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The Role of Smart Tourism Cities (STCs) on Tourists' Destination Loyalty (TDL): Evidence from World's Largest Sea Beach Destination (Cox's Bazar)

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Abstract: *This research identified dimensions of smart tourism cities (STCs) and measured their impact on developing tourists' loyalty towards a specific location. This study employed a descriptive research methodology, utilizing quantitative approaches to find out the components of STCs and their impact on tourists' destination loyalty (TDLs). The convenience sampling method has been employed to gather data from 300 individuals. Quantitative data analysis was conducted using smart PLS 4 with the SEM application. The results indicate that four components, including smart tourist applications (apps), smart accommodations, innovative governance, and intelligent people (service providers), positively influence the TDL. Tourists emphasize tourist apps, advanced amenities like VR technology, live streaming, tourist-friendly destination management, and efficient and skilled workers to develop loyalty towards an STC. This study can motivate stakeholders in the tourism industry, particularly hotel owners, transportation owners, government officials, and other relevant parties, to develop a smart and sustainable tourist city. Moreover, the results could assist policymakers in identifying the specific aspects of STCs that are most impactful in fostering loyalty among tourists. This study exclusively focused on Cox's Bazar as a prospective smart tourist destination. Therefore, future studies should consider other destinations including smart mobility and smart security to achieve comprehensive knowledge.*

Keywords: *Smart; Tourism City; Destination; Loyalty; Bangladesh; Cox's Bazar*

1. Introduction

The tourism sector serves a crucial role in the economics of many countries due to its favourable impact on GDP, job creation, and global trade (Oromjonovna & Eshnazarovna, 2023). Recently, the concept of "Smart Tourism Cities" (STCs) has gained popularity, intending to enhance visitor experiences via digital technology and insights derived from data. On the other hand, a smart tourism ecosystem (STE) means a combination of tourist attractions utilizing modern technology to produce, manage, and distribute smart scenic experiences and services (Gretzel et al.,2015). Within this ecosystem, information sharing and co-creation of value are substantial. According to Mandić and Garbin (2019), a smart destination is a crucial component of smart cities that uphold the STE

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conceptual framework. Side by side, Wang et al. (2016) incorporated "smart tourism attractions" (STA) that include eight primary domains: intelligent data systems, advanced visual analysis, sophisticated electronic commerce systems, cutting-edge security measures, innovative mobility solutions, predictive analytics, and virtual experiences tailored for visitors. Both the STE area and the STA field played a significant role in shaping the core ideas of STCs. STCs have an impact on both inhabitants and visitors by making it easier for people to move around, distributing resources efficiently, ensuring long-term sustainability, and improving the overall quality of life and tourism experience (Lamsfus et al., 2015). Moreover, Azis et al. (2020) mentioned that smart tourist services enhance visitors' experiences, leading to increased loyalty to specific tourist sites. Nevertheless, this study exclusively examined innovative tourism technology, and its conclusions cannot be universally applied due to the substantial impact of STC infrastructures on tourist behavior (Um and Chung, 2021). The influence of STCs on the inclination of tourists to return to a specific location, especially in developing countries like Bangladesh, is yet uncertain.

The rise of "smart cities," "smart tourism "and" smart destinations" has attracted considerable interest because of the technology in improving both the tourist experience and the tourist industry's financial performance (Buhalis et al., 2023). To improve the travel experience for all parties concerned, Corrêa and Gosling (2021) define smart tourism as relying on internet-based systems that publicly distribute relevant data and link tourists, service providers, and others in real-time. Smart tourism utilizes technological breakthroughs to enhance tourists' experiences, increasing satisfaction and commitment to the place (Stankov & Gretzel, 2020). Um and Chung (2021) argue that smart city services directly influence tourist behaviour as tourists utilize the advantages of smart cities throughout their visit. Smart tourism is a crucial element of smart city pillars in countries like Portugal, where the tourism industry contributes over 5% to the GDP. This holds for both emerging and industrialized nations (Matos et al., 2019). Researchers assert that intelligent technology such as cloud storage, the internet, and mobile device connectivity will simplify finding and developing captivating new tourism destinations (Buhalis & Amaranggana, 2015; Jovicic, 2019). The expeditious decision-making about a destination is a prominent advantage of utilizing innovative tourism city services, as emphasized by Lee et al. (2018). Despite the widespread use and popularity of the STC concept in developed countries, there is a dearth of research on this topic in emerging nations such as Bangladesh.

Smart tourism towns greatly enhance employment opportunities in the transit, hotel, tour guide, entertainment, and retail industries (Buhalis et al., 2023). Furthermore, it will enhance infrastructure development by improving transportation systems, implementing efficient garbage management systems, enhancing public safety and security measures, and upgrading the overall city infrastructure (Han & Kim, 2021). STCs will enhance individuals' soft skills through collaborative learning and professional growth in various areas such as

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hospitality, technology, marketing, and urban planning (Buhalis et al., 2023). These technologies enhance the tourism business and boost visitors' experience through astute mobility, sophisticated accommodations, smart apps, advanced security measures, knowledgeable individuals, and cutting-edge governance (García-Maroto et al., 2024).

