Journal of **Tourism** & Development | n.º **39** | 2022 | [**9** - 26]
DOI: 10.34624/rtd.v39i0.30330
e-ISSN 2182-1453

Conceptualizing the **smart community** in the ages of **smart tourism**: A literature perspective

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Abstract | Today smart tourism, smart tourist, and smart destination concepts are widely discussed by researchers in tourism literature, but the smart community concept for tourism is overlooked. Therefore, to conceptualize the smart community in tourism for tourism way forward in the times of digital technologies is the purpose of this study. This is a literature review based study and literature was searched online of various quality journals. During the literature search for data collection, generally smart destination, smart community, smart tourism, artificial intelligence, smart ecosystem, digital technologies, and other study related terms were used. After retrieving the data, the study demonstrated diverse aspects of the smart community concerning to digital infrastructure and the community's quality of life for refining the smart community concept in tourism. This study will help planners in planning and developing smart communities for tourism, and it will also contribute expedient knowledge in existing literature for academicians.

Keywords | Community development, smart community, smart ecosystem, smart technologies, smart community for tourism, sustainability

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1. Introduction

The local communities play a significant part in tourism development at destinations (Wang, et al., 2021). Their contribution is largely evitable from displaying their cultural heritage, hosting tourists, and protecting local tourism resources (Muganda, et al., 2013). By their traditional socio-cultural and other forms of lifestyle, local communities have helped the tourism sector pointedly to sustain and grow (Uslu et al., 2020). But today, smart tourism has changed the course of tourism services, facilities, and destination management (Wang, et. al, 2016; Lee et al, 2020). Smart tourism is the next level of tourism development in which technologies are playing a significant role. Smart tourism refers to the application of information and communication technology (ICT), such as similar to smart cities, for developing innovative tools and approaches to improve tourism (Gretzel, et. al., 2015; Wang, et. al, 2016; Guedes, et at, 2018). Advanced technologies are employed in smart tourism practices (Buhalis & Amaranggana, 2014; Gretzel, et. al., 2015; Lee et al, 2020). To be a part of smart tourism, the local communities should be trained and equipped first for smooth participation in smart tourism (Iqbal & Olariu, 2021). Smart tourism needs technology-driven communities to go with for better outcomes and maintaining the objectivity of installed digital infrastructure at tourist places. Apart from smart tourism, smart destination and smart tourist concepts are getting momentum these days (Wang, et. al, 2016; Dabeedooal, et al., 2019; Lee, et al, 2020). And these smart concepts are largely reliant on technologies (Stratigea, 2012; Wang, et. al, 2016).

As tourism demand is growing consistently and contribution of the local people in the tourism sector is also becoming crucial. They have to uphold high principles of resiliency, livability, and sustainability; and deal with economies, tourists, tourism services, and so on smartly. Therefore, we need smart communities at tourist destinations. It is imperative to turn the local communities' technology friendly for effective innovation and sustainable growth (Iqbal & Olariu, 2021). Indeed, we develop digital infrastructure at destinations but without having well-trained local people, its purpose will remain un-served. At the same time, we have to serve smart tourists, and they are essentially technology users. Hence, the research scope comes in light to define *Tourism Smart Community* as a concept with all its principles and requirements.

This study is important in many ways. The applications of the smart community concept will improve the quality of life to residents at tourist places; it will enhance tourist experience; the smart community will be strong support for planners in managing resources sustainably, cost-efficacy and sundry other advantages of the smart community concept are there (Plotnikova, 2018).

Methodologically, the present study is following a theoretical approach to accomplish its objectives. Data were gathered from numerous quality journals generally indexed in Scopus and web of sciences. Apart from the quality journals and publications, expert researchers' work on smart tourism, technologies, cities and destinations were preferred in the current study. However, main focus was on all aspects related to smart tourism, smart tourist, smart destination, smart community, artificial intelligence, smart ecosystem, digital infrastructure, and technologies during the data search to define the tourism smart community concept. While defining the tourism smart community concept, various dimensions of the smart community are discussed. Defining the concept appropriately is needed for a better fit in tourism affairs as a smart community. Because tourism smart communities will take tourism to the next level.

2. Background of the study

2.1 Smart concepts in tourism

Smart tourism

Smart tourism refers extensive use of technologies in tourism service delivery and consumption by tourism stakeholders. Smart tourism constitutes virtual, digital and intelligent tourism based on virtual, digital and intelligent technologies. The applications of smart tourism principles are effective tools for destination planning, tourism resource management and improving tourism product quality with new creativities (Silva & Lopes, 2020). It is well-thought-out to be a sensible move from traditional tourism to advanced technology based tourism. Smart tourism is one of the latest conceptual developments in tourism; originally result of establishing smart cities around the word. According to Wang et al. (2013) smart tourism is an Information Communication Technology (ICT) integrated tourism platform, managing tourism serves and usage of technologies such as cloud computing, the Internet of Things (IoT) and artificial intelligence. In order to improve the quality of the tourism stakeholders, the incorporation of advanced technologies is imperative in the tourism (Gretzel & Koo, 2021).

