

## **Integrating Smart City Features into Non-Smart Urban Environments to Enhance Tourist Experiences and Foster Community Development: The Case of Alexandria Egypt**

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### **Abstract**

Smart city initiatives have gained significant momentum in recent years, with an emphasis on leveraging technology to improve urban living. While major metropolises have embraced these innovations, there is a noticeable gap in the integration of smart city features into non-smart urban environments.

Based on the significant positive relation between technology, innovation and smart, technological solutions are being implemented to solve identified urban problems and conflicts.

In other words, ICTs is used in products that improve urban function management in areas such as transport, energy, health care, water, and waste. Hence, allowing for the development of innovation networks, healthy societies and dynamic economies as well as providing solutions to many problems of urbanization and sustainability (Angelidou, 2015). This raises the question, can the infusion of smart city elements into conventional urban spaces not only elevate tourist experiences but also catalyze community development?

This study tried to explore the challenges, opportunities, and potential impacts of integrating smart city features into non-smart urban areas, with a specific focus on enhancing tourist experiences and fostering community development in Alexandria. This study adopted the qualitative approach by using the focus group method. Using the purposive sampling, two focus groups were made with academic specialists, Tourism industry expertise and government official. Results clearly revealed that smart city features can be integrated in Alexandria to face some of its major problems and enhance tourist experiences and community development. Establishing widespread Wi-Fi hotspots throughout the city to ensure continuous connectivity for tourists, having smart mobility- and smart security solutions are especially needed. Some of the main challenges for implementation would be the lack of adequate financial and technical resources.

### **Keywords**

Smart cities, tourist experience, community development, smart city features, Alexandria.

## 1. Introduction

In the rapidly evolving landscape of urban development, the concept of Smart Cities has emerged as a transformative paradigm, leveraging technology to enhance the quality of life for residents and visitors alike (Caragliu et al., 2011). While major metropolises have been quick to adopt smart city initiatives, there exists a considerable gap in the integration of such features into non-smart urban environments (Hollands, 2020).

Smart city technologies encompass a wide array of innovations, including but not limited to the Internet of Things (IoT), data analytics, and interconnected infrastructure (Nam & Pardo, 2011). These innovations have the potential to redefine the dynamics of urban living by promoting sustainability, efficiency, and connectivity. However, their application has predominantly been concentrated in urban centers already equipped with modern infrastructure. The challenge lies in extending the benefits of smart city features to non-smart urban areas, where the potential for positive impact on tourism and community development may be significant.

Tourism, as a vital aspect of urban economies, stands to benefit from the integration of smart city features (Townsend, 2013). The enhancement of tourist experiences through real-time information dissemination, interactive navigation, and personalized recommendations can contribute to a more engaging and memorable visit. Furthermore, the integration of smart city technologies has the potential to address challenges such as traffic congestion, environmental sustainability, and safety concerns, thereby fostering a more tourist-friendly environment (Caragliu et al., 2011).

Beyond the immediate advantages for tourists, the integration of smart city features also holds promise for catalyzing community

development in non-smart urban environments. By leveraging technology to optimize resource allocation, improve public services, and enhance overall quality of life, these initiatives can create a more attractive and resilient community (Caragliu et al., 2011). This, in turn, may lead to increased local pride, economic growth, and a sense of belonging.

This research seeks to explore the feasibility and implications of integrating smart city features into non-smart urban environments, focusing on their impact on tourist experiences and potential contributions to community development. Through a comprehensive analysis of case studies, technological frameworks, and stakeholder perspectives, this study aims to shed light on the transformative potential of smart city features integration in reshaping urban landscapes Alexandria.

To achieve these objectives, the following research questions were formulated:

1. Is it possible to integrate Smart City Features into Non-Smart Urban Environments to enhance tourist experiences and foster community development?
2. What are the main problems facing tourists visiting Alexandria that need smart solutions?
3. What are the smart cities features that best solve these problems and offer better tourist experiences and enhance community development in Alexandria?

## 2. Literature Review:

### 2.1. Smart Cities: Concept, Evolution and Features

The word 'smart' refers to "technological, economic and social developments enriched by ICT revolutions that bank on sensors, data,

new ways of connectivity and exchange of information” (Gretzel et al., 2015; Lee et al., 2020).

