Information Office (Diskominfo), explained that this program is part of the Smart City implementation launched this year. According to Kelik and Gunungkidul Regent Hj. Badingah, the Smart City concept was introduced in Gunungkidul in 2019, following the preparation of an integrated infrastructure throughout the regency since 2017. In 2018, the government began connecting various information systems to enable seamless integration (Ardiatma, 2025).

Kelik added that the Smart City initiative has become a top priority in Gunungkidul's development. He emphasized that this concept is not just a trend but a necessity that must be fulfilled. So far, Smart City-supporting infrastructure has been established at the regency, district, and village levels. The E-Tourism program aims to provide broader information for tourists about destinations in Gunungkidul. Through this initiative, tourists are

expected to enjoy a more interactive digital experience and share reviews on their social media. By analyzing this data, the government can conduct evaluations to further improve the tourism sector.

To support the E-Tourism program, several facilities will be provided, such as free WiFi access in tourist areas, villages, and districts. Kelik revealed that this program requires approximately IDR 1.5 billion in funding, which will be sourced from various government agencies' budgets and partnerships with multiple stakeholders. Regent Hj. Badingah added that the local government has prepared the necessary infrastructure and facilities to realize E-Tourism. She hopes that this program will contribute to improving the economic well-being of the Gunungkidul community (Pramono, 2025).

The implementation of the Smart City concept in Gunungkidul must be adapted to the local context and regional characteristics. Its main pillars include:

- a. **Smart Governance**, which involves the digitalization of public services, Open Data availability, public participation through digital platforms, and inter-agency collaboration.
- b. **Smart Economy**, which includes digital MSME assistance, e-commerce development, business incubation, and the use of technology for tourism.
- c. **Smart Living**, which involves improving healthcare services through telemedicine, utilizing technology in education, enhancing security with CCTV, and improving infrastructure quality.
- d. **Smart Environment**, which focuses on smart waste management, the use of renewable energy, environmental quality monitoring, and natural resource conservation.
- e. **Smart Mobility**, which covers intelligent public transportation systems, real-time traffic information, smart parking solutions, and road infrastructure development.

Concrete examples of implementation include the development of tourism mobile applications, the installation of CCTV cameras at tourist sites, the development of Geographic Information Systems (GIS) for spatial planning, ICT training for MSMEs, and the provision of free internet access in public areas. Challenges in implementation include limited ICT infrastructure, a shortage of skilled personnel, budget constraints, and a lack of community engagement. Strategies to address these challenges include infrastructure investment, human resource development through training, private sector partnerships, education and socialization efforts, and a focus on local needs.

The Smart City concept offers innovative solutions to address development challenges in Gunungkidul Regency. With proper implementation, a Smart City can enhance the quality of life, drive economic growth, and ensure environmental sustainability. The success of the Smart City initiative in Gunungkidul requires commitment from all stakeholders, including the government, private sector, community, and academics. Through strong collaboration, Gunungkidul can serve as a successful example of a Smart City in a rural area, focusing on sustainable and inclusive development.

### **Best Implementer of Smart City in the Smart Branding Category**

Smart Branding refers to innovations in promoting Gunungkidul Regency to enhance its competitiveness by developing three sub-dimensions: tourism, business competitiveness, and city appearance. Smart Branding is one of the key dimensions of a Smart City because, in today's information era, a city is no longer solely reliant on utilizing its local potential to meet its needs. Instead, it must also attract public participation, both from within and outside Gunungkidul Regency, as well as business actors and investors, to help accelerate its development.

The concept of Smart City branding shares similarities with corporate branding, with the key difference lying in their objectives. The goal of corporate branding is to increase a company's brand value, leading to higher income and profits. Meanwhile, Smart City branding aims to enhance brand value in a way that stimulates economic activity and promotes the development of local social and cultural life, ultimately improving public welfare. The realization of smart tourism branding is expected to improve the performance of the tourism sector.



**Figure 2: Smart Branding**

*Source: Smart City Masterplan Development Guide 2021, Ministry of Communication and Informatics of the Republic of Indonesia*

The Smart Branding roadmap aims to enhance the image of Gunungkidul Regency as an attractive and visitor-friendly tourism destination. The key performance indicators include the percentage of public information and communication management achievements, the number of promotional media, collaboration networks, events, and tourism promotional materials, as well as the number of tourism businesses that have obtained TDUP licenses.

