Sustainable Energy Technologies and Assessments 47 (2021) 101494

Contents lists available at ScienceDirect

Sustainable Energy Technologies and Assessments

journal homepage: www.elsevier.com/locate/seta

An energy-efficient smart city for sustainable green tourism industry

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ARTICLE INFO

Keywords:
Sustainable green tourism industry strategies
Data-driven approach
Green Management Framework
Smart cities
Smart tourism
Energy-efficient

ABSTRACT

In recent times, Tourism and Travel are considered a flexible, dynamic, and ever-growing industry. The Smart Tourism Destinations concept arises from the advancement of smart cities. Since information technologies are considered a key competitive element of a city's destination, tourism companies invest extensively in smart system initiatives. Moreover, the smart city concept and related approaches are increasingly recognized by cities worldwide to optimize sustainable environments. Furthermore, a smart tourist city faces the challenge of creating urban areas that residents and tourists can experience together, particularly in cities that pose new tourism challenges. This paper proposes the Data-Driven Sustainable Smart City Framework (DDSSCF) for sustainable green tourism strategies and policies. This paper explores the aspects of technologies essential for creating a smart city and a fashionable tourism destination. The preservation of the climate, protected cultural heritage, and natural resources would contribute to an environment, the economic, social sustainable field of tourism by reducing hazardous pollutants and energy usage. Therefore, based on the preservation limit, it has been classified into three components includes-green architecture, green waste, and green energy as a part of the green management framework at the same time. Hence, green tourism, including marketing efforts, such as green marketing, are necessary for the vision of successful adequate green management activities. The experimental results show that the proposed method enhances efficiency ratio when compared to other existing methods.

Overview of green tourism industry

The smart urban idea recently suggested potential and effective technologies to enhance destinations' viability in the green tourism industry [1]. The subsequent are some of the features of ecotourism, Visitor behavior that is considerate and reduced. Sensitive to native customs and ecosystems, as well as enjoyment of them. Nature conservation initiatives are supported. The term "green tourist" has developed throughout history and has been used in a variety of contexts. A harmonious ecosystem is frequently associated with longevity. Is the growth procedure that meets the necessities of the moment. All of this without jeopardizing future generations' option to fulfil their own demands. This form of travel considers all aspects of its financial, cultural, and environmental damage, both now and in the foreseeable. In the tourism industry, the concept of smart tourism terminates as the development of smart cities, which has increased dramatically over the last decade [2]. These goals use various technologies such as an Internet of Things (IoT), cloud platform, and remote end-user services in advance of digitalization of tourism systems, and the introduction of technology into the physical world of tourism terminates to Enhancing tourist competitiveness and locals' quality of life. Finally, the Internet of Things (IoT) entails adding internet access to each and every day products and accessories, capable of communicating among each other. This has a number of advantages for anyone in the tourism industry, along with the capabilities to provide a competitive advantage of consumers and optimize business procedures. By utilizing a cloud architecture, tourism organizations can save money on infrastructure, technology, and IT management. Apps are often developed on comparable frameworks, making it easy to recycle and redistribute support and programs across multiple services. The travel services industry is comprised of a

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https://doi.org/10.1016/j.seta.2021.101494
Received 5 November 2020; Received in revised form 31 May 2021; Accepted 16 July 2021
Available online 24 July 2021

complicated network of interactions involving a wide range of vendors, tourist attractions, destination management companies, travel agencies, and tour operators, among many others. The overall operations are basically handed or delivered to the end customer, who then works only with regional development business to make sure that specific arrangements have been made to match his or her demands and agenda [3]. Tourists seek to provide technical strategies for enhancing sustainability through processes to enhance tourism experience and implement steps to promote tourism management in tourist metabolism, knowledge technology efficiency, and energy cost cuts [4]. There are a variety of similar elements in the conceptions of sustainability and knowledge [5]. The creation of smart tourist destinations could make a crucial contribution to improving sustainability [6]. There are various views on smart tourism destinations in research and scholarly papers, observational research on adopting initiatives, and the effect on urban growth still lacks [7]. The sustainability provided by the smart tourism destinations has been backed by the strategic initiatives or green choice, which fuel sustainable rhetoric as already discussed in the sense of sustainability in smart cities [8]. The usage of Iot systems which includes sensing, controllers, and handsets, as well as the intelligent systems, is a really rapid and useful resource for addressing the desires of the growing community and metropolitan growth. Therefore, establishing a smart system requires integrating thousands of Iot systems simultaneously talking with one another through the Network. Integrating Iot systems in order to acquire real-time city information and afterwards efficiently handling such vast amounts of data in order to construct an urban development is a difficult undertaking. Home automation monitors, vehicle connectivity, climate and water level, smart stability control, monitoring items, and other detectors are deployed.