Kozłowski & Suwar (2021) believe that there's no single, universally accepted definition of "smart city" due to its multi-faceted nature. However, common threads emerge like information and communication technologies (ICTs), social infrastructure and sustainable development. Mozūriūnaitė, & Sabaitytė, (2021) also argue that existing definitions often emphasize technology and infrastructure, neglecting social and environmental aspects.

Historically, two dominant approaches shaped smart city development, a technology-driven approach emphasizing infrastructure and technological solutions and a human-driven approach focusing on citizen engagement, social equity, and community development. Kummitha, & Crutzen (2017) advocate for a "hybrid" approach that integrates both aspects, constantly adapting to local contexts and evolving needs.

The foundational understanding of smart cities, also called digital cities or intelligent cities (Gretzel et al, 2015) is essential to contextualize the integration of smart features into non-smart urban environments. Caragliu et al. (2011) discuss the evolution of smart cities in Europe, emphasizing the multifaceted dimensions of technology, people, and institutions (Nam & Pardo, 2011). These studies provide a framework for comprehending the core components of smart city initiatives and their potential applications in diverse urban settings.

According to Glasmeier & Christopherson (2015), the concept of smart cities entails two essential attributes. Firstly, the use of technologies to facilitate the coordination of fragmented urban sub-systems (for example, energy, water, mobility, built environment). Secondly, it is associated with new employment opportunities, wealth creation and

economic growth. Moreover, they explained that most smart cities are about fixing problems through technology, for example making transportation systems more efficient, rather than about building wholly new urban environments.

One of the most comprehensive definitions of a smart city is that provided by Dameri (2013, p. 2549) “a smart city is a well-defined geographical area, in which high technologies such as ICT, logistic, energy production, and so on, cooperate to create benefits for citizens in terms of well-being, inclusion and participation, environmental quality, intelligent development; it is governed by a well-defined pool of subjects, able to state the rules and policy for the city government and development”.

In this sense, smart cities are not just about technological modernization but also how to enhance the culture and heritage so that more people come to these cities. Looking at the problems and finding solutions is the pathway to a smart city (Glasmeier, & Christopherson, 2015). For instance, a smart city is one whose citizens are not leaving it because of employment problems and have local industry insuring suitable jobs for its community. Thus, they are considered as high-tech, intensively connected cities that use advanced modern technologies to create a sustainable metropolis, innovative commerce, and enriched quality of life for its citizens (Lee et al., 2020).

In their study, Verrest & Pfeffer (2019) had put a strategy to bring urbanism into smart urbanism. They concluded three core dimensions, namely: the urban is relational; cities are ordinary; and urban knowledge, problems and solutions are constructed. The first dimension is concerned with how smart policies are related to urban needs. For example, how urban–rural mobility is impacted by new kinds of smart transport or how informal practices can contribute to smart

urban development. The second one requires an understanding of how cities are integrated in larger urban regions and urban networks and its effect on smart policies. For example, how do global economic conditions impact urban economy actors, and how do these influence applied policies. The third dimension is concerned with bringing urbanism into smart urbanism, i.e., how urban problems are solved by using smart solutions and technologies. In that sense priority should be given to key problems. Hence, much attention should be paid concerning social, economic, and political characteristics when implementing smart policies to ensure equality, for example, how access to digital platforms and privacy issues are affected by class.

Examining the challenges and opportunities associated with integrating smart city features into non-smart urban areas is crucial for a comprehensive understanding. The literature recognizes the complexities involved in retrofitting existing infrastructure (Caragliu et al., 2011). However, Nam and Pardo (2011) argue that overcoming these challenges presents opportunities for innovative solutions and sustainable urban development. In this context, Kozłowski and Suwar (2021) present a comprehensive framework for understanding and building smart cities, emphasizing the importance of balancing technology with social and environmental concerns for sustainable and inclusive urban development. Thompson (2016) emphasized that technology should be seen as a tool to support human-centered urban development, not the driving force. Prioritizing social well-being, environmental sustainability, and democratic decision-making should be at the core of smart city planning.

