Smart Sustainable Ecotourism in Dooars, India: Challenges and Opportunities

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ABSTRACT

The latest form of "smart tourism" is becoming more and more accepted worldwide. The goal of smart tourism is to provide tourists with technological facilities and integrate them into their travel. Five priority areas have been identified during India G-20 Presidency for accelerating the growth of tourism sector to achieve the targets for the 2030 Sustainable Development Goal. The aim of this research is to determine how technological advancements in ecotourism contribute to the development of sustainable ecotourism in the study area. The study has been done using a literature review, secondary data, and a questionnaire. There are 204 respondents total through random sampling, including tourists, transporters, homestay owners, local shopkeepers, tourist guides, etc., and secondary data collected from the Department of Tourism, Government of West Bengal, Ministry of Tourism, Government of India, census data, etc. Implementation of smart tourism practices through ICT in Dooars region is very difficult due to its remote location and lack of education as well as awareness among the local community. The results of this research show how ICT and other innovative, environmentally friendly technological ideas can be developed for managing and distributing the knowledges for critical decision-making and working of eco-tourism and smart tourism technology simultaneously for improving the tourist experience and the livelihood of local communities. The findings of this research will contribute a better grasp of how strongly stakeholders feel about the need for potential innovative technologies for community development and environmental conservation in Dooars area of West Bengal, India.

1. INTRODUCTION

The natural and cultural heritage of the destination can be protected by using the method of Ecotourism. It may be considered as a fastest –growing sectors within the global tourism industry and capable to serve different viable choices in terms of ecologically, socio-culturally, commercially etc., for promoting sustainable development of tourism in a region which is diverse in ecologically [1]. The effect of COVID-19 epidemic was more serious in tourism sector than all other sectors of the worldwide in recent year. In order to rejuvenate towns and lessen the impact of seasonal tourist attractions, the focus will now be on smart tourism destinations. In three key areas—economic, environmental, and sociocultural—smart tourism is believed to have advantages. The revenue-generating advantages of smart tourism result from an investment in the infrastructure of a place. This infusion uses digital technology, which boosts the area's competitiveness. Digital transformation helps to improve the customer experience and builds a positive impact during the entire trip, beginning with an online travel agency, a tour search engine, a booking tool, online ticket purchase, check-in, sightseeing, check-out, and safe return home. There are many benefits that technology can bring to the tourism industry. For example, technologies like artificial intelligence (AI) and chatbots can improve the guest experience, mobile ordering can increase efficiency, and robots can lower staff workloads and minimise costs. The government of India is concentrating on the three Ts: trade, tourism, and technology. During the seventh meeting of the NITI Aayog Governing Council, Prime Minister of India also requested the states to concentrate the boosting trade, tourism and technology for decreasing in import and increase in export. According to Prime Minister Shri Narendra Modi, the NITI Aayog would research the states' issues, difficulties, and best practices before formulating a future strategy in these three areas [2]. Because smart tourism destinations often have infrastructure that promotes self-sufficiency, the environmental element is closely tied to sustainability (e.g., green regions, improved water and air quality, and sustainable flexibility). The last component, socio-cultural, relates to the psychological value that is unintentionally produced as a result of smart tourism activities [3]. International travel is done by billions of people each year, to the point where renowned tourist areas are beginning to feel the consequences of mass tourism. Some of the most stunning places on earth are currently threatened, and the situation is out of control. To manage, the tourism sector must make savings and improve its sustainability. If travel is more responsibly conducted, this might be possible.

Like all other economic activities, tourism struggles for

limited resources. Governmental organisations had to balance the interests of more established resource industries like fisheries, forests, and agriculture with those of expanding tourism. Furthermore, in an era of ecological conservation driven by an increasing knowledge of the world's resource constraints and interconnected ecosystems, such concerns regarding resource allocation needed to be taken into account [4].