Smart tourism destination

Smart tourism destinations are generally like smart cities aiming to increase destination competitiveness and tourism stakeholders' quality of life (Buhalis & Amaranggana, 2014). Smart destination facilitates access to tourism services, spaces, and experiences through technologies such as mobile IoT, applications, artificial intelligence and big data. Apart from Tourism business-led growth and co-creation activities, smart tourism destinations emphasis on the effective and proficient consumption of resources and the application of economic, environmental, and social measures for sustainable future (Massimo & Ricci; 2020). Gothenburg, Málaga, Helsinki, Dubai, and Singapore are good examples of smart tourist destinations across the world.

Smart tourist

Smart tourist is a key beneficiary of smart tourism. He is an active user of technologies for better travel experience, real-time interaction and co-creation in the smart tourism destination atmosphere. Smart tourist is largely reliant on smart technologies during travel operations to get connected with other stakeholders for smart travel experience. Generally, smart tourist is open to share his/her data during using smart technologies for creating improved and personalized smart travel experience (Sánchez, 2016). Moreover, smart tourist is pro-active and open to innovations at smart tourist destinations in the smart tourism ecosystem.

Smart/Digital city and intelligent city

Information and communication technologies are playing critical role in upgrading the traditional cities to Smart cities in a systematic framework for developmental practices in the cities and for sustainable infrastructure backed by advanced technologies (Huang, et. al., 2021). Diversity of user interfaces, software, and communication networks together with the Internet of Things (IoT) is integrating the smart/digital cities for the quality of life of citizens and developments. The purpose of smart cities is to enhance city functions and ensure economic growth, a clean and sustainable environment and the application of 'smart' solutions by using smart technologies and big data (Huang, et. al., 2021). Some patterns of smart/digital cities initiatives are, for example, Amsterdam, Kyoto and Seattle. On the other hand, infrastructure optimization and smart governance to engage citizens in smart city management are done through intelligent solutions. Intelligent City delivers breakthrough turn-key metropolitan housing to landowners, developers, and housing operators. Digi-

tal infrastructure has a substantial impact on the daily lives of the residents and the environment in intelligent cities (Nam & Pardo, 2011).

Smart city concept is based on technology and it has grown promptly over the years. Many experts have stressed on sustainability of the smart city and have recommended including sustainability as a vision. According Song et al. (2017), smart cities aspire to holistically fulfill people's demands in terms of economic and social sustainability, enjoyment, and well-being, therefore the concept transcends a technological focus and expressly bears an anthropocentric tone.

On the other hand, smart city is a concept that visualizes the city of the future. This narration is well exemplified by the explanation given by Vanolo (2014) who considers a smart city as *"an urban imaginary combining the concept of green cities with technological futurism and giving a name to technocentric visions of the city of tomorrow"*.

2.2. Smart Community

Though the term, smart community, got existence in the 90s still it is at the infancy stage in providing a solid meaning (Qi & Guo, 2019). San Diego State University with direction from the California State Department of Transportation (1997) has defined a smart community as a community in which government, business, and residents understand the potential of information technology, and make a conscious decision to use that technology to transform life and work in their region in significant and positive ways. On the other hand, Smart Community International Network (2003) is saying a Smart Community is a community with a vision of the future that involves the application of information and communication technologies in a new and innovative way to empower its residents, institutions, and regions as a whole. As such, they make the most of the opportunities that new applications afford and broadband-based services can deliver–such as better health care delivery, better education and training, and new business opportunities.

Now, this is our general understanding that the smart community is largely reliant on the technologies in their lives. They use technology to have quality of life by having technology backed businesses, healthcare, education, etc. smart community is useful in many developmental areas at a place from home to environment and environment to industries (Gurstein, 2014; Qi & Guo, 2019).

A smart community is an interrelated urban area and people that leverages the smart usage of advanced technologies to benefit its businesses, citizens, and service organizations for socio-economic benefits, and a sustainable environment and quality of life and well-being of communities (Stratigea, 2012; Gurstein, 2014; Guedes, et al, 2018; Ballina, 2020). Upholding and improving the necessities of the community, such as income generation, business and cost efficiency, global competition, etc., are the main services of the smart community for better fiscal sustainability. However, because of these integrated efforts, the smart community is capable of controlling resources and projects to improve and benefit from information communication technology infrastructure much earlier than it otherwise would (Gurstein, 2014). The technology is bringing behavioral changes in the community activities in the form of their choices, control, suitability, and opportunities. They experience the different improved lifestyles, work opportunities, governances, travel choices, education, and entertainment facilities in their areas.

2.3. Need of the Smart Community in Smart Tourism

As smart tourism and destinations are directly associated with the smart cities concept (Stratigea, 2012; Khan, et. al., 2017; Guedes, et al,

2018; Lee, et al, 2020). Rana et al. (2019) has found that local communities are less involved in the smartness of the places. The authors have stressed making the local communities part of the smart system by creating efficient IT infrastructure and giving them training for the smart destination system. Therefore, practitioners and policymakers must focus on smart community planning to create well-trained and IT user smart communities for smart tourism (Aref et al, 2009; Mokhtar, et al., 2017).

While studying the smart tourism city's developments and transformations, Lee et al. (2015) have argued that social capital and wellbeing, governance, accessibility, creativity, businesses, etc. are pivotal aspects of tourist destinations that are affected by the technologies. According to Gretzel et al. (2015), the smart destination aspects are playing a tremendous role in making residents' quality of life and visitor's travel experience effective (Kayumovich et al, 2020). Further, Júnior et al (2020) studied that more technology-friendly behavior of the local community at a destination will improve their quality of life and satisfaction level as well.