The principal purpose of the present paper overview of the degree to which smart tourism pilot projects initiated in China suggests strategies to enhance urban sustainability based on technical creativity relevant to biodiversity [9]. The proposals have been assessed using a material review approach and are coded according to the numerous urban sustainable growth fields defined in scholarly literature [10]. The programmed study of behavior is a useful metric for calculating sustainability as a real reality in intelligent tourism [11]. Proposal for creative governance regimes that build political possibilities and anxiety about global initiatives is likely to be valid instruments of change towards sustainability in smart cities [12]. This study fills this void by knowledge about smart tourism in China tourist towns, thus enabling a strategic understanding of their future effect on the urban development of destinations [13]. Academics have been attracted little exposure to the role of technology in sustainable growth [14]. Smart tourism destinations to technological convergence with the tourism ecosystem, possible synergies between smart and urban development are unclear [15]. This analysis investigates technology-programmed interventions to encourage city development that has established multiple urban models [16]. The town's road traffic has been upgraded where comfort and effectiveness of public transportation have improved. The livelihoods of city people have generally improved. The functioning of all municipal services is centralized and monitored. Another of the ways that the Internet of Things is make communities smarter is through mobility. The problem in terms of movement is to offer individuals with simple availability of resources, preferably environmental and socio-economic assets, to fulfil their daily demands. The Internet of Things could aid in the integration of various forms of transportation, and also the reduction of traffic, the facilitation of storage, and the optimization of limited urban landscape.

In [17], the author discussed Light-Emitting Diode (LED) to evaluate and determine the energy security problems in smart cities by considering economic production determinants. The key methods included are the economic analysis of infrastructure improvements, which lead to a reduction in smart cities' energy demand through the LED system. Smart LED streetlights are becoming more popular among the leading components of the "smart" community in the world's leading metropolises. The efficacy of LED street lighting is used in smart cities.

In [18] author suggested Smart Tourism Dynamic Responsive System (STDRS). Smart tourism has grown as a part of the smart cities' concept to provide tourists alternatives to satisfy the unique needs of travel. China is an emerging tourism destination, which has introduced smart cities and smart tourism networks to attract multiple stakeholders. This helps to recognize best practices in the smart city and smart tourism of China. Here, China's mission and vision and main aspects and structures about academic development and stresses significant opportunities and challenges. STDRS is suggested, indicating how China will improve user engagement and experience overall.

In [19], the analysis results show that smart tourism is a core component of smart urban towns. This analysis will enable us to understand the current situation of the rising growth of smart cities in China if there is an hour to make viable plans for creating smart cities that eventually will take us to smart tourism destinations. The Information and Communication Technology (ICT) to the management model that the smart city uses in terms of how particular priorities are accomplished with creative structures and stakeholder-oriented processes in smart cities. In the tourist, traveling, and hospitality sector, information and communications technology (ICT) runs as a critical influence Adoption of Sustainability in the tourism sector is pivotal to the survival of the business. Individuals can use ICT to gather information on travel items from everywhere all the moment. With the advent of mobile computers, web technology, and other technology, business organizations may now contact specific clients all over the world with a simple keystroke. Innovation and progress are handled at the core of this initiative by technical innovations and integrated mechanisms that underlie objectives' achievement. Innovative utilization of state-of-the-art infrastructure frameworks describes the inclination towards "smart" initiatives.

In [20] author Suggested International Council for Local Environments Initiatives (ICLEI) is ready to have a stable and peaceful society with the requirements of global, political, economic, and social developments. Through realistic, sustainable systems, ICLEI integrates environmentalism into urbanization and fosters structural change in urban settings. From fast urbanization and climate disruption to environmental destruction and inequalities, we assist towns, municipalities, and areas forecast effectively that adapt to challenging problems. Smart cities will use the connectivity and sensors in the city's infrastructures to maximize day-to-day power, transport, and other logistics activities, thereby enhancing everyone's quality of life.

In [21], IoT devices are being used to govern towns without the use of human communication. In this pervasive factory, the increased probability of detecting and releasing sensitive information focuses on the three big concerns: anonymity, diversity, and real-time operations. In this research, First, they offer an ontology consisting of gadget confidential data. Then, over addition of all that, they apply a real-time private information strategy, which is accomplished by developing an interactive atmosphere from a confidentiality and integrity standpoint.

In [22], in the consumer sector, Internet of things is quite often associated with goods that claim to be "Smart Home"-like. The major goal of the project is to create a clever sophisticated garbage alarm system enabling proper waste management. Incorporating sensors, such as ultrasonic sensors to monitor the levels of the dumps and the movement of persons as they approach to dispose of waste. ARDUINO UNO for data transport across an entity to server farms, different PCB devices, and other applications. Additional sensing or hardware, including an RFID tag, a Gsm modem, a battery, and so on, can indeed be utilised to build a Smarter Dustbin. As a result, the main development of smart CITY Trashcan is to correctly manage garbage and cure infection caused by environmental damage caused by a certain trash [23–25].

Based on the analysis and observed survey, the significant contribution of the paper is listed as follows,

- Design and development of DDSSCF for sustainable green tourism strategies and policies, which are essential for exploring smart tourism destination.
- The analysis has been carried out to preserve the climate, natural resources, and cultural heritage limit for tourism's social sustainable field by reducing hazardous pollutants and energy usage.
- Experimental case study analysis based on DDSSCF for sustainable green tourism strategies in comparison with conventional strategies

This paper is divided into six parts. Section "Theoretical basis for the relationship between sustainability and smart tourism destinations in DDSSCF model" – Deals with Backgrounds studies Section "Smart tourism in local and regional tourist destinations DDSSCF model" – explains the theoretical basis for the relationship between sustainability and smart tourism destinations. Section "Result and discussion" – More significantly, the research analyses the China proposals for smart tourism in local and regional tourist destinations introduced in 2020. Section "Conclusion" – The findings provide an outline for recognizing the lines of action resulting from Smart tourism policies of urban developmentand the discussion of the Smart City, sustainable tourism, and a range of changes are suggested to develop sustainable tourism destination technology solutions.