Therefore, a smart city would build a business model to achieve its goals through innovative systems and processes with a stakeholder

orientation, using state-of-art technology systems. In this context several characteristics of smart cities have been identified, namely, efficient (ICT), co-creative platforms to engage stakeholders, effective use of big data and systems (Khan et al., 2017). Hence, features of a smart city entail efficient communication between people, technology, and processes with various sectors like healthcare, education, transportation, telecom, tourism, utilities, public safety and buildings. In this regard, the six elements of a smart city would be: Smart Mobility, Smart Government, Smart Economy, Smart People, Smart Living and Smart Environment (Khan et al., 2017; Samarakkody et al., 2019; Kozłowski & Suwar, 2021).

Examples of Smart Mobility encompass smart traffic and parking management, while Smart Government and Smart Economy include offerings such as e-government services and the electronic facilitation of new businesses and investments online. Within the domain of Smart People, initiatives may involve smart education through the provision of online solutions. Under the category of Smart Living, smart features might include the implementation of smart home and smart health solutions. The attainment of a Smart Environment is realized through effective smart waste, water, and energy management (Khan et al., 2017; Clevercity, 2020; Kumar, 2020). These elements collectively form the foundational core of smart destinations and contribute significantly to the evolution of smart tourism. Table 1 illustrates the six elements and examples of smart city features.

Table 1. The six elements and examples of smart city features

Elements of smart city	Examples of features of a smart city
Smart mobility	ICT infrastructure including WIFI Hotspots and IoT, smart traffic and parking management, smart public transportation network, smart toll system.
Smart economy	facilitation of new businesses and investments online, smart business solutions for locals and entrepreneurs alike; e-marketplaces
Smart governance	e-government services, e-payments
Smart environment	smart waste-, water-, water irrigation-, sewage water-, smart storm water-management, and smart energy management, smart meter and smart grids and buildings integration
Smart living	smart home and smart health solutions; telemedicine and smart healthcare systems, smart safety and security systems
Smart people	smart education, digital platforms for community engagement

## 2.2. Tourism, Community and Smart City Integration

The 21st century's emphasis on technology and digital innovation has paved the way for "smart" destinations. These destinations leverage ICT (Information and Communication Technologies) to enhance tourist experiences, optimize resource management, and promote sustainable development (Kumar, 2020).

There is a direct relationship between the concept of a smart city and smart tourism, with sustainability serving as a core factor driving

tourism destinations in their planning processes. ICT is utilized to provide users with smart solutions, enhance efficiency, and improve process automation, achieving the goal of enhancing tourist experiences and establishing sustainable tourism destinations (Khan et al., 2017).

The impact of residents' perceptions on tourism significantly influences the industry. Consequently, more tourism destinations are transitioning into smart tourism ones to attain urban sustainability. This is particularly evident in cities grappling with tourism-related challenges, where the adoption of smart tourism city concepts and strategies creates urban environments enjoyable for both residents and visitors. Therefore, smart tourism cities are willing to make substantial investments in smart tourism systems to address issues like over-tourism, enhancing visitors' experiences and residents' quality of life (Lee et al., 2020).

Furthermore, smart tourism destinations heavily rely on cloud services, the Internet of Things (IoT), and End-user Internet Service Systems. Cloud services offer a plethora of technological tools such as applications, software, and data. The IoT supports smart destinations by providing information management and analysis for innovative problem-solving. End-user service systems equip users with tools and applications to access tourism-related services, including the use of e-payment systems, telecommunication, and wireless connections, including hotspots (Khan et al., 2017).

The intersection of smart city features, and tourism is a critical aspect of this research. Townsend (2013) explores the concept of smart cities and their impact on various facets of urban life, including tourism. The study highlights the potential for big data and technology to enhance the tourist experience, emphasizing real-time information

dissemination and personalized recommendations. Understanding these dynamics is crucial for evaluating the applicability of such enhancements in non-smart urban environments.

The integration of smart city features goes beyond tourism, extending to community development. Hollands (2020) delves into the diverse aspects of smart city technologies and their implications for urban development. The study highlights the transformative potential of these technologies in optimizing resource allocation, improving public services, and fostering a resilient community. Such insights provide a theoretical foundation for assessing the potential socio-economic impacts in non-smart urban areas.