The Gunungkidul Regency Government is also committed to preserving local culture through the physical development of the Gunungkidul Cultural Park and the enhancement of cultural heritage sites. This roadmap reflects the government's dedication to improving the image and quality of tourism services, promoting local products, and preserving local culture. Efforts are made to collaborate with business actors and the Tourism Awareness Community Group (POKDARWIS) to promote tourism through online media. The three sub-dimensions of Smart Branding are as follows:

**1. Tourism:**

- a. Developing and enhancing tourist destinations that are suitable for visitors.
- b. Building infrastructure that supports visitor comfort (amenities), such as roads, transportation, hotels, restaurants, etc.
- c. Fostering a culture of hospitality for visitors, including foreign language proficiency, the availability of tour guides, and more.

**2. Business Competitiveness:**

- a. Establishing platforms and marketing a conducive and comfortable trade ecosystem, such as marketplaces and e-commerce.
- b. Developing and promoting an investment ecosystem that is easy and effective, including Investment Lounges, Dashboards, and Investment Portals.
- c. Creating and marketing creative industry products and services, such as culinary arts, handicrafts, fashion, digital products, and more.

**3. City Appearance:**

- a. Revitalizing the city's appearance by emphasizing architectural values that reflect Gunungkidul's identity while aligning with modernization trends that seek beautiful, clean, organized, and internationally standard urban planning.
- b. Constructing city borders (edges), establishing memorable location markers (landmarks), providing unique navigation signage leading to the city, ensuring well-structured roadways (paths), and developing key city nodes, such as town squares, monuments, and other significant urban landmarks.

The Smart City program in Gunungkidul Regency has been running for four years, from 2019 to the present. Based on national evaluations conducted over the past three consecutive years, Gunungkidul Regency consistently ranked among the top 10 out of 100 evaluated cities/regencies. In 2021, Gunungkidul Regency even received the Smart City Innovation Award in the Smart Branding dimension through programs such as:



### **1. Cakrawala Budaya Dhaksinarga**

Gunungkidul Regency officially joined the "Towards 100 Smart Cities Movement" Program on May 15, 2019. This participation began with the signing of a Memorandum of Understanding (MoU) between the Director-General of Informatics Applications at the Ministry of Communication and Informatics and the Regent of Gunungkidul. The program aims to implement technology-based development that benefits the public.

As the program progressed, the implementation of Smart City initiatives in Gunungkidul Regency has resulted in various innovations that contribute to regional development. The program is carried out through collaboration and integration across Smart City dimensions to create more efficient and effective solutions. One of the key focuses of Smart City development in Gunungkidul is Smart Branding, which leverages the potential of the tourism and cultural sectors as the region's main attractions. Additionally, Gunungkidul's rich cultural heritage and traditions serve as fundamental pillars in developing Smart Society. The integration of tourism, culture, and active public participation forms a strong foundation for Gunungkidul to become a sustainable Smart City.



**Figure 3: Cakrawala Budaya Dhaksinarga Application**

As part of the digital transformation, the Gunungkidul Regency Department of Culture developed Cakrawala Budaya Dhaksinarga, an application-based innovation aimed at preserving and protecting the region's cultural heritage. This program serves as a solution to various challenges, such as the lack of accurate information on cultural potential, limited access, and low public participation in cultural preservation. The application features a search tool and an interactive map that facilitates access to cultural site information. Additionally, Cakrawala Budaya Dhaksinarga functions as a promotional and outreach platform for cultural events in Gunungkidul Regency. The application can be accessed via the official website: <https://cbd.gunungkidulkab.go.id>.

To enhance tourism and cultural appeal, the Gunungkidul Regency Department of Culture and Tourism officially launched the Cakrawala Budaya Dhaksinarga application on May 26, 2015. The application was initiated by Hadi Risma and inaugurated by the then Regent of Gunungkidul, Badingah. This Android-based application, available for download on the Google Play Store, provides information on more than 150 tourist sites, including cultural heritage sites. Its key features allow users to search for tourist destinations based on categories or specific regions. For example, users can explore Playen District to discover local tourism and cultural sites. Moreover, the app includes social media sharing options, a tracking feature to guide users to tourism locations, and event notifications for ongoing cultural and tourism activities.