Theoretical basis for the relationship between sustainability and smart tourism destinations in DDSSCF model

The analysis aims to characterize and classify China tourist destinations in the area of tourism as sustainable, in line with their ability to encourage technical solutions. The numerous pilot projects on the smart tourism destinations and smart city developments by towns belonging to the mobility of the smart China towns involving tourism activities were made available. Several tourism activities and the strategic planning emphasize innovations present in the DDSSCF technologic solutions for sustainable tourism destinations. The creation of knowledge with existing on approaches for plan, promoting, and advertising a destination is known as strategic making plans in the tourism sector. Developing a strategic plan is a crucial step in ensuring the destination's long-term sustainability and tourism development. Strategic planning in the hospitality sector is a continual process that necessitates assessing, evaluating, and creating recommended decisions based on data received while considering biological influences. Besides, the recreational use and development of tourism areas are taken into account based on various impacts. The survival of tourist areas is evaluated based on the impacts such as mobility management, specialized production, utilization, and competitiveness, focusing on the private sector in managing the process, as shown in Fig. 1.

Firstly, 1080 scheduled urban sustainability acts have been identified in DDSSCF Model and smart mobility according to seven areas identified in urban and tourism sustainability. Secondly, Smart touristic destinations and intelligent cities are defined by the scheduled operation's delivery, volume, and specialization indexes. Thirdly, the DDSSCF proposed urban sustainability behavior, the presence/absence of technological technologies used in tourism has been listed in Fig. 1. The goal is to discriminate between various models for Smart city sustainability. The goal has been to detect the DDSSCF method of transition to Smart tourism destinations to improve urban sustainability. DDSSCF is designed to compare strategic approaches in smart cities and tourist destinations, to define differences, and to promote a system of urban assessment for tourism development and the creation of urban and tourism sustainability indices. It is established on a cutting-edge information technology that ensures the long-term development of tourism destinations that are reachable to all. It enables the tourist information communication with others and incorporation into his little her immediate environment, enhances the quality of the service at the departure point, and enhances the quality of life for the locals. Communicating among visitors and locals is vital not just for offering a decent experience for visitors as well as for the city's social context, yet this can be challenging at times owing to cultural differences. It provides tourist destination in order to improve visitor experience and boost export performance.

This research clarified that smart tourist destinations are the endpoints that use the technology available to co-create value, fun, and tourist experience. Smart tourism destinations need to involve residents in a proactive way to ensure community involvement, as shown in Fig. 2. The smart tourist destinations support the tourism industry as they promote exchanging information through a consolidated forum between

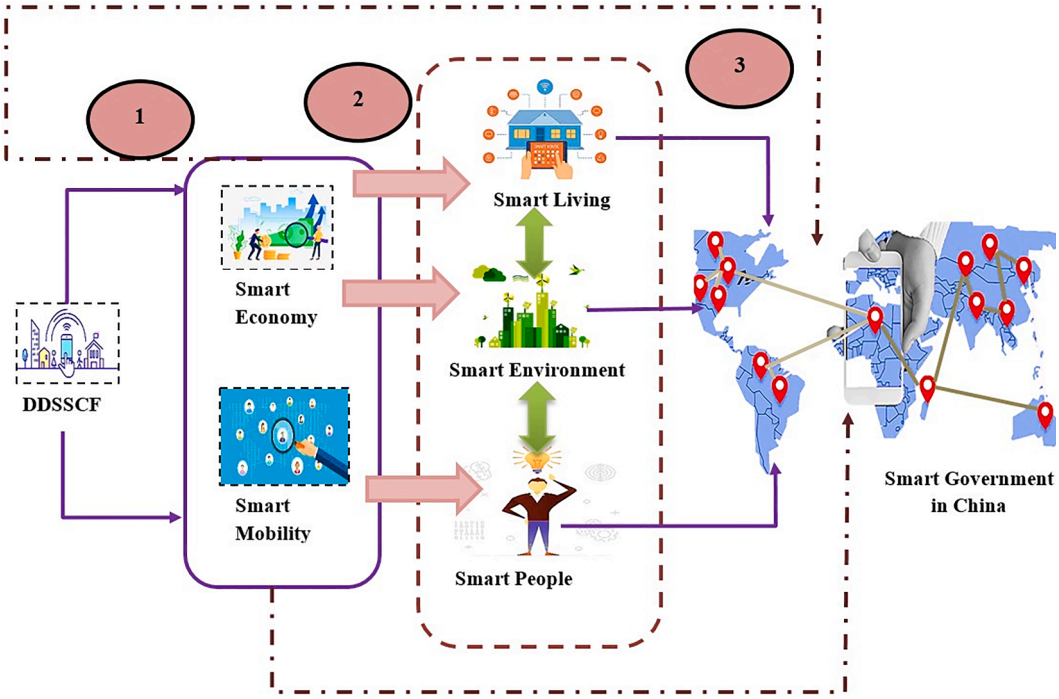

Fig. 1. Sustainability and smart Tourism in DDSSCF Model.