Moreover, Kumar (2020) argued that smart tourism can contribute to achieving the United Nations' Sustainable Development Goals (SDGs). Through resource efficiency and pollution reduction, it minimizes environmental impact. Cultural heritage and traditions are preserved, paving the way for sustainable development. Smart tourism fosters economic growth by creating local jobs and ensuring that all communities, not just a select few, reap the benefits of tourism. It's a win-win for both visitors and residents, building a thriving future where memorable experiences go hand-in-hand with environmental responsibility and equitable prosperity (Kumar, 2020).

To gain practical insights, it is imperative to analyze case studies of smart city integration in different urban contexts. Three case studies have been introduced: the Lübeck Bay in northern Germany, Ahmedabad in India and Dubai in United Arab Emirates (UAE).

### 2.3. Case Studies of Smart City Integration in Diverse Urban Contexts

The first two case studies; Lübeck Bay and Ahmedabad, have been carefully chosen as a noteworthy example for non-smart cities that have integrated some smart city features to enhance residents' and visitors' experiences. The third case study; Dubai, represents a middle eastern smart city example with more than fifty (50) smart city features.

#### Lübeck Bay - Germany

Lübeck Bay is a beach destination receiving a large number of visitors in the summer arriving by car, resulting in traffic congestion as tourists look for available parking spaces. In many cases, drivers headed for the parking lots closest to the beaches to find out that they were already fully occupied, so, they kept searching in other nearby parking lots in parking lots or residential streets causing traffic jams. Facing challenges of traffic congestion and inadequate parking space information, Luebeck Bay implemented a real-time parking occupancy monitoring system for two lots with a total of 100 spaces. This intervention not only reduced traffic and CO2 emissions but also earned the Lübeck Bay Tourism Agency recognition at the German Tourism Awards in 2020 (Clevercity. 2020). This success underscores the potential of integrating smart city features, even partially, to enhance both visitor experiences and local community living in traditional cities.

#### Ahmedabad - India

Kumar (2020) highlighted Ahmedabad, India, as a case study to show the implementation of smart tourism initiatives. Ahmedabad is a UNESCO Heritage City and one of the one hundred (100) Indian cities selected for the Smart Cities Mission.

Key smart tourism initiatives in Ahmedabad include:

- The Ahmedabad City Management Information System (ACMIS): Providing real-time data on traffic, transportation, and heritage sites.
- The Ahmedabad BRTS (Bus Rapid Transit System): Offering a green and efficient public transportation network.
- The Sabarmati Riverfront Development Project: Revitalizing the riverfront for recreation and tourism while promoting environmental sustainability.

### Dubai - UAE

The goal of Smart Dubai is “to become the happiest city on earth”, for citizens, residents and/or visitors alike, where technology has been adopted across the previously mentioned six dimensions (elements). Some of the smart city features include e- government services including those encouraging easy opening of new businesses, and new investments. As for smart environment management it entails smart energy like smart meter and smart grids and buildings integration, smart water irrigation, smart sewage water, smart storm water management, and smart waste management for green outcomes. Smart living includes smart buildings, smart homes, building and facility management, while eHealth solutions include remote services such as telemedicine and smart healthcare systems that enable a smooth interface between patients and hospitals. Smart mobility includes smart traffic and parking management, smart taxi, smart Salik (toll system), smart drive and other such infrastructure that make use of technology. Moreover, smart education is delivered using On-line solutions and interfaces that include technological platforms have resulted in better teacher and student experiences. Also, there

are hotspots for instant connections within the country (Khan et al., 2017). All these smart features and more aim to raise the happiness levels and well-being of not only citizens but also visitors.

The previously mentioned case studies introduced a better idea of how technology can be used efficiently to enhance peoples’ and visitors’ lives alike in urban environments. Examples of smart features of each smart element were presented.

In conclusion, the literature review establishes a foundation for understanding the integration of smart city features into non-smart urban environments. By examining the evolution of smart cities, the impact on tourism, and the potential for community development, this research aims to contribute to the discourse on transforming urban landscapes through technological innovation.