Having a smart community at tourist places is needed because of several reasons, such as sustainable resource consumption, better income generation, and effective tourist experience, and so on (Plotnikova, 2018). Planners have set up various technologies at tourist destinations to cut costs and mend productivity, and achieve the sustainable goals that create space for developing smart tourism communities (Dabeedooal et al., 2019; Lee et al, 2020). Moreover, at smart tourist destinations, residents must live digital life in the smart ecosystem it is indispensable to have a well-skilled local community to actively participate and to be part of an innovative environment. It has been observed that smart communities are knowledgeable and cooperative, and it is fact that innovation does not transpire in segregation which is proved from *location-based analytic* technology where smart community' collaboration for work is highly required (Iqbal & Olariu, 2021). Apart from this, the real government transparency and innovation in smart cities and tourist destination comes only when you initiative community involvement in big data sharing in the smart ecosystem (Al Nuaimi, et al., 2015; Guedes, et al, 2018).

Today, the economy of most of the tourist places, generally in the developed economies, is largely reliant on local tourism; therefore, fleetness and efficiency in tourism service delivery for escalating tourism through the smart economy are imperative for making the local economy stronger (Kalenyuk & Uninets, 2020). The residents are predominantly involved in the tourism business (Uslu et al., 2020); hence smart communities are required to explore more and more business and income opportunities at tourist destinations. Smart communities can employ location-based analytics technology in critical decision-making for a wide array of tourism projects and businesses.

The social needs patterns of the community vicissitudes timely in terms of population growth, income, work choices, infrastructure, and so on. The communities take diverse and improved decisions to follow the trends where local resources are discussed largely (Baskin et al, 2003). Smart communities are future-oriented and they are aware about the sustainability as well (Dabeedooal, et al., 2019). They use and plan local resources sustainably during the decision-making process for quality of life which is excessively significant for tourism (Gurstein, 2014; Plotnikova, 2018). Smart communities can use Big Data analytic tools in smart decision-making for maximizing the resources' efficiency and in policy implementation (Al Nuaimi, et al., 2015; He et al, 2017). The sustainable nature of the smart community will not only follow the green practices in their day-to-day lives but predict the future needs, tourism demand, infrastructure requirements, and destination planning also (Baskin et al, 2003; Martins & Costa, 2021).

It is evident from the literature that there is a

dire need of smart communities for smart tourism at tourist destinations for maximum technology usage, service delivery, sustainable resource management and consumption, better living, and work (Lee, et al, 2020; Kasznar, et al., 2021). Smart communities are capable enough to handle issues related to overpopulation, socio-culture, economy, and environment at tourist places. The smartness of the residents will not only improve the quality of community life but also the tourist experience as well (Atembe, 2015).

2.4. Factors affecting in making a Smart Community

Today digital and innovative infrastructure is getting momentum across the world (Stratigea, 2012). Countries are developing smart cities for their people as a significant number of communities are using advanced technologies for the diverse benefits of their citizens (Qi & Guo, 2019). However, developing a smart community is not easy for planners. Every time for every city or destination, a new strategy is followed in creating smart communities because no existing strategy fits other communities (Baskin et al, 2003; Batty, et al., 2014; Schipper & Silvius, 2018).

There are many factors which are affecting the formation of smart communities since the beginning of its process (Qi & Guo, 2019). The city or destination size is one of the major factors as the smart ecosystem is best applicable for small geographical areas (Stratigea, 2012; Batty, et al., 2014; Schipper & Silvius, 2018). Smart communities at small size destinations are having maximum benefits as compared to large size. An appropriate size of destinations allows planners to manage and control the smart system effectively for better use of the smart communities. On the other hand, the collaboration of the smart ecosystem stakeholders is also playing a critical role in making smart communities. Without the support of its partners and constituents, it is difficult to provide smart services related to transport, health, energy, business, etc. to the residents (Stratigea, 2012; Zhou, et al., 2013). In addition to the collaboration among the stakeholders, leadership from the community and different unions has a vital impact on smart community formation. The community leaders are expressing their community goodwill during decision-making for their smart destination. However, the entire process is reliant on digital infrastructure. Digital infrastructure should be sufficient to connect the community digitally. The technologies, used in the smart ecosystem, should be universally and spontaneously available to support the vision and purpose of the smart community even in the future (Qi & Guo, 2019).

Community awareness, organizational stability, market profile, and smart policy implementation are the other factors affecting the creation and refining the smart communities. Every stakeholder of the system should be willing to accept the change and utilize the local resources sustainably while using the technologies (Dabeedooal et al., 2019). Understanding the magnitude of the present digital and innovative infrastructure at a destination is crucial to know the further need of the technology (Ivars-Baidal, et al., 2021).

2.5. Digital Infrastructure for Smart Communities

Digital Infrastructure is the outcome of a combination of traditional physical infrastructure, such as *energy, road, and transport, water, and waste* etc., and technology-oriented infrastructure (such as *networks, IoT, sensors, Big Data, BIM/GIS, and Machine Learning*) (Al Nuaimi, et al., 2015; Qi & Guo, 2019). Here communities live in an interconnected and holistic ecosystem supported by broadband and wireless technologies (He et al, 2017; Iqbal & Olariu, 2021). At smart tourist destinations, real-time data procurement and scrutiny are done

by entrenched sensing technologies which allow infrastructure suppliers to use reliable and eloquent information for effective decision making (Wang et. al, 2016; Kasznar et al., 2021). Services are a key aspect of the smart community ecosystem of digital infrastructure delivered through diverse means of technology (Serrano, 2018; Zuccalà & Verga; 2018).