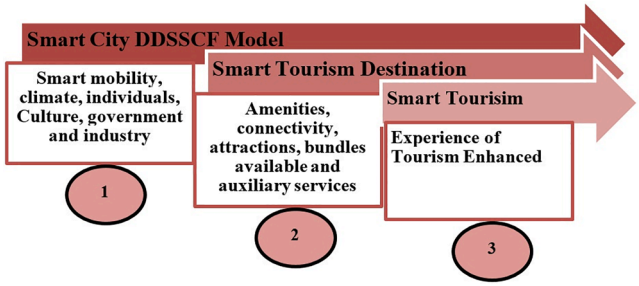

Fig. 2. Smart Cities and Smart Tourism in DDSSCF Model.

tourist organizations. Smart tourism destinations should think about the needs and desires of their clients.

DDSSCF is necessary to have goods that adapt effectively to tourists' needs to significant interaction between tourists and service providers. This allows service providers to recognize visitor needs and offer creative and expanded services eventually. The local solution effort to address traditional planning schemes is not having growth viability to solve the major challenges and issues in smart tourism terminuses such as tourism, ecological productivity, or tourism knowledge. This strategic approach to smart tourism growth in China is the root of two crucial issues, as listed as follows.

1. The program focuses extensively on a sectoral basis in DDSSCF that has been approached from the single point to sustainability in other sector-specific development fields. Urbanization affects communities of all kinds, from remote communities to cities to states, eventually culminating to the establishment of metropolises with populations exceeding ten million. 2. China's national Smart tourism strategies are primarily implemented at a provincial urban level, where intervention and outcomes are impossible to apply to urban areas or territories. In China, growth has resulted in improvements in brain activity, food, and cultural norms, all of which have significant consequences for non-communicable diseases.

Smart tourism in local and regional tourist destinations DDSSCF model

Presently, smart tourist cities face the challenge of creating urban areas that residents and tourists can experience together, particularly in cities that pose new tourism challenges. Furthermore, the DDSCF concept of smart city management promotes investment in human resources, and the infrastructures to accomplish sustainable growth is given below,

This model proposes a general structure for the smart cities: (1) Goal of the smart city and smart cities' development. (2) Smart Economy, Technologies, Smart Technologies, Smart Energy Efficient (3) Smart Government in China based on the DDSSCF method, as shown in Fig. 3. This model is useful for tackling smart urban change leading to sustainable growth. It offers a description of specific processes of change required to be the smart cities. DDSSCF Technological sustainable strategies are represented in tourist towns compared to revitalizing tourism destinations such as the production of new tourist goods, planning and promotion, and community growth.

This approach's goal is fundamental to build an urban model in which sustainability plays a prominent role since programmed activities have been aimed at resolving the stagnation of tourism in the urban

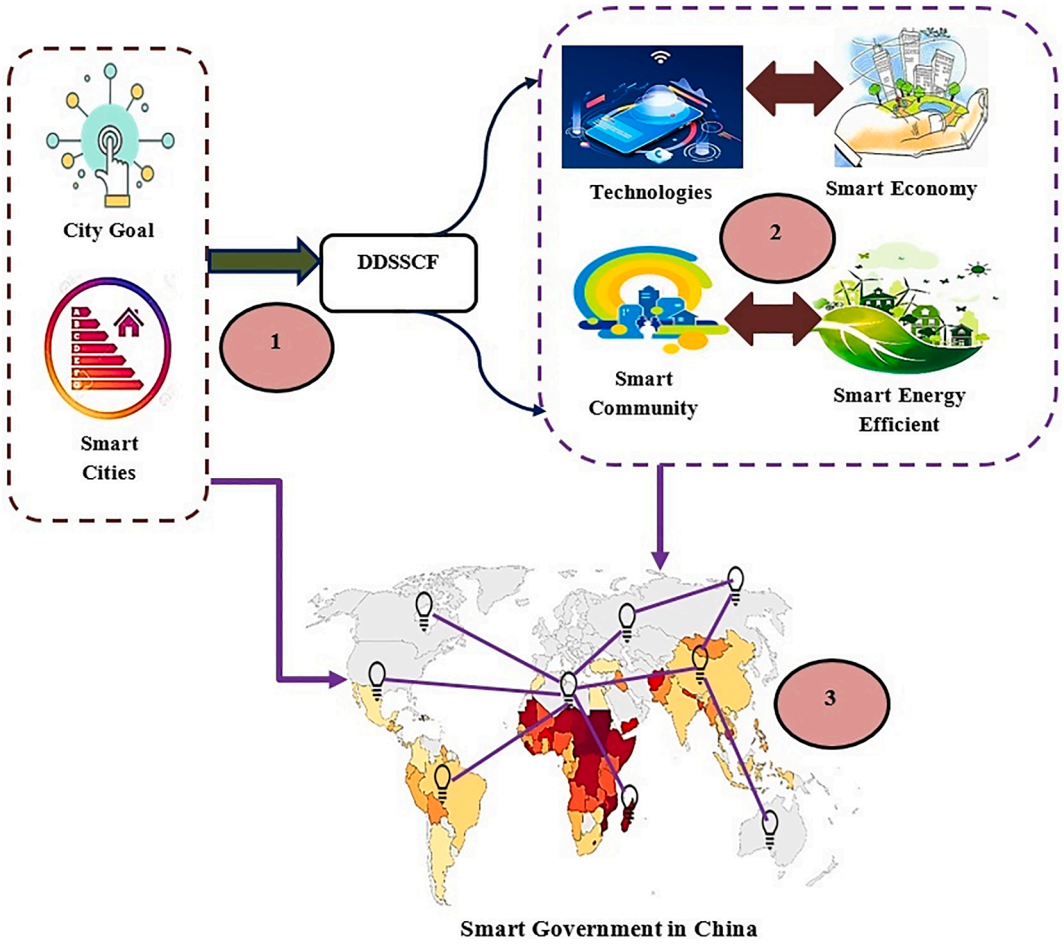

Fig. 3. Smart Cities and Smart Tourism goals in DDSSCF Model.