Cox's Bazar, known for being the largest beach in the world, attracts a significant number of tourists from different parts of the world annually. The Government of Bangladesh (GoB) has recently identified Cox's Bazar as a potential STC. Many measures have been implemented, including the construction of a marine drive road along the shore, the development of smartphone tourism apps, the integration of VR technology in hotels, and the establishment of digital information kiosks to enhance the tourists' experiences. How tourists view these activities and how they affect destination loyalty is unclear. Moreover, there is a lack of study concerning STCs and tourist loyalty within the setting of Bangladesh. Thus, the purpose of this study is to investigate how visitors' loyalty to Cox's Bazar, Bangladesh, is impacted by the STC concept.

RQ1: *To what extent STCs influence tourists' destination loyalty?*

RQ2: *What impact would STCs have on tourists' inclination to revisit?*

2. Literature Review and Hypothesis Development

2.1 Smart City and Smart Tourism City

The rise of smart cities in the twenty-first century is a direct consequence of the increasing development and integration of ICTs and efficient urban development (Hollands, 2008; Molinillo et al., 2019). According to Snow et al. (2016), a smart city is a neighborhood where organizations, government departments, and inhabitants collaborate to effectively integrate systems, including citizens, and uphold a particular level of living. Within the digital city movement, smart tourism and hospitality refer to the use of information and communication technologies (ICTs) to provide eco-friendly travel destinations, operations, and sights (Lamsfus et al., 2015). Hence, the construction of infrastructure necessary for the growth of smart cities has a direct impact on tourism. Accordingly, STCs are defined as those that implement smart tourism techniques (Um & Chung, 2021). Therefore, the STC has arisen as a new phrase to offer reciprocal benefits to visitors and inhabitants by creating a location that encourages sustainable tourism practices and guarantees excellent visitor experiences.

2.2 Association Between Smart Tourism (ST) and Smart City (SC)

The literature has recognized various attributes of smart cities. The fundamental pillars of a SC include human beings, devices, and systems that connect several sectors like health, telecommunications, transportation, learning institutions, tourism, amenities, and infrastructure (Khan et al., 2017). The key characteristics of "smart" tourism destinations involve converting physical infrastructure, operational procedures, and service delivery into digital form. Furthermore, these locations promote increased interaction between tourists and the local area while

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also considering the participation of residents and governing organizations. The main goal of ST is to construct and manage visitors' satisfaction (Koo et al., 2015).

ST sites implement structures and concepts of smartness that apply to urban and rural environmental development, resulting in significant advantages for the sustainable tourist sector. These locations facilitate establishing relationships between tourists and their visiting places, leading to substantial enhancements in visitor experiences (Del Chiappa & Baggio, 2015). In their study, Chan et al. (2019) discovered a significant association between the number of smart tourism attractions in a specific region and the level of satisfaction and commitment exhibited by tourists towards that particular site. The idea of a SC has had a significant impact on and accelerated the growth of "smart tourism," mostly through the application of technology and other breakthroughs in information (Li et al., 2017). As a result, the relationship between intelligent attractions and the concept of a SC has become increasingly significant. To encourage people to extend their stay or visit again, it is advisable to market the region as a "smart destination brand" (Kerr, 2006). Over time, these tourists may become increasingly interested in traveling to, revisiting, or even permanently moving to smart cities due to their appealing characteristics (Chan & Marafa, 2018). Tourists' opinions and first-hand encounters hold the same level of significance as the information and communication technology (ICT) infrastructure in cities when promoting a city as an intelligent destination (Hospers, 2010).

2.3 Dimensions of Smart Tourism City

Zhang et al. (2012) determined that the essential elements of smart tourist attractions are cloud computing, the Internet of Things (IoT), and client digital service platforms. The ability to easily access a variety of programs, data, and applications using a standard web browser is a fundamental feature of cloud computing (De Esteban et al., 2017). IoT offers smart locations the ability to rapidly collect and analyze data, as well as benefit from sophisticated automation and management features (De Esteban et al., 2017). A STC is built on a web of interdependent and connected systems that include its people, structures, associations, the press, transit, enterprises, utilities, hospitals, and tourists (Khan et al., 2017). According to Cohen (2014), Buhalis and Amaranggana (2014), Matos et al. (2019), the six essential elements of an STC are smart transport, digital sound governance, savvy environment, smart economics, talented people, and smart living. Furthermore, authors contend that the emergence of STC infrastructure is starting to impact the conduct of tourists, hence establishing a connection with visitor loyalty. Regardless of the reason for their visit, travellers have the opportunity to utilize and access city services while they are staying. Chan et al. (2019) stated that various factors contribute to visitor satisfaction in a smart city. These factors include information technology and infrastructure, the voluntary participation and expertise of the residents, innovation and the quality of life, and collaborative efforts in governance. This study did not take into account other variables, such as intelligent mobility and business facilities that could potentially impact the loyalty of tourists.