Artificial Intelligence is one of the main elements of smart infrastructure. It enables smart communities to use evocative, vigorous, and reliable acquired information for active participation in and using the digital infrastructure (Kiliçhan & Yilmaz, 2020). The diversity of technology made community life easier and met their day-to-day living needs in the best way. The communities can measure their analytics easily with the help of *cloud computing* as a supporting technology in the digital infrastructure (Iqbal & Olariu, 2021).

Digital infrastructure has *a geospatial technology* component, one more aspect, and an advanced set of tools used for studying human societies and geographic mapping. This helps in designing smart cities/tourist destinations by using big data (Buhalis & Amaranggana, 2014; Al Nuaimi, et al., 2015). Geospatial technologies include *Geographic Information Systems (GIS), Internet Mapping Technologies (IMTs), Global Satellite Navigation System (GNNS)*, and *Remote Sensing (RS)*. GIS tools are used in data pattern detection in data mining to access resources easily, while as IMTs are web-centered applications (such as *Google Earth and Microsoft Virtual Earth*) that are largely used in geospatial data viewing and sharing. Users get information from Google Earth and Microsoft Virtual Earth keep for using GIS. On the other hand, GNNS is a satellite network system in the smart ecosystem to coordinate its users like Galileo, GLONASS, and GPS, etc. Satellites give much scope to remote sensing in the smart community environment as they monitor destinations from way far with cameras (Borza et al, 2019).

Connectivity is another important part of digital infrastructure. Today we have cellular services widely available everywhere irrespective of smart cities or tourist destinations. Cellar network is a great support to IoT in linking remote infrastructure with sensor technologies (Qi & Guo, 2019; Kasznar, et al., 2021). Cable, telephone, and fiber-optic network cables are used to connect city and destination traffic lights to IoT (Stratigea, 2012; Schipper & Silvius, 2018). The existing connectivity and cellular infrastructure give a strong shoulder to smart infrastructure in expanding its services in the cities and tourist places for residents' benefit.

Smart communities are majorly reliant on technologies, hence to move forward efficaciously, planners should ensure active digital infrastructure for the benefit of the local community. Strong broadband network is the success mantra of the smart community, broadband is way more than merely offering internet services to the residents. It contributes much more to the digital infrastructure as an important component.

2.6. IoT in Smart Community Development

Internet of things is playing the foremost role in the smart ecosystem at smart destinations (Perera, et al., 2014). It collects, analyzes, and manages data in real-time to help users in better decision-making to improve quality of life (Stratigea, 2012; Yang & Hsu, 2017; Iqbal & Olariu, 2021). IoT is helping users bring more efficiency to the smartness of the system. This is a cluster of security, cloud, networking, and device management tools for diverse uses (Balakrishnan, et al., 2019). IoT can be used for positioning resources perfectly through near real-time data and diverse community elements can be accessed at the same time. Communities remain connected and their immediate needs are being prioritized under a strong innovative communication infrastructure (Gunardi, et al., 2015; Kirtil & Askun, 2020; Iqbal & Olariu, 2021).

Residents are using internet services across the destination for information sharing, business, emergency alerts, service delivery, interactions, events, and hyper location (Mingyan, 2017; Syed, et al., 2021).

Smart communities use IoT under a few paradigms for its practical implications (Gunardi, et al., 2015). *IoT technological workflow* is one of the paradigms which cover the whole digital data life cycle from data bagging, collection, processing, and evaluation to feedback to the computer-generated system information in line with the smart community requirements (Gunardi, et al., 2015; Nahrstedt, et al., 2016). Generally, *IoT technological workflow* of smart communities' framework constitutes development and connecting sensory things, data processing as per user needs, and generating innovative services in the digital eco-system (Perera et al., 2014; Nahrstedt, et al., 2016; Borza et al, 2019). On the other hand, *IoT metropolitan sphere and application* paradigm works on smart destination's mobility, utilities (water, energy, etc.), healthcare, smart living, sustainability, safety, and security, etc. In digital infrastructure, IoT stakeholders, particularly decision-makers, ensure economic growth and cost-effectiveness at destinations for the ease of businesses and residents, hence in a nutshell; IoT has a diversity of implications in smart community growth and development (Nahrstedt, et al., 2016; Dabeedooal, et al., 2019; Kirtil & Askun, 2020; Syed, et al., 2021).

3. Community Trust in Smart Technology

It has been discussed that the technologies have significant implications in smart community affairs at tourism places. Smart communities have to use technology significantly for surveillance, Safety Monitoring Systems (SMS), banking and business, Intelligent Road Systems (IRS), and many other purposes (Borza et al, 2019). But many concerns are raised by the users related to the privacy and trust in the technology, such as vulnerabilities, cyber-attacks, hacking, and data theft. There are other apprehensions of the communities as well, like, at tourist places where several users share information, how does local community trust that users are who they say they are? Moreover, how does the local community know the data they report is true? Smart technology is highly advanced in these issues too (Qi & Guo, 2019). Therefore, solutions to these concerns are robust authentication, physical data vaults, and ID management.