### 3. Methodology of the Study

Aiming to achieve the research objective, this study deployed a qualitative approach by adopting the focus group method. Foremost, based on previous studies discussed in the literature review, a number of preliminary questions were written down to start the question formation process. The consistency of the questions—more especially, the way the questions were worded—was given special consideration. Five (5) open-ended questions were created as a result of the process to find out the respondents’ perspectives on smart cities and their features. The potential and difficulties of incorporating smart city elements into the urban areas are also addressed. Furthermore, several other inquiries were formulated to elicit the respondents' socioeconomic and demographic details.

The most effective method for gathering the necessary data for this exploratory study would be purposive sampling, which entails

carefully choosing the study respondents within the population. Two focus groups were illustrated, the first entailed ten (10) academic specialists, while the second one included five (5) Tourism industry experts and three (3) government officials including one official from Alexandria governorate.

Facilitators oversaw the conversations in the focus groups (Mwaijande et al., 2009), where one gave an overview of the discussion's goals and participant expectations, established the tone for the conversation and went over the guidelines, including the fact that everyone would be able to speak, questions would be allowed, and the facilitator would just supervise the conversation rather than take part in it. Another facilitator guided the conversation, managed its flow, and noted the participants' answers on a flip sheet. The flip chart notes, which served as the raw data source for the focus group study findings, needed to be precise and in-depth. The facilitator prompted participants to provide even more information by probing them with questions as needed and made notes about the subject matter.

The two focus group conversations were recorded, and the transcripts of these sessions served as the textual data that were examined for emerging themes. The participant responses were qualitatively analyzed using content analysis to synthesize the findings from the data gathered during the focus groups (Masadeh et al., 2016). The general topics that emerged from the data were used to categorize them during the analytical phase.

Deductive content analysis was utilized as it follows a more systematic procedure than inductive technique (Moretti et al., 2011). A theory or pertinent research findings serve as the foundation for the initial coding process in the deductive approach, which is based on previously developed, theoretically determined categories. Researchers start by selecting

important ideas or variables as the first coding categories of analysis, connecting them to the text by drawing on preexisting theory or previous study (Hsieh and Shannon, 2005; Elo and Kyngäs, 2008)

#### 4. Results and Discussion

The facilitator started the meeting by explaining the concept of the research followed by introducing the six (6) smart city elements and examples of their features, then went through the questions where each participant was given the time to share his/her opinions and inputs.

The main variables of the discussion included the concept of smart cities and its main features, the main problems related to tourism in Alexandria that need smart solutions and finally the challenges of implementing these smart solutions.

##### *4.1. What differentiates a smart city from a non-smart one*

Some of the participants (30%) explained that a smart city can be distinguished by heavily using technology in everyday life, including the Internet of Things (IoT), interconnected infrastructure, which were previously mentioned by Nam & Pardo (2011). They mentioned the example of smart mobility, where smart transportation, smart toll, smart traffic and smart parking are all connected for the ease of mobility in a destination. Also, e-government services, smart health solutions and online education integrated public transportation networks like those in many European countries and smart Destination Management Systems (DMSs) were also stated. Most of the respondents (70%) simply added that all the previously mentioned smart city features are what differentiates a smart city.



*4.2. The possibility of integrating smart city features into non-smart urban environments to enhance tourist experiences and foster community development*

All the respondents (100%) agreed that Smart City Features can be integrated into Non-Smart Urban Environments to Enhance Tourist Experiences and Foster Community Development. The majority indicated that smart city features would face some challenges in implementation in non-smart urban environments due to the lack of required infrastructure. They also pointed out the problem of awareness of the existence of some smart services and the misuse of others.

*4.3. The main problems in Alexandria related to tourism that need smart solutions.*

Several problems were identified, where the problem of traffic congestion, especially in the summer followed by the problem of drained streets in winter because of heavy rains, came on top. Also, the low quality of public transportation and lack of interconnectivity was pointed out.