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2.3.1 The association between smart apps and tourists' destination loyalty

Prior studies on mobile tourist applications have primarily concentrated on specific areas such as e-reservation; location sharing, or airline tickets (Wang et al., 2016). Although several apps are designed exclusively for tourism, travelers do not use them frequently, especially during holidays (Tsiotsou & Ratten, 2010). Nevertheless, Ukpabi and Karjaluoto (2017) reveal a scarcity of research examining the customer acceptance of mobile information systems in the tourism industry. Moreover, the utilization of apps has shown an increase in both the phase of planning tourism and during the actual tourism experience (Castañeda et al., 2019). Castañeda et al. (2019) underscored the direct impact of tourism apps on travelers' loyalty. They highlighted the need for these applications to consider cost and benefit analysis, user enjoyment, and provision of timely information to encourage more significant usage. Moreover, Tavitiyaman et al. (2021) found that visitors' perceptions of the location were positively impacted by four innovative tourism application features: smart technology, smart touring, internet shopping systems, and smart projecting. In Bangladesh, now visitors frequently utilize different mobile apps such as Gozayaan to select particular tourist spots like Cox's Bazar. Thus, it is imperative to investigate the connection between destination loyalty and ST applications.

H_1: *Smart applications (apps) positively impact on TDL.*

2.3.2 The association between smart accommodations and tourists' destination loyalty

Smart accommodation includes VR technologies, online booking, CRM software, etc. Visitor happiness and loyalty can be improved using smart technologies, including accommodations, mobility, sharing, caring, and customization, as Azis et al. (2020) stated. ICT tools are crucial in connecting accommodation facilities and destination management organizations. They serve the purpose of communicating the offerings of these facilities, increasing their position in the market, and improving their competitiveness (Buhalis, 1998). Smart accommodation services with mobile applications can improve the choice of a particular destination (Gretzel et al., 2016).

Moreover, Digiorgio and Renga (2021) mentioned that websites that provide data and allow for booking for hotels, and CRM software with customized accommodation details will have a favorable correlation with direct bookings for accommodations. There is a positive correlation between direct bookings of accommodations and revenue. Furthermore, there is an adequate number of five-star hotels and motels equipped with sophisticated housing facilities in Cox's Bazar. Consequently, it is essential to examine how these intelligent accommodations affect visitors' purchasing decisions at the Cox's Bazar destination.

H_2: *Smart accommodations have positive implications for TDL.*

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2.3.3 The association between smart governance and tourists' destination loyalty

Several issues about citizen services, public participation, public sector operations, and improved public-government relations are all included in the concept of smart governance (Selada and Silva, 2020). When creating smart tourism destinations, governance ensures openness, transparency, responsibility, cooperation, creativity, and efficiency for all citizens (Santos et al., 2017). Destination governance is a significant topic in tourism and destination management. It involves organizing activities and coordinating various stakeholders to enhance the competitiveness of a destination. Several studies have explored this area, including those by Berittelli et al. (2007) and Pechlaner et al. (2012). Effective governance is crucial for achieving these goals, as highlighted by Crouch & Ritchie (2005); and Del Chiappa & Bregoli (2012). Smart governments formulate and oversee tourism strategies and implement appropriate measures to enhance tourists' inclination to revisit. Intelligent administration and competent governance are essential components of smart tourism that substantially influence travelers' loyalty (Li, 2021). The Government of Bangladesh has implemented strategic initiatives, including the establishment of a free trade zone and the digitalization of municipal services in Cox's Bazar. Consequently, it is essential to understand how these measures affect visitors' choice of Cox's Bazar as a smart destination.

H_3: *Smart governance has positive implications for TDL.*

2.3.4 The association between smart mobility and tourists' destination loyalty

Smart mobility is a viable option that pertains to the transportation of tourists from their residences to their desired locations and vice versa. Currently, the phrase "smart mobility" refers to the use of ICTs to enhance transportation and make it easier for tourists to access different sites. The management of tourism will be significantly impacted by the adoption of smart mobility, especially concerning the movement and modes of transportation that visitors choose (Tung et al., 2020). By lowering pollution, relieving traffic, increasing safety, and saving money on transportation, smart mobility has the potential to improve people's quality of life (Zygiaris, 2013). Marchesani et al. (2023) said that there is a link between the adoption of smart mobility practices in modern cities and the increase in visitor numbers, which fosters destination loyalty.

H_4: *Smart mobility has positive implications on TDL.*

2.3.5 The association between smart people and tourists' destination loyalty

The decision-making processes of visitors are influenced by the level of openness to new experiences and the extent of social engagement among smart people (Selada and Silva, 2020).