A few things are there that the planners (network service providers, governments, device manufacturers, software providers, etc.) should ensure to generate and maintain the trust of the communities in technology (Shin, et al., 2021). Data must be real-time, accurate, accessible, and reliable without any ill effect on its availability to stand smart ecosystem infrastructure for the residents (Polese, et al., 2018; Syed, et al., 2021). We are seeking community trust in the technology; subsequently, information confidentiality is significant here. Sometimes user details and information are sensitive, so prevention of unauthorized revelation of user's sensitive information must be ensured (Khatoun, et al., 2017). Moreover, there should be accountability like system users should be answerable for their activities. For tight security, the logging system should be highly protective for transactions and interactions with its users. (Balakrishnan, et al., 2019) As stated above, robust authentication and ID management ensure users' privacy and security to the users and it will increase the trust of the community in the smart technology in their daily use (Khatoun, et al., 2017; Syed, et al., 2021).

4. Smart Ecosystem of Tourism Smart Community

Normally, the surroundings of the community make its ecosystem where people live, interact, coordinate, manage resources, and day-to-day live (Khan, et. al., 2017; Mingyan, 2017). Therefore, for a smart community, a smart ecosystem is imperious where advanced technology implications are largely observed (Fig. 1), generally in smart cities (Buhalis & Amaranggana, 2014). The process of transforming many tourist destinations into smart destinations across the globe is underway where sustainable innovation, artificial intelligence, and fully technological infrastructure are available or under development (Zuccalà and Verga; 2018).

The community smart ecosystem broadly constitutes *infrastructure, analytics, and communications* networks at a destination (Khan, et. al., 2017). The local communities are the first stakeholders of this ecosystem; hence they should be able to maintain its objectivity in time. In every activity, such as mobility, living, behavior, energy usage, healthcare, and economy, and so on, they show smartness and in every conduct, they use technology for more efficacy and benefits. To understand the ecosystem of a smart community at a tourist destination deeply, it is essential to break down its smart ecosystem into different elements.

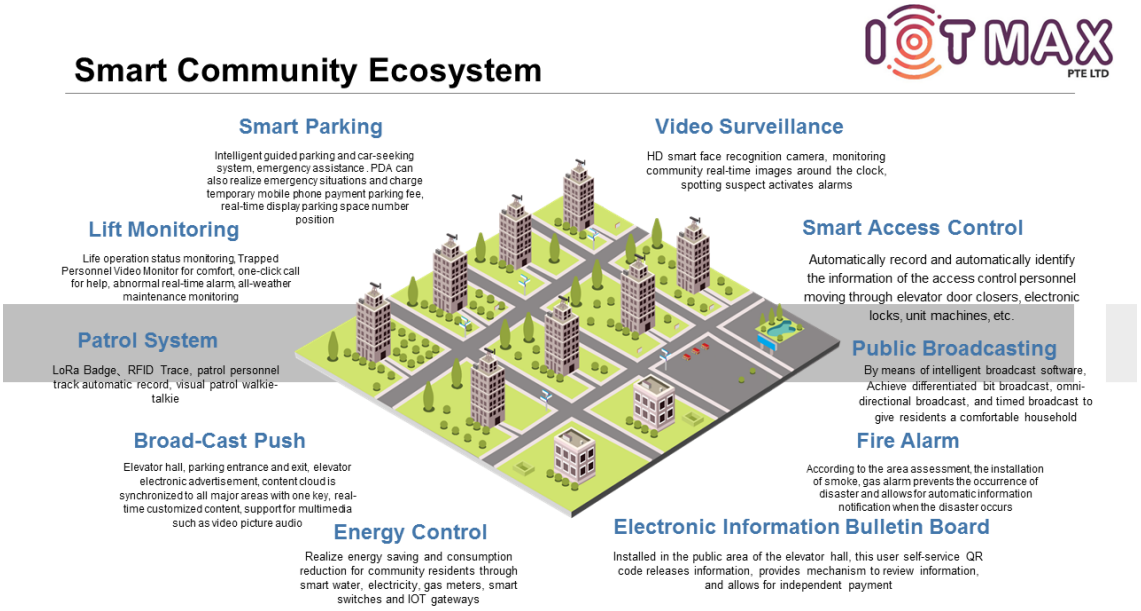

Figure 1 | Smart Community Ecosystem

5. Smart Community Facilities and Fundamentals

Smart Buildings: These are largely regarded as green buildings supported by technology with diverse features such as light, temperature, energy-consuming, security management, and less human touch. Generally, building infrastructure is automatic (Serrano, 2018; Syed, et al., 2021). Communities must be well equipped with smart buildings for daily consumption at tourist places.

Smart Mobility: Smart transport permits optimizing transportation services. It leads us towards sustainable transport practices where carpooling, electric vehicles, multimodal transport systems, etc. are commonly found (Khan, et. al.,

2017). There is a rousing demand for smart mobility at tourist places and smart community can contribute significantly to meeting smart mobility demand in sustainable manners.