In addition, the focus group highlighted other problems that are related to tourists like understanding local customs and traditions which need cross cultural understanding from both sides. They stated that activities related to raising awareness might help in those aspects using, for example, community engagement platforms. Furthermore, participants talked about the problem of language barriers and recommended that smart education solutions might lessen the problem. Finally, the problem of personal safety and harassment was raised and the need for smart security and safety systems was strongly advised.

*4.4. Prioritizing smart city features that can be applied in Alexandria.*

All participants (100%) agreed that the first priority should be given to establish widespread Wi-Fi hotspots throughout the city to ensure continuous connectivity for tourists. This would enable them to easily access online resources, stay connected with family and friends, and share their experiences on social media. Improved connectivity also benefits local people and businesses. However, one of the participants suggested that it should be limited to tourist attractions and museums only.

At the second place, came the need to implement smart services aimed at enhancing the overall tourist experience. This could include smart tourism apps, interactive maps, and augmented reality features to provide tourists with real-time information about historical sites, cultural events, and local attractions in Alexandria. In relation, participants also pointed out the need for having a smart destination management system (DMS). In that context they mentioned the fact that the Egyptian Tourism Authority (ETA) developed a web portal and an app named "Visit Egypt" that allows visitors to build an itinerary to visit Egypt by browsing attractions, festivals, activities, and other pertinent travel information. They suggested that a similar web portal and app named "Visit Alexandria" should be introduced to better promote the city. In this context, participants suggested that "Visit Alexandria" would be linked with local businesses including handicrafts, food outlets/ restaurants, events and festivals and allowing online marketplaces and smart payments systems...etc. One added that there was an attempt of such an app named "Discover Alex" but unfortunately it stopped due to financial and bureaucratic problems.

They also suggested having digital signage and information kiosks at key locations in Alexandria. These can provide tourists with

dynamic information about the city's history, current events, and points of interest. Touchscreen kiosks can offer interactive maps, directions, and recommendations. However, one of the participants rejected this suggestion claiming that the locals will probably misuse the kiosk.

At the third place, some of the participants (40%) suggested to integrate smart security systems all over the city and especially at tourist attractions, including surveillance cameras, emergency response systems, and public safety apps and which are easy to apply. They mentioned the privilege of having a smart grid and interconnectivity, where for example these cameras relate to nearest police- and fire stations. This would enhance the overall safety of the city, creating a more secure environment for residents and tourists alike. They justified their argument by the fact that this would enhance the image of Alexandria as a safe tourist destination.

However, others (50%) preferred having smart mobility and smart transportation solutions to improve mobility for tourists and residents alike. This could involve implementing intelligent traffic management systems, interconnecting various public transportation from buses and tram to upcoming metro that connect all parts of the city and its airport. They justified their choice by highlighting that Alexandria's major problems are related to traffic and transportation.

They added that all previously mentioned smart features will specifically serve the cruise tourists having quick trips in the city as they will need the hotspots to get connected with apps displaying detailed information of attractions with interactive maps and needed integrated public transportation to get there. A one card for all integrated public transportation would be an added value.

Afterwards, came the need to leverage technology to preserve and promote

Alexandria's rich cultural heritage by (90%), where participants recommended implementing virtual reality experiences, digital archives, and interactive exhibits in museums to make historical and cultural assets more accessible to tourists and locals. Only (10%) of the participants gave priority to this smart feature to be at third place)

Then participants talked about smart people, and that digital platforms for community engagement should be developed, encouraging residents and tourists to actively participate in the city's development. This could include virtual town hall meetings, online forums, and social media channels to gather feedback and ideas for improvement. This argument is consistent with the Dubai case study revealed by Khan et al. (2017), which raises the standard of openness in the city and resulting in enhancing the levels of happiness.

Concerning smart environments, they raised the fact that international hotel chains are applying some green solutions, and it will be easy for them to apply smart environmental features like smart waste and water management. They added that there are already some applied smart environmental features like street lightning that have sensors adapted to daylight. However, they believe that is not rated among the top priorities except for the need of smart storm water management to benefit from rainwater and at the same time overcome the street drainage problem, enhancing traffic conditions and community development.

Participants believe that smart homes are hard to apply but of immense potential to newly built living compounds where the Internet of Things (IoT) can have a crucial role in enhancing the quality of life for the community.