The expertise and reputation of a destination can significantly enhance the efficacy of destination marketing, enhance tourist satisfaction, and even act as a distinctive selling point for the location's brand (Boes et al., 2016). Furthermore, according to Prentice et al. (2020), AI and staff service quality contribute

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significantly to assessing total service quality, customer happiness, and loyalty. Therefore, it is necessary to find out the connection between intelligent people/ employees and tourists' destination loyalty. A fundamental component of smart tourism is the presence of knowledgeable individuals—a community of informed and service-oriented persons, encompassing residents, and tourism service providers, and policymakers, who jointly enhance the success of a destination. These personnel are essential in facilitating significant encounters, improving service quality, and cultivating a sense of belonging for tourists. Therefore, it is important to know how smart people influence visitors to visit Cox's Bazar.

H_5: *Smart people have a favorable impact on TDL.*

2.3.6 The association between smart safety and tourists' destination loyalty

A smart tourist location's competitive advantage depends on its historical and scenic appeal, infrastructure and amenities for tourists, and the quality of its services. These services include security and privacy, which are important considerations when a tourist chooses a location (Ruiz-Sancho et al., 2021). Moreover, smart tourism offers tourists weather updates and real-time data to ensure their safety and security (Ko et al., 2022). In the Cox's Bazar area, the governing body implemented a comprehensive safety system that includes the installation of CCTV cameras, the deployment of tourist police patrols, and the establishment of a helpline. This initiative aims to enhance safety and security in the region. The Additional Superintendent of Police (tourist police) stated that around 150,000 people can be accommodated in 450 residential hotels, and all accommodations are monitored by CCTV for security purposes (Prothom alo, 2023).

H_6: *Smart safety has a favourable implication on TDL.*

2.4 Tourist Destination Loyalty (TDL)

Prior studies have investigated the notion of tourist destination loyalty, applying the theoretical frameworks put forward by Amin (2016), Tabrani et al. (2018), and Zeithaml et al. (1996). To gauge and quantify the degree of a visitor's emotional attachment to a place, the tourism sector frequently employs the notion of "attitude loyalty." This method takes into account travelers' propensity to return, which is impacted by their prior experiences (Yoon & Uysal, 2005). The phrase TDL refers to the dedication of tourists to a particular spot (Chen & Gursoy, 2001; Lv and McCabe, 2020). Furthermore, Chen et al. (2020) defined TDL as the likelihood of both returning to a place and endorsing it to others. As stated by Shahijan et al. (2018), revisit intention pertains to the probability that a previous visitor will return to the same area. The main criterion we will use to determine destination loyalty in this study is users' expressed desire to return to the site.

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2.5 Conceptual Framework

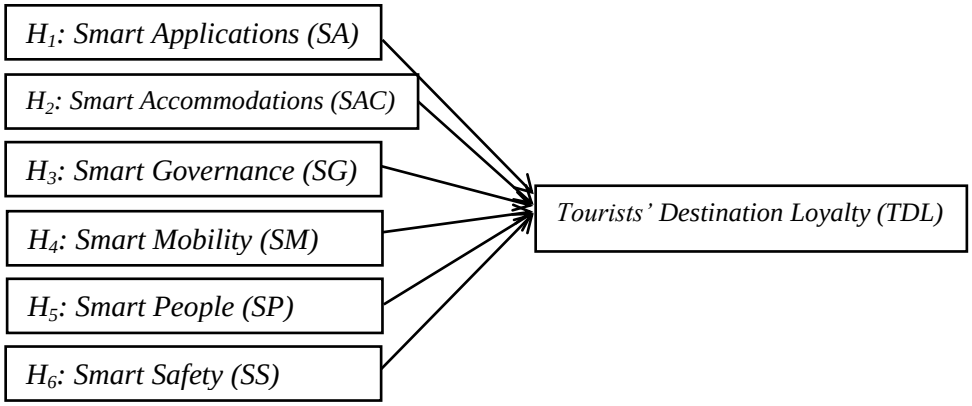

Figure 1: Proposed model for dimensions of smart tourism city and tourists' destination loyalty

3. Research Methodology

3.1 Research Design

A descriptive research design was employed in the study to determine the essential characteristics of STC that significantly support TDL. During the assessment, it was found that the models' methodologies and the highlighted hypotheses adhered to past research findings. According to an earlier study (Cavana et al., 2001), this approach and methodology can meet the needs necessary to provide trustworthy outcomes. Visitors to Cox's Bazar were asked to complete a standardized questionnaire on their own, which was used to gather data.