period of maturity. In other words, they emphasize areas that boost tourism (technologies, Smart Community, Smart Economy, Smart Energy Efficient, etc.) instead of pursuing greater urban efficiency using technology or management of knowledge using governance, as shown in Fig. 3.

$$Energy\ Efficient(\%) = \frac{B_{3.254}}{3.254} \tag{1}$$

$B_{3.254}$ – indicates the spatial unit actions in smart cities; Eq. (1) is used to improve the Energy Efficient ratio in DDSSCF Method. In this method, structural support for smart tourism has been established in numerous smart tourism destinations for public funding in the China Government. These proposals that encourage competition and sustainability in the tourism sector accompanied by the institutional interest, where investment in smart tourism has been suggested as a policy of distinction in tourism. The institutional smartness debate reflects the need for technical strategies in development, policy advancement, and political opportunities in tourism.

$$Smart\ Tourism(ST)\% = \frac{B_p - B_q}{B_q} \tag{2}$$

B_q – Object assigned in normalized data in p actions, B_p in original actions in the smart cities, Eq. (2) is used to improve the Smart Tourism (%) in DDSSCF Method. The research shows the presence in terms of the sustainability of various urban structures. In the Smart City, diverse urban development perceptions indicate that the proposals offer customized solutions in the smart city for urban sustainability programmed. smart cities employ information and analytics to increase efficiency, enhance continuous, spur economic growth, and raise the standard of living for residents and workers. Also, it implies that perhaps the metro's transport infrastructure is more intelligent.

$$Smart\ City(SM)\% = \frac{C_p - C_q}{C_p} \tag{3}$$

C_p – indicates the value of sustainability benchmarking in p action, C_q – indicates the positive effects of benchmarking in q actions. Eq. (3) is used to improve the smart cities' efficiency (%) in DDSSCF Method. In this proposed method, initiatives on biodiversity in smart cities are improved. It is based on an approach to the environmental aspect as powered by tourism activities. It resolves the problems posed by the complexities of tourism that pose a significant challenge to maintaining the destination's environmental nature.

$$Quotient\ Location\ in\ smart\ Tourism\ (QLST) = 100(B_p + 1) \tag{4}$$

where, B_p – indicates the objects assigned in normalized data in p actions; Eq. (4) is used to improve the QLST in DDSSCF Model. This method, a space for cross-sectional discussion, focused on cooperation or interaction among the various players has been analyzed, say, for instance., traditional knowledge processing by open data structures, as shown in Eq. (3). In addition, at the local level, the political possibilities resulting from the smart plans that are introduced to specific circumstances and issues in the green tourism Industry. Furthermore, this Industry supports its smart strategy on particular issues, including coastline management and tourism facilities development.

$$Quotient\ Location\ in\ smart\ Cities\ (QLSC) = \left(\sum\nolimits_{p=1}^{o} QLST\right) \Big/ 12 \tag{5}$$

The preservation of the climate, protected cultural heritage, and natural resources would contribute to an environment, Economy, the socially sustainable field of tourism by reducing the usage of hazardous pollutants and energy in the DDSSCF Model. This method is used to improve the tourism experience, in which smart tourist destinations aim to enhance the quality of the atmosphere and life of their residents in the green tourism industry. This is demonstrated by several activities that influence visitors, residents' facilities, and environmental sustainability, vital for attracting tourism for the community. However, few steps involve mobilization of a dynamic fabric of economic factors (innovation) requiring some kind of organizational structure (such as stability or mobility).

$$RM = (B_{mn}/B_n)/B_m/B_u \tag{6}$$

B_{mn} – indicates the spatial unit actions m and type of action n, B_n – indicates the unit of the spatial total in m action and B_m – actions of total type,B_u – actions total, as shown in Eq. (5), RM –indicates the total number of actions. The concept of smart city tourist information is focused on growing tourist satisfaction in enhancing people's actions. This action aimed at improving people's quality of life committed to the development of visitor information systems. Smart tourism strategies provide tourist destinations with an incentive to technical alternatives for sustainable challenges generated by their operations. However, shortcomings and determining factors have been established, rather than a systemic view of development, as direct in industrial dimensions. Eq. (5) is used to improve smart tourism and Quatent location in smart cities based on three major components: green architecture, green waste, and green energy. Further, the vision of successful adequate green management activities is improved, and the corresponding analysis has been carried out in the results and discussion part below,

Result and discussion

This section discriminates between smart cities and visitor destinations; the number and area of acts vary considerably. The number of actions linked to tourism in tourist destinations is projected to rise, while China's government actions in smart cities remain dominant. However, in the plans of both city forms, the same amount of acts relating to various facets of sustainability (environmental mobility, and social).

i. China Governance, ii. Innovation and Economy, iii. Transport and mobility, iv. Sustainability of territorial and Environment, v. Quality of Life and Social Sustainability, vi. Tourism, vii. Smart destinations for visitors are shown in Table 1. In most tourist locations, economic growth policies are targeted at reducing negative externalities and mass tourism costs. Furthermore, initiatives aim to enhance the urban climate is an impact on tourism. For, e.g., the concrete waste initiative aims to introduce initiatives intended to reduce the visual effect of waste bags on commercial roads with plentiful visitors.