Although the application still has some limitations, such as the need for improved access speed, continuous development efforts are being made to attract more visitors to Gunungkidul. One strategy employed is withholding detailed location information to encourage users to visit the sites in person. With this technology-based innovation, Gunungkidul is expected to gain wider recognition as a leading tourism destination that integrates natural beauty, culture, and technology in its management.

### **2. Digital Market**

The Digital Market was one of the Quick Wins of the Smart City program from 2020 to 2022. This initiative aimed to enhance and develop tourism destinations by creating and managing tourist attractions through the Digital Destination Ecosystem—a concept where a location becomes a true tourist destination after being promoted through social media.

This transformation is supported by camera-friendly and visually appealing spots, enabling visitors to create content for platforms like Instagram and Facebook. Digital interactions (such as views, likes, comments, reposts, and shares) help attract more online users to visit these destinations.

In Gunungkidul, three digital tourism markets are currently being developed: *Pasar Taman Bumi* – located within the Geosite Lembah Ngingrong Mulo, *Pasar Telaga Jonge* – in Semanu District and *Pasar Ekologis* Argowijil – in Gari Village, Wonosari District. Additionally, independent replicas of digital markets have been widely established in village tourism destinations, inspiring local tourism entrepreneurs to build their own digital markets.



**Figure 4: Wooden Coins as a Medium of Exchange in Ngingrong Digital Market**

These markets highlight Gunungkidul's local wisdom, allowing visitors to experience a nostalgic journey into the past. The traditional market setting and concept enhance its uniqueness—while transactions still involve conventional currency, visitors can also use a traditional barter system with local tokens as a unique selling point. Traditional snacks and local products, including authentic regional foods and handcrafted souvenirs, are curated and sold by local communities, further strengthening cultural preservation and economic sustainability.

The Head of the Tourism Office consistently translates the Regent's vision and mission into concrete tourism programs, such as the Digital Market initiative. This proactive approach has increased awareness among staff about the strategic goals of the organization. The head of the department demonstrates strong commitment and fosters pride and confidence among the team—regularly monitoring activities in the early morning to ensure everything runs smoothly. The Digital Market program recently received an award in the Smart Branding category in 2023, recognizing its innovation in tourism promotion through digital media. While not entirely digital in operation, this initiative effectively utilizes digital branding strategies to promote tourism destinations, making them more accessible and well-known to travelers.

The program was launched on September 8, 2018, with Ngingrong and Jonge as the first locations, and has continued to expand as part of Gunungkidul's vision for sustainable tourism development. Gunungkidul's commitment to Smart Economy is evident in its digitalization of micro, small, and medium enterprises (MSMEs) within the tourism sector. The local government collaborates with various digital platforms to help local businesses market their products online. Through e-commerce and digital booking applications, tourists can easily discover and purchase Gunungkidul's unique offerings, including: Traditional foods, Handicrafts, and Tourism packages. Additionally, digital payment systems are being introduced across various tourism sites to enhance transaction convenience. Several attractions in Gunungkidul have already implemented cashless payment systems using QRIS, making transactions more practical and secure. With these technological advancements, Gunungkidul is positioning itself as a modern and sustainable tourist destination, blending cultural heritage with digital innovation.

### **The Impact of Smart City on Tourism in Gunungkidul Regency**

The implementation of the Smart City concept in Gunungkidul Regency has brought significant changes to the tourism sector. By utilizing digital technology, destination management has become more effective, the tourist experience has improved, and the economic impact on the local community has increased. Smart City, which encompasses various aspects such as Smart Governance, Smart Economy, Smart Mobility, Smart Environment, Smart People, and Smart Living, has had a positive impact on multiple facets of the tourism sector.

One of the most significant impacts of Smart City implementation in tourism is the increased access to information for tourists. Previously, many tourists struggled to obtain complete information about tourist destinations in Gunungkidul, including location, ticket prices, and available facilities. With digitalization, tourists can now access information through the official government website, tourism applications, and social media managed by the Tourism Office. These digital platforms not only provide basic information but also feature interactive elements such as digital tourism maps, recommended travel routes, and reviews from other visitors. Additionally, tourism promotion has expanded through the use of digital technology, such as social media campaigns, data-driven advertising, and collaborations with travel influencers (Kamal et al., 2022; Kusumastuti & Rouli, 2021).