3.2 Research Instrument, Scale, and Measurement

There were three parts to the structured questionnaire. General questions concerning visitors' experiences visiting Bangladesh are covered in Section 1. Thirty-two items in Section 2 correspond to the six pillars of STC and three items for tourist loyalty variables. Five items in Section 3 give specific information about the respondents' demographic characteristics. Hence, a comprehensive set of six components has been utilized to clarify all aspects of a smart tourism city. According to prior validated studies, having a minimum of 3 items is essential to create the construct. The assessment of the items' dependability was conducted using Cronbach's alpha. The survey incorporated nominal, interval, and ratio methods to assess several aspects of the smart tourist city. The nominal scale was employed for categorical data, including gender, age, and binary yes/no inquiries. Additionally, an interval scale was used to assess tourists' perceptions of different aspects of smart tourism cities and their correlation with loyalty status. Finally, ratio approaches were employed to evaluate the frequency of tourist visits to Cox's Bazar. The survey employed Likert scales consisting of five possibilities to assess constructs and items.

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Table 1: List of constructs, items, and sources

Constructs	Items	Sources
Smart Application	Mobile apps, Websites of tourism, Blogs, new development, Online payments	Lee et al. (2018) Lee et al. (2020) Jeong and Shin, (2020)
Smart Accommodation	e-reservation, Quality of accommodation, Free WIFI, VR technology and customized CRM.	Um and Chung (2021)
Smart Governance	Partnership, Governmental initiatives, national tourism policy, Hi-Tech Park, Railway project	Chan et. al., (2019)
Smart Mobility	E-ticketing, Vehicle tracking system, Digital transportation facilities Smart airport, highway development	Kassim and Asiah Abdullah (2010) Jin et al. (2014) Tung et al. (2020)
Smart People	Interactive, IT Knowledge, Training, Socially interactive, efficient in delivering smart services	Selada and Silva, (2020)
Smart Safety	CCTV, Emergency number, Tourist police, data privacy, Tourist Police Patrolling	
TDL	Revisit, WoM, Recommend to others	Jeong and Shin (2020) Stylidis (2020)

3.3 Sampling Frame, Sample Size, and Data Collection Method

Cox's Bazar tourism destination's sample frame includes present and future visitors. The data collection was conducted using convenience sampling, a non-probability sampling technique. A survey was carried out, with a total of 300 participants. The data was collected using a computerized platform. The survey questionnaire was created on the Qualtrics platform. Visitors who had recently toured Cox's Bazar were provided with a Uniform Resource Locator (URL).

3.4 Measurement of Validity and Reliability, Data Analysis Techniques

Validity and dependability are crucial for guiding research on the correct path and identifying observable factors. The internal consistency was measured by utilizing Cronbach's alpha value. A Cronbach's alpha value exceeding 0.70 indicates a higher degree of internal consistency among the factor's components (Guilford, 1950; Nunnally, 1978). Items weighing less than 0.50 are not accepted. The present study will evaluate construct validity by examining correlations to ascertain how a scale effectively represents the concept being measured. An analysis of multicollinearity analysis was conducted to assess the interrelationships among the variables. The data analysis utilized structural

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equation modelling (SEM) with the software Smart PLS 4.0. In addition, the demographic profile was analysed using frequency distribution.

4. Results

4.1 Demographic Data

Table 2: Demographic Profile of Respondents (N=300)

Characteristics		%
Gender	Female	32%
	Male	68%
Education	PhD	4%
	Master's Degree	41%
	Bachelor's Degree	26%
	Higher Secondary School	21%
	High School Degree	4%
	Less than high school	4%
Age	20-25	25%
	26-35	40%
	36-45	18%
	46-55	12%
	Greater than 55	5%
Employment Status	Students	28%
	Homemaker	17%
	Self-employed/ Businessman	10%
	Employed part-time	9%
	Employed full time	32%
	Unemployed	3%
	Retired	1%
Number of Visits	Once	10%
	2-3 Times	59%
	4-5 Times	20%
	6-7 Times	7%
	More than 7 times	4%
	Sample Size	N= 300

4.2 Measurement Model

The present study employed measurement model testing to evaluate the concept and internal consistency reliability and validity (Table 3). Hair et al. (2013) said

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that the recommended minimum value for two reliability measures, α and rho_A, is 0.700 or higher. Table 3 shows that the values of α and rho_A are higher than the cutoff. The findings indicate that the range of factor loading values is 0.750 to 0.929, exceeding the α and rho_A cutoff values. Furthermore, the AVE is assessed by the convergent validity test and is expected to be greater than 0.500. The average of the squared loadings of the construct-related components is determined to be the AVE. The AVE values for SA, SAC, SG, SM, SP, SS, and TDL are 0.684, 0.781, 0.684, 0.835, 0.712, 0.812, and 0.812, respectively.