The tourism activities in China, where the social and historical tourism, have been expanded dramatically for the past 15 years. The Smart City Strategy essentially plans to establish a regional information center for the smart idea (based on organizing smart city conventions, the formation of smart city networks, engagement in conferences, seminars, smartness forums, etc.). The same proportion of tourism technology activities in two city styles makes an interesting note that tourist destinations are rational (92.14 percent of towns and 98.25 percent from traditional cities) in this province, as shown in Fig. 4.

This DDSSCF approach offers purely informative knowledge without allowing direct contrast between towns, provided that the multiple situations and the quantities of acts involved in any town category are subject to preconception. However, the study of systematic variations between the two smart city styles about smart behavior helps comparisons be carried out at the stage, as shown in Fig. 5. A coverage predictor for each type and subtype has been developed for this reason, Tourism Economics offers the much more extensive geographic analysis of travel patterns possible to a sector. Coverage predictor aids in forecasting covering and extending outreach from the farthest reaches in acquiring a competitive edge and deliver realization judgments and a position quotient is used to evaluate definition for each type and subtype:

The smart city acts are used to identify the position quotient; it reflects each smart city's specialization in DDSSCF. Secondly, the construction of the allocation of a given category of action is taken. The

Table 1
Comparison of Energy Efficiency Ratio and Type of total Action.

Type of Total Action	i	ii	iii	iv	v	vi	Vii	Total Energy Efficiency (%)
Smart destinations for visitors	91	72	42	85	62	62	51	82.65
Smart Cities	122	75	52	191	82	110	67	88.25
Number of Total Cities	222	142	94	12.56	20.56	15.25	12.45	92.14
Smart tourist destinations Average acts by city	21	10.45	7.25	8.56	10.25	10.25	15.24	97.25
Municipality average behavior of Smart Cities	7.8	6.2	4.65	9.51	6.45	10.34	6.25	98.25

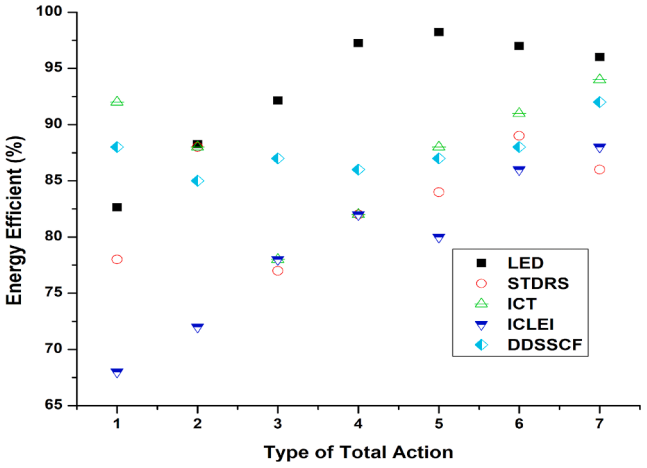

Fig. 4. Type of total action vs. Energy Efficient (%).

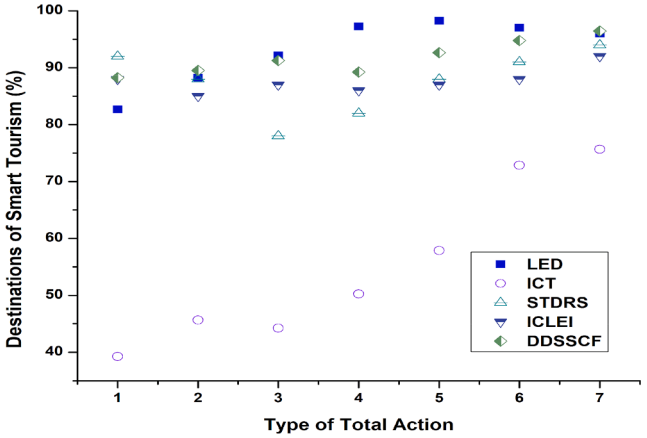

Fig. 5. Type of Total Action vs. Smart Tourism (%).

position quotient demonstrates specialization areas of two smart city groups, as shown in Table 2. Furthermore, this knowledge has been complemented by the systemic distribution, in which intervention areas are analyzed based on the category of city.

Table 2
Comparison of Destinations of Smart Tourism (%).

Actions	Smart Cities Quotient location	Smart Tourism of Quotient Location	Smart Cities in Energy Efficiency (%)	Destinations of Smart tourism (%)
i	2.22	1.54	88.25	39.25
ii	2.26	1.91	89.52	45.65
iii	2.52	1.86	91.25	44.25
iv	1.88	2.52	89.25	50.25
v	1.78	2.68	92.65	57.86
vi	2.65	2.78	94.78	72.86
vii	2.87	2.0	96.45	75.68

The finding of Fig. 6 shows that most steps have been taken at tourism destinations to address obsolescence issues in the DDSSCF model, as shown in Fig. 6. Furthermore, the lack of intervention provides technical options for improving urban development in Energy efficiency, as shown in Table 2.