One of the main challenges in Gunungkidul's tourism sector is accessibility to various destinations, especially in remote areas with limited transportation infrastructure. Through the concept of Smart Mobility, tourists can now more easily find the best routes to tourist destinations with the help of navigation technologies such as Google Maps and AI-based travel applications. Moreover, app-based transportation services are beginning to develop in Gunungkidul, enabling tourists to book vehicles more conveniently. Real-time traffic information also helps tourists avoid congestion, particularly during peak holiday seasons when visitor numbers surge.

The Smart City concept also contributes to enhancing tourists' comfort through various technology-based innovations. Several tourist destinations have implemented digital ticketing systems, eliminating the need for long queues to purchase entrance tickets. Digital payment systems such as QRIS are also increasingly being adopted, allowing tourists to make transactions without carrying cash. Additionally, some destinations are equipped with free Wi-Fi, enabling tourists to easily access the internet and share their experiences on social media. Customer service through chatbots and tourism applications further enriches the tourist experience by providing faster and more accurate information.

With economic digitalization under the Smart Economy concept, tourism entrepreneurs in Gunungkidul now have broader access to market their products and services. Small and medium-sized enterprises (SMEs) in the tourism sector, such as souvenir artisans, lodging owners, and culinary businesses, can sell their products online through marketplaces or social media. The increase in tourist arrivals due to digital marketing strategies also positively impacts local community income. Additionally, online booking platforms allow tourists to easily find and reserve services such as accommodations, tour packages, or other tourism activities.

Comparing Gunungkidul Smart City tourism initiatives to Bandung, Surabaya, and Denpasar provides practical benchmarks:

**Tabel 1. Comparative Insights Smart City**

City	Key Smart City Tourism Focus	Noteworthy Initiatives	Lessons for Gunugkidul
Bandung	Integrated digital tourism and urban management	Mobile apps for tourism, smart reporting systems	Emphasizes enhanced digital visitor services and streamlined governance
Surabaya	Environmental sustainability and public safety	Smart waste management, AI-powered video surveillance	Model for environmental management and security measures within tourism
Denpasar	Cultural heritage and community-based tourism	Digital cultural promotion, smart booking platforms	Demonstrates community engagement and heritage preservation using technology

These cities illustrate how integrating smart technologies with policy innovation and community participation can achieve sustainable tourism. Gunungkidul can adapt these models by prioritizing local assets, addressing geographic and infrastructural challenges, and promoting inclusiveness. One of the challenges in tourism development is maintaining environmental sustainability. Through the Smart Environment concept, environmental management in tourist destinations has become more efficient. Some tourist spots have implemented technology-based cleanliness monitoring systems, where sensors can detect waste volume and notify sanitation workers to conduct timely waste collection. Furthermore, digital environmental education is increasingly being promoted to raise tourists' awareness of the importance of maintaining cleanliness and preserving nature. Technology-based sustainable tourism programs, such as the use of electric vehicles in some tourist destinations and the implementation of renewable energy systems, are being adopted to minimize negative environmental impacts.

With the application of technology under Smart Living, tourist safety is more assured. Some tourist destinations are equipped with CCTV surveillance systems connected to security centers, allowing for quick responses to emergency situations. Additionally, GPS-based emergency applications are being developed, enabling tourists to request immediate assistance in case of incidents or emergencies at tourist sites. This technology not only enhances security but also provides a sense of comfort for tourists while exploring various destinations in Gunungkidul.

### **Challenges in Implementing Smart City for Tourism**

Although the Smart City concept has had numerous positive impacts on tourism in Gunungkidul, several challenges need to be addressed for optimal implementation. One major challenge is the limited digital infrastructure, particularly in remote areas that serve as key tourist attractions. Many tourist destinations still have

restricted internet access, limiting the utilization of digital technology in tourism services. Additionally, digital literacy among the local community and tourism entrepreneurs needs improvement. Not all business owners understand how to leverage digital technology to enhance their business competitiveness. Therefore, further training and education are required to better prepare them for the digital era. Funding and regulations for Smart City development also need attention. Implementing technology requires significant investment, so the regional government needs to collaborate with the private sector and investors to support digital infrastructure development in Gunungkidul.