Table 3: Measurement Model Statistics

Items	Factor Loading	M	SD	Cronbach's alpha	Composite reliability	AVE
SA1	0.766	2.709	0.833	0.883	0.885	0.684
SA2	0.898	2.836	0.909			
SA3	0.835	2.692	0.899			
SA4	0.816	3.067	0.941			
SA5	0.814	2.970	0.952			
SAC1	0.891	4.047	0.702	0.860	0.860	0.781
SAC2	0.885	4.054	0.692			
SAC3	0.876	4.094	0.678			
SG1	0.838	3.993	0.633	0.846	0.847	0.684
SG2	0.813	3.846	0.691			
SG3	0.826	4.110	0.610			
SG4	0.830	3.923	0.721			
SM2	0.873	4.030	0.705	0.934	0.935	0.835
SM3	0.928	3.977	0.686			
SM4	0.929	3.970	0.691			
SM5	0.925	3.977	0.691			
SP1	0.750	3.749	0.772	0.898	0.904	0.712
SP2	0.867	3.906	0.730			
SP3	0.904	3.903	0.741			
SP4	0.824	3.766	0.771			
SP5	0.865	3.763	0.732			
SS1	0.895	3.007	0.954	0.769	0.771	0.812
SS2	0.908	2.893	0.915			
TDL1	0.887	3.910	0.803	0.769	0.778	0.812
TDL2	0.915	3.829	0.737			

Note. SA=Smart Applications, SAC= Smart Accommodation, SG= Smart Governance, SM= Smart Mobility, SP= Smart People, SS= Smart Safety, TDL = Tourists' Destination Loyalty.

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Tables 4 and 5's discriminant validity was evaluated using the HTMT and Fornell-Larker Criteria. Except for two values, 0.920 and 0.960, all HTMT values are below 0.850 (Hair et al., 2013), which further supports the discriminant strong validity of the constructs. The two HTMT values were included here since Hair et al. (2013) indicated that HTMT values within a range of 0.9 are also acceptable. The AVE showed a more vital correlation value than the other constructs, supporting the threshold (Hair et al., 2013). All AVE values are more significant than 0.80, indicating a substantial association among items within each construct. Therefore, all the constructs demonstrate satisfactory levels of discriminant validity.

Table 4: HTMT - List

HTMT ratio	
SAC <-> SA	0.312
SG <-> SA	0.432
SG <-> SAC	0.512
SM <-> SA	0.365
SM <-> SAC	0.920
SM <-> SG	0.590
SP <-> SA	0.313
SP <-> SAC	0.478
SP <-> SG	0.780
SP <-> SM	0.567
SS <-> SA	0.960
SS <-> SAC	0.327
SS <-> SG	0.411
SS <-> SM	0.342
SS <-> SP	0.317
TDL <-> SA	0.382
TDL <-> SAC	0.599
TDL <-> SG	0.767
TDL <-> SM	0.634
TDL <-> SP	0.845
TDL <-> SS	0.326

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Table 5: Fornell-Larcker criterion

Variables	SA	SAC	SG	SM	SP	SS	TDL
SA	0.827						
SAC	0.272	0.884					
SG	0.374	0.435	0.827				
SM	0.333	0.824	0.526	0.914			
SP	0.276	0.419	0.679	0.519	0.844		
SS	0.789	0.266	0.332	0.290	0.259	0.901	
TDL	0.316	0.485	0.621	0.538	0.708	0.253	0.901

4.3 Structural Model

Analyses of structural models depend on the VIF, R^2, path coefficient values, and Q-square, which are obtained from PLS and depicted in Tables 6, 7, and 8. The initial phase of evaluating the structural model involves assessing multicollinearity using the VIF. The VIF values were less than the suggested cutoff of 5, indicating that multicollinearity was not an issue. Furthermore, most results were below 3 (Hair et al., 2013).

Table 6: VIF Values

	VIF
SA -> TDL	2.799< 5.000
SAC -> TDL	3.145< 5.000
SG -> TDL	2.109< 5.000
SM -> TDL	3.680< 5.000
SP -> TDL	1.996< 5.000
SS -> TDL	2.688< 5.000

Subsequently, the explanatory capacity of the model is assessed. The analysis yielded an R-square value of 0.573 for the endogenous variable. The R square values can be characterized as ranging from moderate to enormous (Hair et al., 2013). The assessment of predictive relevance was conducted using the Q square value. The Q square values of the endogenous constructs are 0.551. The Q square values in the study can be characterized as ranging from moderate to large (Hair et al., 2013).