Study of tourism expenditure smart city concept in the DDSSCF model

The six variables describing the discrepancy have been included in 62.25% of the variance. It defines an urban DDSSCF model that invests in sustainable activities in numerous areas (mobility, productive use of resources, urban ecology, engagement of citizens), and activities focused on product generation and customer fulfillment. The Smart City Acts have taken the urban model that integrates equity and productivity standards in administration, improves the quality of life, and considers a Tourism economic activity area. Furthermore, the DDSSCF model refers to cities like China, where visitors come in tourism-oriented geographically.

Tourism smart city concept of tourism information system

The tourism Smart City dimension consists of two variables, which explain the Energy efficiency to 98.65%. Furthermore, the DDSSCF model of a tourism area aims to enhance tourist information by developing tourist information networks and tourist offices 4.0. The enhancement of facilities for tourists and guests in these cities is a priority in smart tourism operations. This urban model primarily refers to the cities that are based on enhancing visitor satisfaction.

The smart cities have been distinguished by combining tourist and sustainable initiatives (China government, social and territorial sustainability) coverage. This designation is intended to demonstrate each smart city's strategic orientation, as shown in Table 3.

Form Type i cities are primarily hubs for tourists and are targeted to developing tourism. Form type ii smart cities of tourist destinations and regional capitals distinguished by governance-oriented behavior, as shown in Fig. 7. Furthermore, the groups have been entirely

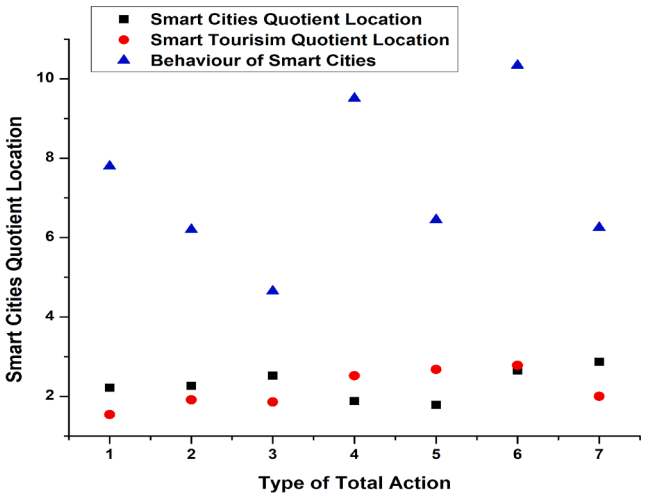

Fig. 6. Type of Action vs. Smart Cities Quotient Location.

Table 3
Comparison of social and Territory in Energy Efficiency (%).

City Action	Governance of China (Type i)	Sustainability of social (Type 2)	Sustainability of Territory	Energy Efficiency (%)
i	95.24	24.25	20.25	92.12
ii	98.25	35.26	30.65	88.56
iii	81.24	28.47	34.56	89.25
iv	92.14	42.35	47.52	91.25
v	96.32	44.65	39.75	89.25
vi	93.24	39.5	42.12	90.25
vii	92.14	46.25	44.62	94.51

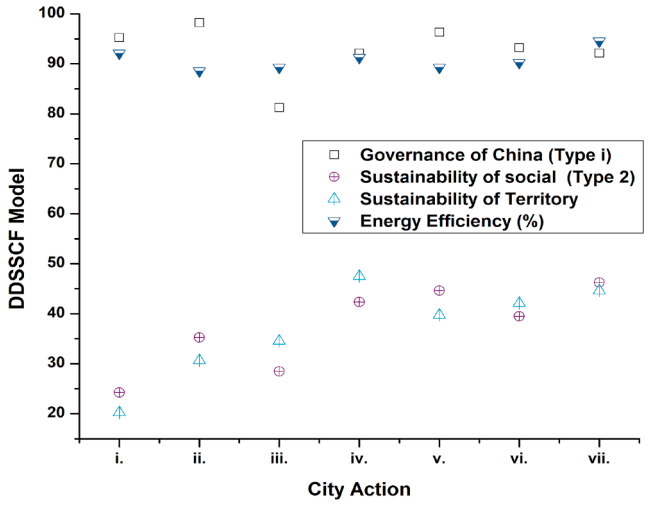

Fig. 7. City Action vs. DDSSCF Model.

standardized, showing little variations, especially concerning the diversified cities (type ii) (see Table 4).

Study at the instrumental stage in the DDSSCF model

A DDSSCF method is assessing the significance of technologies designed to enhance sustainability in the tourism sector. The DDSSCF model is suggested for sustainable and smart destinations as an empirical structure. Furthermore, tourism services are prevalent. About one-third of these interventions suggest creative technical initiatives, such as augmented or virtual reality in the perception of tourist attractions and blended learning of exhibitions.

The most programmed actions of technical solutions are introduced in QR (Quick Response) codes and apps for tourists and the creation of Wi-Fi or IoT networks in tourist areas. One-third of the steps are contained or unrelated to technological use. These acts' fundamental goal is to increase tourism experience, identify new markets, respect cultural heritage, and increase environmental consciousness among tourists. Surprisingly, few programmed shows have been conducted in tourist cities to facilitate Smart change through technical solutions. For, e.g., 85.32% of actions suggest implementing big data platforms and 52.32% of activities proposed in the Internet of Things (IoT) resources.