Smart Healthcare: Smart healthcare is a health service system that uses technology such as IoT, wearable devices, and mobile internet to vigorously access information, connect materials, people, and institutions related to healthcare, and then dynamically control and smartly respond to the medical ecosystem needs. E-health and m-health are used to monitor and diagnose the health of citizens (Quwaider & Jararweh, 2015; Allam, et. al., 2019).

Smart Technology: Smart Technology uses machine learning, artificial intelligence, and big data analysis to provide cognitive wakefulness to the user. Database, web, mobile, sensors, and wireless access are important aspects of smart technology usage (Al Nuaimi, et al., 2015). It connects mobile, car, and office on a single wireless IT platform (Serrano, 2018). Smart technologies enable the community to have information access and contact with all other tourism stakeholders at smart tourism destinations

Smart Infrastructure: It is the technology-driven amalgamation of diverse departments such as transport, water, electricity, health, waste management, telecommunication, etc. for the ease of the local people (Zhou, et al., 2013; Batty, et al., 2014; Khan, et. al., 2017; Guedes, et al, 2018). Operators use data-controlled tools, *Cyber-Physical Systems* (CPS), for inter-departmental interactions (Iqbal & Olariu, 2021). Without smart infrastructure, the smart community cannot function; hence local community should be well equipped with smart infrastructure at tourist places.

Smart Governance: It is a technology-oriented system that facilitates and supports better planning and smart decision-making for green solutions. It improves the social life of people by smart service delivery. Mobile working and e-government are the main aspects of the smart government (Buhalis & Amaranggana, 2014). Tourism communities are key stakeholders and participants in tourism decision making and planning processes, smart governance will improve the community participation and quality of decision-making.

Smart People: It is a group of people habitual of adopting sustainable smart solutions in their daily lives (Khan, et. al., 2017). They prefer smart products and ideas, and accordingly, they choose smarter routine selections. Smart people contribute towards their communities by educating them and making them understand their surroundings by offering a substitute to the main database and management. Smart people use databases for information to make their destinations/cities sustainably smart. Smart destinations provide an appropriate atmosphere for smart people to live in innovative and technology bounded culture.

Smart Energy: Smart energy refers to a digital technology that is used through the Advanced Meter Infrastructure, distribution grid management, transmission structure of high Voltages. In a different perspective, smart energy is the structural use of technology for sustainable consumption of energy. The main intention of smart energy is to bring down costs, resource management, and eco-friendly usage of energy (Syed, et al., 2021). Smart energy has diverse advantages for the local communities which could encourage them to adopt the concept in tourism areas.

Smart Economy: Smart Economy is referring a series of concepts based on technology and intellectual approaches to promote the sustainability, attractiveness, and development for new investments such as e-commerce, e-business, growth of productivity, income, employment, and innovation in the local economy and enlargement of innovative products and services, new small and large scale business models and opportunities (Stratigea, 2012; Zhou, et al., 2013; Galperina, et al., 2016; Ballina, 2020; Kalenyuk & Uninets, 2020).

Smart living: Smart Living is a progressive lifestyle of people where they get benefits from

the latest ways of living. There are innovative and original solutions for greater life efficiency, controllability, economic, integrity, productivity, and sustainability (Khan, et. al., 2017). In other words, smart living, with the help of technologies, permits the local communities to pursue smart life where innovative smart choices are made for daily life in their work and entertainment for a healthier and better world for the future (Lee, et al, 2011; Zhou, et al., 2013).

Smart Schools: These are those educational institutes where modern advanced technology infrastructure is used to impart education, and because of technology consumption, these schools are different from traditional schools (Aryotejo et al 2021).

Smart Environment: A small world where different kinds of smart devices are continuously working to make inhabitants' lives more comfortable (Cook & Das, 2005; Buhalis & Amaranggana, 2014). Smart environment is imperative for the tourism smart communities at tourist places to live quality lives while dealing with other tourism beneficiaries and resource management.

Smart Attractions: A smart attractions refer to tourist interests that are IoT driven for the effective tourist experience, cost-effective, time and energy-saving (Zhang et al, 2020; Barman & Sharma, 2021). At smart tourist destinations, smart tourist attractions are crucial for effective smart tourist experience and smart community, on the other hand, play a key role in service delivery.

Smart Behavior: Ways of smart action in which people are curious to seek out new information, adopt change for progress, focus on and communicate things, and often take smart decisions (Lesani et al., 2021). Generally, residents possess this behavior at some tourist destinations and we have to bring every member of the community under this concept.

Smart tourist destinations provide a sound smart ecosystem to tourism communities and other tourism stakeholders: governments, tourists, private partners, and environments. The smart ecosystem improves the quality of life for smart communities at tourist destinations apart from enhancing tourist experience, business development, and destination value (Zuccalà and Verga; 2018). In smart tourism, a smart community has a place to serve smart tourists with transport, accommodation, food and ancillary services.

6. Principles of Smart Community

A smart community has some key principles which distinguish its residents from common people in terms of quality of life. Dhaliwal (2019) has studied various smart cities (such as Barcelona, Boston, New York, London, Dubai, Singapore, Chicago, Edmonton etc.) across the world for understanding the basic principles of the smart community. He has identified the following eight principles for the smart community:

Livable: The focus should be on the day-to-day needs of Smart Community, such as fresh food, education, health services and a healthy environment (Iqbal & Olariu, 2021). These needs are generally fulfilled within walking distances. Telemedicine, e-education to all, parks for a healthy lifestyle, well maintained open spaces, etc. are the basic aspects of smart living (Zhou, et al., 2013; Guedes, et al, 2018; Junior, et al., 2020).