Table 7: R-square & Q-square Value

	R-square	Q^2predict
Tourists' Destination Loyalty (TDL)	0.573	0.551

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The path coefficient value is used to test the relationship between the variables being studied, as shown in Table 8. The objective of H_1 is to measure the correlation between the utilization of smart tourism applications and tourists' loyalty towards their chosen destinations. The findings indicate that smart tourism applications substantially affect travelers' loyalty to a particular place (β= 0.125, t = 2.138, p = 0.033). Therefore, H_1 was accepted. Next, the H_2 hypothesis examines the substantial influence of smart accommodations in a tourist city on travelers' devotion to that destination. The statistical analysis reveals a positive correlation (β= 0.152, t = 2.144, p = 0.032). Thus, H_2 is also compatible. Furthermore, H_3 demonstrates that a smart tourism city's smart governance substantially influences tourists' loyalty to their chosen destination (β= 0.183, t = 2.770, p = 0.006). Thus, the proof of H_3 is also established. Subsequently, H_4 determines that smart mobility has a negligible effect on tourists' devotion to a certain destination (β= 0.049, t = 0.617, p = 0.537). Therefore, H_4 is not supported. Subsequently, H_5 examines the substantial influence of smart individuals (service providers) in smart tourism cities on tourists' loyalty to their chosen destinations (β= 0.482, t = 6.910, p = 0.000). Thus, the H_5 is also supported. Based on the assessment conducted in H_6, it is determined that smart safety has an insignificant effect on tourists' loyalty to a destination (β= -0.086, t = 1.440, p = 0.150). Therefore, H_6 is rejected. Moreover, Figure 2 displays the study framework, which includes the path coefficients.

Table 8: Path coefficient statistics

Hypotheses	β	SD	t values	p values	Result
H_1: Smart Applications -> TDL	0.125	0.059	2.138	0.033	Supported*
H_2: Smart Accommodation -> TDL	0.152	0.071	2.144	0.032	Supported*
H_3: Smart Governance -> TDL	0.183	0.066	2.770	0.006	Supported*
H_4: Smart Mobility -> TDL	0.049	0.080	0.617	0.537	Not supported
H_5: Smart People -> TDL	0.482	0.070	6.910	0.000	Supported*
H_6: Smart Safety -> TDL	-0.08	0.060	1.440	0.150	Not supported

Note: TDL = Tourists' Destination Loyalty

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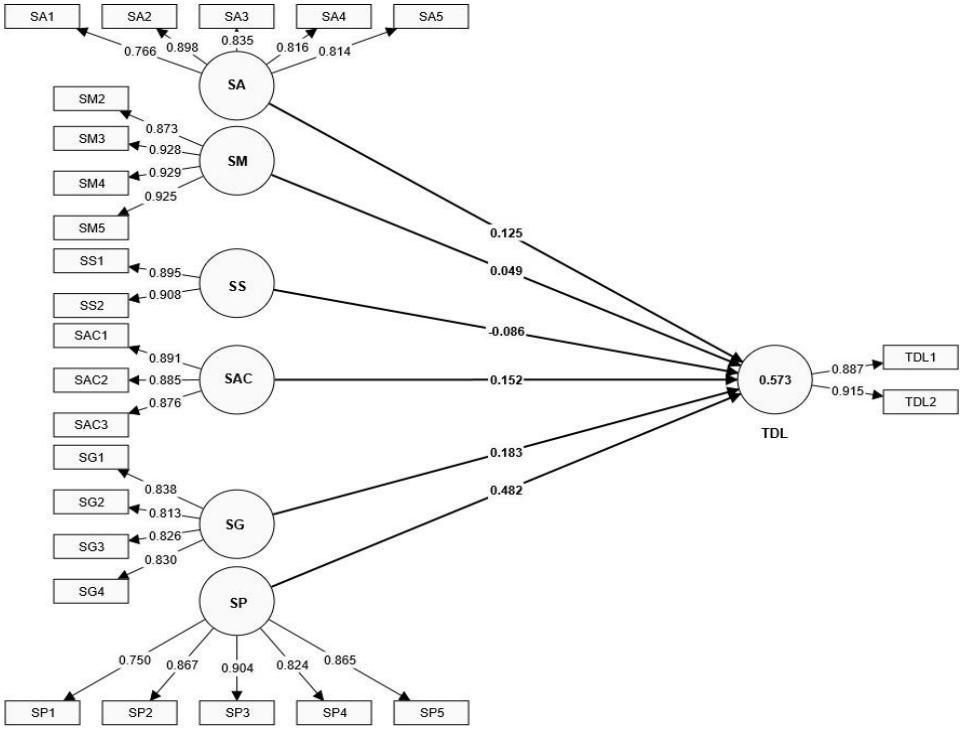

Figure 2: Research Model

Table 8 represents the result of the hypotheses. H_1 (Smart apps), H_2 (Smart Accommodation), H_3 (Smart Governance), and H_5 (Smart People) have been accepted based on the t-values and p-values. According to the statistical analysis results (H1: t =2.138, p =0.033), the use of smart tourism apps substantially impacts destination loyalty. Prior studies have also discovered that smart tourism applications substantially impact travellers' favorable experiences. Intelligent accommodations also substantially impact travellers' devotion to a particular destination (t =2.144, p =0.032). Tourists heavily rely on advanced accommodation features such as e-reservation and VR technology, which significantly impact their level of happiness. Subsequently, the effective management of a tourist city substantially impacts tourists' decision-making and loyalty to the location (t =2.770, p =0.006). Prior research has also demonstrated that effective governance significantly influences tourists' experiences and levels of satisfaction. Ultimately, individuals with high intelligence, particularly those who provide services, significantly impact the level of loyalty towards a specific location (t =6.910, p =0.000). Given that tourists rely heavily on service providers for an enjoyable experience, intelligent individuals are crucial in establishing destination loyalty in an STC. Furthermore, the findings indicate that smart mobility and smart safety are not considered factors contributing to tourists' loyalty to a place, since travellers expect minimal security and safety in any destination they visit.