The long-term essence of the environment is ensured through ecotourism. For the benefit of future generation, some of the ecosystems of the world are safe guarded and preserved. Conservation, communities, and education should be the three guiding concepts for sustainable ecotourism. By using a destination management strategy, this study attempts to find the links between innovative thinking, technology, and eco-tourism [5]. A planning strategy is required for the development of a tourism destination which need participation of various stakeholders like government officials, travellers, representatives of tourism sector, science and educational institutions, local people etc. According to Buhalis [6], the fundamental function of the tourist market stakeholders, their commercial activity, and their contact with one another make up the tourism destination. "A set of organisations and participants situated in the study area, either in person or virtually, and that evolve as the outcome of social, political, and economic practices," according to Saraniemi and Kylanen [7], is what they characterise as a tourism destination. Destination management, as defined by the World Tourism Organisation (2007), is "the coordinated management of each of the aspects that together form a destination for tourism (attractions, resources, accessibility, marketing, and pricing)" [6-8]. Due to the demand of sustainability in tourism sector, application of smart tourism through information and communication technologies (ICT), virtual reality (VR), augmented reality (AR), artificial intelligence (AI) become increase on the ecotourism sector [9]. One of the innovative ICT-based technologies is ChatGPT, which is in demand due to its capability to reject improper requests, challenge incorrect replies, and record what users have said in prior chats for use in follow-up questions in tourism organisations. ChatGPT can be used as a powerful teaching and learning tool [10]. The awareness of environmental change due to tourism and the precision of climate forecasts might be significantly improved by artificial intelligence and technologies for natural language processing like ChatGPT, which help in understanding the importance of environmental conversation in tourism destinations and developing them as ecotourism destinations. Environmental research can benefit from the usage of ChatGPT in a number of areas, including framework parameterization, interpretation of data, prospect creation, and evaluation of models. With the help of this technology, researchers and decision-makers now have a potent tool for creating and analysing various environmental futures based on a variety of data inputs and for enhancing the precision of environmental climate forecasts [11].

The internet offers a brand-new, significant electronic commerce channel for the travel industry. In the context of ecotourism, it offers the main method for advertising ecotourism operators and for learning about and organising ecotourism activities (consumers) [12]. However, one of the biggest problems that nations, especially developing nations, are facing is implementing technology to strengthen their ecotourism development, make it more beneficial to the natural ecosystem, and provide possibilities for local

entrepreneurs and other stakeholders to earn through the availability of suitable technology and the necessary infrastructure to implement it. Technology availability is not just a financial issue; however, it does depend to some extent on financial means. Regulatory and institutional structures frequently make it difficult to create, import, export, transmit, and apply technologies for the growth of eco-tourism and sustainable tourism [13]. Like several other regions of India, Dooars area is also dealing with certain difficulties in this regard. It is a very difficult challenges for implementation of smart tourism practices with the aid of ICT for the development of eco-tourism in Dooars region due to its remote location and lack of education as well as awareness among the local community for the usage of ICT in tourist operation.

For people who enjoy the outdoors and are seeking regular respites from the busy schedule of modern city life, North Bengal is a veritable treasure trove. North Bengal is located in the northern part of the state of West Bengal and is surrounded by Nepal, Bhutan and Bangladesh. It has beautiful places of diversified scenery spreading from a high mountainous region in the far of north to the very large Gangetic plains in the far south [14]. The river valleys of North Bengal are known as Dooars, a huge area situated at the base of the Eastern Himalayas. Dooars of West Bengal are bordered by Bangladesh to the south and the Kingdom of Bhutan to the north. The area is renowned for its rich biodiversity, verdant landscape, wildlife, and different ethnic populations and traditions. The most important forests in the region can be found in Gorumara National Park, Jaldapara National Park, and Buxa Tiger Reserve. Dooars is renowned for its huge forest as well as its serene villages, temples, and historical landmarks. Dooars has already made a name for itself on the tourism map as a destination worth visiting due to its rapidly increasing popularity. Alipurduar district is situated 113 kilometers away from Siliguri in the north-eastern region of West Bengal sorunded by Assam and Bhutan. In essence, the town of Alipurduar is referred to as a gateway to India's north-eastern provinces and Bhutan. It is the most significant town in the area, and the entire town is completely covered in beauty [15]. The city of Jalpaiguri, which is also the capital of the north Bengal region, has special significance in terms of tourism, ecosystems (forests, mountains, and tea plantations), economic activity, and business. The district's executive base is also situated here. A small region of land called Jalpaiguri, which is sandwiched between the Gangetic West Bengal and the Sikkim-Darjeeling Mountain Ranges, has frequently touched many people's emotions with its beauty. The area has been referred to as Dooars (or Duars), which translates to Gateway to Bhutan, because the Bhutan border has been an important part of it since the early days of British control. The division of British India was established in 1869 [16]. In Jalpaiguri and Alipurduar regions of Dooars, the tourism sector has become a significant part of local communities' everyday lives, bolstering their economies and producing supplemental income for locals in both rural and urban locations. However, North Bengal's tourist industry is currently suffering greatly due to a lack of appropriate management in terms of smart technological infrastructure and promotion activities for developing it as a sustainable ecotourism destination. A development in this region would not only be beneficial for the social and economic uplifting of local people without damaging the culture and environment but also help in conserving them. The state government of West Bengal works with local authorities and residents to