Sustainable: Technologies have had a great impact on the sustainability of natural and manmade resources belonging to residents (Ribes & Baidal, 2018). Hence due concentration is given on destination sustainability goals. Sustainability allows smart communities to experience the reduced magnitude of carbon footprints and greenhouse gas

emissions for better living by adopting smart mobility, green packaging, zero waste management, and embracing green practices in energy and water consumption (Plotnikova, 2018).

Efficient: Smart communities consume high class infrastructure and services in their day-to-day life. High quality transport with fewer occupancies, point-to-point connectivity, vehicle free zones, flexible lanes, walking trails, and sensor-based signals for safe and hassle-free traffic services are widely used by smart communities (Syed, et al., 2021). They use smart buildings for living and work, smart parking, smart energy, high speed internet, and various other technology-based services for the quality of life (Mingyan, 2017; Junior, et al., 2020).

Secure: Safety and security are some of the earliest needs of the smart community. They need protection from nature and social elements. Therefore, leveraging IoT devices, CC cameras, sensors, drones, and unnamed devices are playing a critical role here (Zhou, et al., 2013; Balakrishnan, et al., 2019; Syed, et al., 2021). A smart ecosystem provides privacy and cybersecurity frameworks to safeguard users' data and enables steadfast connectivity of data sources and devices. Moreover, vision zero and real-time data are highly used in road safety and enhancing situational awareness respectively at destinations for residents (Khan, et. al., 2017).

Resilient: the resiliency of the smart community is a knack to bounce back after something unexpected happened, be it a natural calamity or manmade happening. It is possible by *Smart Alerting Systems* at the times of fire, hurricane, earthquakes, weather warnings etc. (Lopez & Castro, 2021; Tzioutziou & Xenidis, 2021).

Productive: Productivity is an essential principle of a smart community in achieving triple-bottom-line outcomes. Smart ecosystem stresses skill-building and quality work within and for the community. It encourages local entrepreneurship, cost efficiency, and *Public-Private Partnership* (PPP) for the circulation of the economy (Galperina, et al., 2016).

Inclusive: It refers equitable community that accommodates all citizens to live with dignity and equal rights irrespective of their ethnicity, age, gender, religion, and color etc. Besides, there is inclusiveness in jobs opportunities, education, and security, and business operations in the smart ecosystem (Ballina, 2020). More focus is on the equitable economy in the community to reduce economic disparity among residents.

Transparent: smart communities live in open and collaborative government norms where cross-departmental and data sharing is common. Residents have direct access to the hefty amount of data through Open Data for consumption (He et al, 2017; Iqbal & Olariu, 2021). Digital communications have reduced physical interactions down to the bottom level, all most zero visits. The transparency of the smart community is reflected by cashless government, paperless documents, driven by cutting-edge and disruptive technologies in use (Reverté, 2019).

7. Conceptualizing Tourism Smart Community: a theory for practice

From the previous literature, it is evident that

technology is acquiring a significant place in the community's day-to-day lives (Kirtil, & Askun, 2020; Iqbal & Olariu, 2021). Defining the concept, Smart Tourism Community, all of sudden is very difficult. Because it is a systematic process that includes community needs, life and living, behavior towards the technologies, training community for technologies, implementing technology projects, and so many other things (Gondokusuma et al, 2019).

Generally, the local communities are not well trained for technology usage and supporting smart ecosystems at tourist destinations (Iqbal & Olariu, 2021). They need education and directions to be able to act as smart communities. At the same time, tourist destination needs to be blessed with a smart ecosystem for generating smart locals for the betterment of communities and tourism (Polese, et al., 2018).

We are deploying highly advanced technologies for the furtherance of the local people (Mokhtar et al., 2017) and destination development. People need training for using the technology; they need to know the implications and benefits of the smart ecosystem (Aref et al, 2009). The local people need to know that how *intelligent lighting* will help them in cost controlling and energy saving; and how does *real-time response system* works; moreover, particularly, they need to know about the Intersection Safety Analytics, Parking Optimization, Internet of Things (IoT), Artificial Intelligence, Big Data, Recognition Technology, etc. (Perera, et al., 2014; Al Nuaimi, et al., 2015; Yang & Hsu, 2017; Iqbal & Olariu, 2021; Shin, et al., 2021). Smart schools will help here to impart digital literacy and the students would guide their elders to learn consuming the technology; digital literacy workshops for the local community will make the local people able to use the smart technologies under the *One-to-Many* training concept and *Many-to-Many* training structures will help to gain maximum participation from the local population at a destination after workshops. Hands-On instructional sessions are a must in digital literacy workshops. The development of mobile applications will also help in training the local community in using smart technologies in their day-to-day activities. The most observable thing is to know how many residents, travel firms, hoteliers, restaurants, transporters, cafeterias, shopkeepers, and other local beneficiaries are attached with tourism through technologies. This approach will guide planners in understanding the scope of the smart ecosystem for the community; and digital infrastructure and training preparation would be equipped accordingly (Polese, et al., 2018).