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5. Discussion On Findings

This study investigates the implications of numerous STC characteristics on TDL. A study was conducted to determine the outcome by examining several categories of tourists in Cox's Bazar, Bangladesh. From the standpoint of tourists, four components, namely smart tourism applications (apps), smart accommodations, smart governance, and smart people (service providers), benefit the TDL (Azis et al., 2020; Buhalis et al., 2023; Ivars-Baidal et al., 2024). Government and business groups develop tourist applications to help tourists access various tourist locations and related services. Both private and public entities have developed various tourist applications, such as Bangladesh Tourist Spot, Vromon Guide, Bangladesh Travel, Hello Tourist, and GoZayaan. Given the availability of tourist applications on platforms like Google Play and other app stores, tourists can conveniently utilise these apps to discover ideal tourist sites. This, in turn, fosters loyalty towards those destinations.

Innovative housing is an essential aspect of STCs that fosters visitor loyalty (Azis et al., 2020). This is because travellers may now preview the amenities of accommodation facilities in a specific location using virtual reality (VR) technology before visiting. Furthermore, Cox's Bazar boasts numerous luxury hotels with a five-star rating, which serve as a prominent symbol of the city's tourism industry. Due to the excellent amenities provided, a specific segment of customers frequently return to the destination of Cox's Bazar.

Furthermore, effective governance serves as the primary foundation of STCs by guaranteeing favourable norms and regulations that promote the involvement of tourists and the local population. Ivars-Baidal et al., (2024) mentioned that good governance works as the primary pillar for developing STC. As tourism is an intangible concept, travellers heavily rely on knowledgeable individuals, particularly service providers. This hypothesis is supported by Buhalis et al. (2023). Tourists' final happiness and loyalty depend on the service quality provided by intelligent individuals. However, two factors smart safety and smart mobility have been rejected due to low factor scoring. One reason is that the survey participants may not have recognised substantial enhancements in transport systems, such as public transit accessibility, diminished commute duration, or the provision of real-time transport information. Next, tourists may not have observed the apparent safety enhancements (e.g., security cameras, and emergency response systems) linked to smart technology. In a nutshell, STC encompasses various facets, including intelligent applications, advanced lodging options, knowledgeable individuals, and efficient administration, all of which contribute to fostering tourist loyalty towards STC.

6. Conclusion

The notions of a smart tourist city and destination signify a fundamental change in how the tourism and hospitality sector is expanded and operated. The tourism industry may generate sustainable social and economic benefits by leveraging cutting-edge travel technologies, such as smart tourist applications, advanced

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accommodation options, data-driven insights, knowledgeable personnel, and digital governance. The sharing economy and advancements in information technology have made it more convenient for customers to obtain data on vacation spots. Therefore, to entice intelligent tourists to destinations such as Cox's Bazar, Bangladesh, and other emerging countries must make significant investments in improving their IT infrastructure. Most respondents agreed that Cox's Bazar offers advanced accommodation and travel alternatives, including smart apps, knowledgeable individuals, and efficient governance. To transform Cox's Bazar into an intelligent tourism destination, the Bangladeshi Government should proactively lead efforts in implementing smart security measures, enhancing smart mobility options, implementing digital governance practices, and developing smart applications. The importance of loyalty programs for tourists visiting smart tourism destinations is projected to increase as the world continues to adopt digital transformation and sustainable practices. By implementing these measures, we can ensure that tourism remains sustainable and fulfilling for future generations by fundamentally transforming how it is both encountered and overseen.

7. Implications of the Research

Theoretical implication: According to the author's knowledge, there is no research on the implications of STCs in developing countries. Consequently, the findings of this study will aid in the development of STC models for emerging nations. Furthermore, the conceptual model employed in the study will incorporate novel features of Smart City Technologies, including smart governance and smart citizens.

Managerial implications: Hence, the findings of this study will assist policymakers, particularly city councillors and government officials, in devising efficient strategies for creating smart tourism cities that can attract more tourists. Furthermore, this study may encourage stakeholders in the tourism sector, especially hotel proprietors, travel operators, government officials, and other pertinent entities, to create a smart and sustainable tourist city.

7.1. Limitations and Future Direction of the Research

Cox's Bazar has yet to be developed by contemporary principles of a smart tourism city. Despite possessing intelligent accommodations and additional amenities, these are inadequate to designate Cox’s Bazar as an STC. Consequently, it is challenging for visitors to ascertain which aspects of STC are present in Cox's Bazar. Consequently, two significant features, namely smart mobility and smart security inside the STC framework, were dismissed. Future research may be undertaken regarding these two aspects of STC and their effects on visitor loyalty.

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