Table 4
Factors For Hards in the DDSSCF Approach.

Factors for Hards in DDSSCF Approach	i	ii	iii	iv	v	vi	vii
Smart Tourism	2.52	2.65	2.46	2.65	2.98	2.75	1.987
Smart Cities	4.56	5.68	5.78	5.24	4.98	5.24	6.75
Energy Efficient Ratio (%)	94.25	92.35	94.25	96.24	98.75	97.24	94.25

The behavior of the Smart city has been evaluated for methods dependent on Hards capital. This strategy splits economic expenditure into radically different strategic places to boost urban development and tourist experience, as shown in Fig. 8. The challenges, constraints, and obstacles have been recognized before concrete planning steps are established, depending on the approach. Furthermore, this study separated interventions into four distinct forms.

The first type is to incorporate metropolitan activities focused on robust tools such as mobility, Energy storage, and infrastructure in the DDSSCF Model. These model technology factors hinder performance, as shown in Fig. 9. The activities included areas such as schooling, expertise, and smart cities.

Results suggest that the tourist destinations' attitude is more geared than in the other cities towards soft capital. DDSSCF Technology is a challenging behavior specialized in visitor attractions (efficient water storage and energy conservation). The strategy for tourist destination behavior relies on individuals and factors that do not include extensive technology or significant physical structures. The method is used for information growth (education, training for business businesses, openness, fair procurement practices, enhanced social awareness) to provide requirements for a vision of successful adequate green management activities.

Conclusion

This article's contribution is to determine the potential smart tourism plans and create urban development planning in tourist towns. This study has proven challenging to encourage long-term urban growth through programmed behavior based on sustainability in tourism. Furthermore, the smart design provides a more rhetorical than actual view of sustainability. The DDSSCF plans contain initiatives to promote sustainable growth, which atomized and clearly defined sustainable development policy. For example, some actions suggest designing integrated tourism management systems, improving understanding of tourist goods by technologies (for instance, through augmented or virtual reality), building big data and open data frameworks, through IT sensors or the DDSSCF designing methods that promote transparent tourism. The experimental results show that the proposed method enhances efficiency ratio when compared to other existing methods. Also, the issue for cities in the future is about being able to combine novel technological facilities and smart sensors with existing systems on the ground, using synergy and compatibility between systems to provide additional value services to inhabitants and to make more energy efficient.

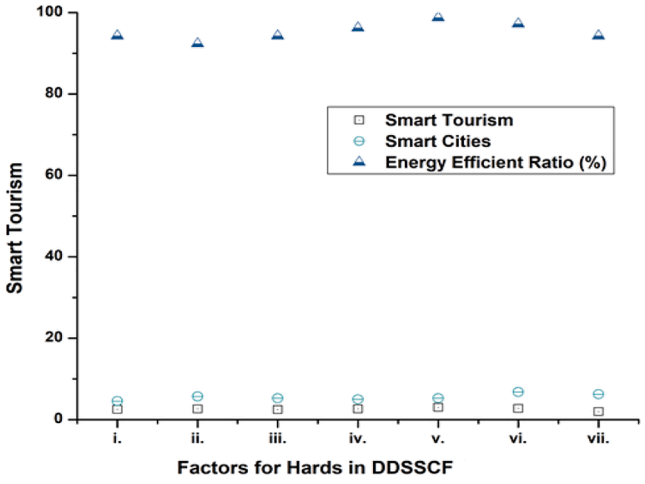

Fig. 8. Factors for Hards in the DDSSCF Model.

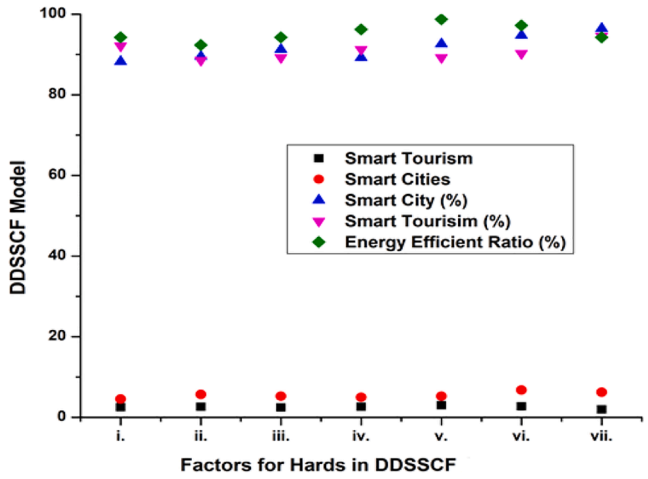

Fig. 9. DDSSCF Model Performance

CRediT authorship contribution statement

Chun-Wei Lu: Conceptualization, Methodology, Writing - review & editing. **Jui-Chan Huang:** Investigation, Methodology, Supervision. **Chen Chen:** Software, Data curation, Validation, Methodology. **Ming-Hung Shu:** Visualization, Investigation, Conceptualization. **Chih-Wei Hsu:** Conceptualization, Methodology, Writing – original draft. **: . B.R. Tapas Bapu:** Methodology, Supervision, Visualization.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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