#### *4.5. Challenges of smart solution implementation*

As for the challenges of integrating smart city features in Alexandria, all participants first mentioned low financial and technical resources. Moreover, many (90%) added the low quality of needed infrastructure whether concerning the internet or other related to smart transportation systems. In that aspect (80%) added the problem of the low quality of public transportation system and no available public transportation to the airport. All government officials (17%) raised the problem of bureaucracy and long-line procedures. Moreover, the issue of privacy concerns was raised that strongly need suitable legislations, which was considered as another challenge by itself.

Finally, the focus group indicated that there are already some smart features applied in Egypt concerning smart government where e-government services are offered with e-payments on “Egypt Digital Portal”, and some can be obtained through kiosks. Furthermore, there are some private sector initiatives concerning smart health solutions, where patients can communicate with specialized doctors and get their medical advice through an application. Moreover, there are some smart services that are directly related to tourism like offering online visas. Once more, participants highlighted that there is a lack of knowledge of these e-government services, for example, the government made QR code labels in some heritage streets that tell its story, but no one knows of that. Therefore, they suggested that educational programs and initiatives should be introduced that teach residents and tourists about the available smart services and raise awareness of the benefits of smart city technologies in general.

## **5. Conclusion and Recommendations**

In conclusion, the integration of smart city features into non-smart urban environments, demonstrated in the case of Alexandria, Egypt, holds significant promise for both enhancing tourist experiences and fostering community development. The study revealed a unified agreement among participants that such integration is not only possible but essential for addressing key challenges faced by the city. The identified smart city elements, ranging from connectivity solutions to security systems and cultural heritage preservation, present a comprehensive framework for transforming Alexandria into a more vibrant and tourist-friendly destination.

The differentiation between smart and non-smart cities, as articulated by the participants, emphasizes the role of technology, especially the Internet of Things (IoT), interconnected infrastructure, and smart mobility solutions. Despite acknowledging the potential benefits, challenges such as financial constraints, inadequate infrastructure, and bureaucratic obstacles pose significant difficulties to the successful implementation of smart solutions.

In light of the findings, several recommendations emerge to guide the successful integration of smart city features into Alexandria's urban landscape. Firstly, addressing the need for continuous connectivity, the establishment of widespread Wi-Fi hotspots throughout Alexandria is recommended. This initiative would not only benefit tourists but also enhance connectivity for local residents and businesses.

To overcome the lack of awareness regarding existing smart services, educational programs and initiatives should be introduced. These programs should aim to educate both residents and tourists about available smart services, fostering a better understanding of the benefits of smart city technologies.

Prioritizing the development and promotion of smart tourism apps, interactive maps, and an integrated Destination Management System (DMS) is crucial. This system should also connect tourists with local businesses, facilitating online marketplaces and smart payment systems.

Implementing smart security systems, including surveillance cameras, emergency response systems, and public safety apps, should be prioritized to enhance the overall safety of Alexandria and portray it as a secure tourist destination.

Given the significant challenges related to traffic and transportation, implementing smart mobility and intelligent traffic management systems is recommended. Integrated public transportation, including buses, trams, and the upcoming metro, should be interconnected for seamless mobility.

Leveraging technology to preserve and promote Alexandria's rich cultural heritage is essential. Virtual reality experiences, digital archives, and interactive exhibits in museums should be implemented to make historical and cultural assets more accessible to tourists and locals.

Developing digital platforms for community engagement is crucial, encouraging active participation from residents and tourists. Virtual town hall meetings, online forums, and social media channels can serve as channels for gathering feedback and ideas for continuous improvement.

While not the top priority, implementing smart environmental features such as smart waste and water management, and utilizing IoT for street lighting to adapt to daylight, should be considered to enhance traffic conditions and contribute to community development.

In conclusion, the successful integration of smart city features in Alexandria requires a multi-faceted approach, addressing technological, educational, and infrastructural

aspects. Overcoming the identified challenges will pave the way for Alexandria to emerge as a model for transforming non-smart urban environments into vibrant, connected, and sustainable spaces for both tourists and the local community.

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