Smartness is not merely installing digital technologies as a part of the superstructure at a destination or streamlining destination operations. The smart ecosystem should be functional and allow users to use data and technologies for better decision-making and quality of life (Khan, et. al., 2017). The functionality of smart technologies is very important for the quality of life of the local communities in terms of health, safety, environment, time and convenience, cost of living, jobs, social connectedness, and so on at a tourist place (Junior, et al., 2020). The functions of technology allow local communities to progress in every field of development and will push everyone to use it. The practical implications of the smart ecosystem are visible when it makes the lives of the local people easier and more convenient.

There are various government and non-government agencies, departments, and other bodies at different places, directly or indirectly, connected with the local communities (Gondokusuma et al, 2019). In the smart ecosystem, numerous departments are having interdepartmental coordination where the local communities are indirectly getting involved (Qi & Guo, 2019). This coordination streamlines information among the stakeholders, including the local communities, and maintains the objectivity of the built smart environment of technologies. The coordination among departments for data sharing is imperative as it ensu-

res effective participation from the communities in embracing advanced technologies. Coordination in the smart ecosystem will let the communities feel improved transport, banking, healthcare, energy, water, waste management, and other services including the crime-free atmosphere (Zhou et al., 2013; Polese, et al., 2018). There are numerous tourist places where various issues are that could be fixed by destination smartness and developing smart communities (Minghetti & Buhalis, 2009).

We are trying to develop a technology lover community at the destinations which need participation from the local people (Aref et al, 2009). Unless the local people are not involved in technology consumption, the objectives of the smart ecosystem will remain unachieved (Shin, et al., 2021). There might be challenges in gaining maximum local participation in the smart ecosystem, such as the local communities' lack of technical skills for technology usage, unawareness of benefits, want to live with traditional lifestyle, and so on (Farooqi, et. al., 2019). Planners have to visualize some immediate benefits of the technologies for the communities like how tourist influx, convenient transport, fast service delivery, direct dealing with companies and tourists, better earnings, water and electricity supply, etc. in destinations. These things will have a profound impact on community participation at tourist places (Kirtil & Askun, 2020). The tourism planners have to promote e-interactions strongly with the local people and businesses, which not only decide the agenda of the destination but also give their ideas on the concerns discussed by the planners for making technology more effective for better outcomes and ease of the people (Khan, et. al., 2017).

Creating smart tourism communities means the communities will have to go through a change. The communities must embrace unusual technology-friendly practices in their day-to-day lives (Zhou, et al., 2013; Aref, et al, 2009). Particularly, they need to use data, innovation, and connected technology for their empowerment and *quality of life* (Junior, et al., 2020). Once communities accept the changes, *Pervasive wireless connectivity, Open data, Security* (they can trust in) and *Flexible monetization schemes* will be common for them (Balakrishnan et al., 2019; Iqbal & Olariu, 2021). The manual work will go automatic by transforming traditional practices into next-generation intelligent proficiencies with the help of protected wireless connectivity and IoT technology. Adjustment or giving space to the technology in the society is a progressive change in the social behavior of the community which is crucial even for resource management and service distribution at tourist places.

Developing a smart community for tourism is a cooperative effort of every stakeholder of the smart ecosystem including governments, private partners, trade and planning agencies, and more importantly the local community itself (Zhou, et al., 2013; Polese, et al., 2018; Reverté, 2019; Gondokusuma, et al, 2019). Their collective work gives meaning to the tourism smart community. Here we can define the concept now by saying that the tourism smart community refers to the technology-driven interconnected residents of a tourist destination using advanced technology for their prosperity, businesses, decision making, tourism resource management, and elevating the quality of life. Tourism smart community is the next level or upgraded version of our traditional community where necessities of the residents are improved, and they are allowed to have more interactions and information access with the help of wireless technology (Serrano, 2018). Smart communities are likely to have a broadband economy, economic growth, smart job opportunities, and cost efficiency at the destinations (Galperina, et al., 2016; Kalenyuk & Uninets, 2020). When smart communities manage local resources, they maintain environmental sustainability which is highly crucial (Ribes & Baidal, 2018). Maintaining the objectivity of the smart community depends on the integration and coordination of the smart ecosystem

elements. Role of the smart community is crucial in making smart ecosystem successful. However, throughout the process and operations, planners and engineers play dominant role technically. They design smart ecosystem to connect all other stakeholders with community digitally (Polese, et al., 2018).

8. Conclusion

By following an in-depth theoretical research approach, the study has brought various aspects of the smart community for tourism into light. The development of a smart community is challenging and yet crucial for tourism way forward. This study has revealed smart community's existence at tourist places is essential not merely for the community *quality of life* but effective resource management and tourist experience furthermore. Therefore, having smart communities for tourism will help in taking tourism to the next level.

This paper will not only contribute to the academic research of smart community development in the tourism sector but also map new instructions for the planning and building of smart communities in practice. The study has pointed out various aspects of the smart community for tourism that decision-makers can consider for standing digital infrastructure, smart destination planning, gaining the residents' participation, etc.

This study has a major limitation that no tourism stakeholder, such as governments, local communities, IT companies, local businesses etc., was taken into account for their views. However, in future research, the impact of smart technologies on the cost efficiency, resource management, sociocultural life of smart tourism communities, and other related aspects, from stakeholders' perspectives, is needed to research.

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