Despite the various Smart City elements already implemented in Gunungkidul Regency, several challenges remain to ensure the optimal application of this concept. One of the main challenges is the limited digital infrastructure, particularly in remote areas that are key tourist destinations. Some tourist spots still struggle with stable internet access, restricting the utilization of technology in the tourism sector. Moreover, the lack of digital literacy among the local community and tourism entrepreneurs poses another obstacle. Not all tourism business operators have a solid understanding of digital technology and how to use it to boost their business competitiveness. Therefore, a more intensive education program is needed to prepare the community for the digital era. Another challenge is funding and regulations for Smart City development. Implementing technology requires significant investment, making it essential for the government to collaborate with the private sector and investors to support digitalization projects in Gunungkidul.

The idea of a Smart City brings together new digital tools and ways to grow that don't hurt the Earth, to make city life, government, and the economy better. For tourism, this idea needs to fit with what makes tourism last—balancing money gains, protecting nature, and including everyone. A strong set of ideas puts together all the different parts of a Smart City—good government, a good economy, easy travel, a clean environment, good living, and smart people—with the main ideas of growing tourism in a way that lasts. Good government helps make decisions openly and with everyone involved, which is important for taking care of tourism resources for the long run. A good economy helps small local businesses come up with new ideas and lets tiny business owners (like UMKM) join in on selling tourism online. Easy travel and environment fixes make tourism less harmful to nature while making it easier to get around and making visits better. Good living uses digital tools like AR and online places to make tourism more interesting and help protect culture.

This complete plan shows how Smart City tools help tourism last by using resources wisely, getting everyone involved, and making the economy strong without hurting culture and nature. How Government Works with Digital Tools. This idea shows how digital tools make government services more open, helpful, and effective. Gunungkidul's online tourism spot, open data, and public involvement through online ways show this. Digital government helps tourism last by letting communities and people involved share information and make decisions together in real-time.

New Ideas in Government Rules: Gunungkidul using Smart City shows new ways of making rules—going from old ways of managing to using data and working together, using digital tools to fix old tourism problems like uneven infrastructure and not enough access to information. This new way is key to changing rules to fit local needs while growing partnerships across different areas. Ideas About Tourism That Lasts: Focuses on balancing how tourism affects the economy, society, and environment. Combining this idea with digital government and new rule-making gives a full way of thinking that puts technology fixes within bigger lasting goals, making sure Gunungkidul's tourism grows in a complete way.

## **CONCLUSION**

Before, travelers often found it hard to get the right details about where to visit in Gunungkidul. Now with computers, travelers can find all the details about places, prices, and what's there on official websites, travel apps, and social media run by the Tourism Office. Plus, maps you can use and reviews from other travelers make going places even simpler. Using the Smart City idea in Gunungkidul Regency makes a big chance to make tourism last and help local people do better. This idea is not just about using computers, but also a way to mix together how people live, money, and nature in every way.

As a place with lots of nice nature spots, like beaches and caves, Gunungkidul has a hard time keeping nature safe. Smart City helps lower the bad things tourists do and helps protect nature more by using smart ways to manage things with computers, like watching the environment online, managing trash in a smart way, and using transportation that's good for nature. Smart City also helps local small businesses do better by letting them use online places to sell things and offer travel help. This makes sure money is shared better and people in the area

make more money. Also, when people in the area help make rules and decisions using online ways, it makes them feel like they own the place and makes their community stronger to help things last.

Using fun computer things like travel apps on phones, seeing things on your phone like they're really there, and getting information right away makes going places more fun for travelers. This not only makes things better but also makes travelers and people in the area closer through telling stories about the area online and getting good ideas together. Using the Smart City idea has become popular in how cities are run and in travel. Gunungkidul Regency, which is famous for its nice nature, is starting to use this idea to get more tourists and run things better.

Using the Smart City idea in Gunungkidul Regency has been good for travel, making it easier to find information, more comfortable for travelers, and helping the local economy grow. Computers make it easier for travelers to get information and help run travel spots better. The Smart Mobility idea makes it easier to get around, while Smart Environment helps keep nature safe in travel spots. But, problems like not enough computers and people not knowing how to use them still need to be fixed to make things even better. With help from everyone, making Smart City better in travel can keep getting better to help people in the area and travelers for a long time.

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