develop some plans that not only give the area digital access and advantages in terms of technology but also take care of the opportunities for work and ecological system of the study area so that, due to the availability of technology, the natural resources of the area don't get impacted. There are numerous tourist attractions in West Bengal that are close to coastal regions and are currently developing as smart, environmentally friendly tourist attractions. In this regard, the Doors, a popular ecotourism destination in West Bengal known for its wild-life sanctuaries and mountainous regions, cannot be kept separate from the beneficial use of ICT for its continued development in the competing tourist industry. Therefore, the study's goal is to ascertain how technological developments in ecotourism contribute to the growth of sustainable ecotourism in the research area. This goal was trying to be achieved by collecting information from stakeholders in the local community and visitors through the distribution of questionnaires to them.

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2. LITERATURE REVIEW

2.1 Eco-tourism and technology

Tourism may be defined as a phenomenon of social, cultural and economic which involves people for travelling away from the location of their normal environments to other places for professional, business or leisure purpose [17]. In order to remain competitive and adapt to the ever-changing needs of its tourists, the tourism industry must be able to adapt quickly. Organisations in the sector place a special emphasis on the satisfaction, security, safety, and comfort of tourists. There are numerous methods to assess the size of the tourism industry because it does not meet the conventional definitions of sectors like production, forestry, and other industries. The tourism sector is composed of several sectors and provides a wide range of products and services to visitors. These businesses also provide goods and services to the surrounding communities [18]. After the COVID-19 outbreak, the tourist and hotel business (H&T) have become the most rapidly expanding sector of the world economy. At the same time, it was also responsible for significant environmental impacts like pressure on resource conservation due to consumption of water, a high carbon footprint, and waste generation. But tourism is now one of the least developed businesses in terms of the adoption of sustainable practices, despite the fact that eco-friendly accommodation and travel are becoming more and more popular with tourists and are crucial for the sector's future development. With the severe economic difficulties, it is currently experiencing, the environmental catastrophe, and the global climate change that is being experienced, the development of sustainable tourism is of the utmost importance, particularly in the post-pandemic period [19]. Internet access is incredibly important in today's society. The internet was developed to facilitate easier, faster, and more productive work for people. The use of the Internet in the tourism industry is widespread. Eco-tourism is now the economic activity area with the fastest global growth. Visitors get the chance to experience a potent embodiment of environment and culture through ecotourism, as well as learn about the value of preserving biodiversity and regional

customs. To get closer to the sustainable development of ecotourism, a destination has to enhance its networks for collaboration, social capital building, and environmental integrity. Various technical applications, such as the Internet system, smart apps, GPS, GIS, location-based services, and environmental management systems (EMS), have been addressed in numerous studies as potential ways to enhance destination sustainability development. There has been a significant amount of published research on the subject of ecotourism innovation. There has been a significant amount of published research on the subject of ecotourism innovation. Dionisio et al. [20] provided a paradigm for trans-media storytelling in ecotourism, including ideas from location-based services, interactive multi-layered experiences, storytelling or narrative methodologies, and mobile and social media technologies [20, 21]. The creation of an efficient eco-process is required in order to facilitate the function of the environment in maintaining tourism destinations. This capability is specifically intended to promote travellers' inclinations to travel to other places. For promotes the expansion of the tourism sector in a sustainable manner, the introduction of efficient eco-process innovation has a remarkable impact [22, 23].

2.2 Eco-tourism and technology in West Bengal, India

Since the state of West Bengal have most of the essential components of nature like vibrant sea beaches, attractive mountains, lush forests, picturesque river deltas etc., hence it has become stands out as a special and distinctive in terms of tourism. As such, the idea of creating eco-tourism is to integrate tourism and environmental conservation programmes so that a positive feedback loop may be developed. Programmes for the growth of the tourism industry are created to educate tourists about the value of protecting the protected areas' complex and sensitive eco-systems. The goal is to increase visitors' knowledge of environmental protection before they return, and making each traveller a tourism promoter will help the surrounding towns, parks, and sanctuaries flourish economically. Five priority areas have been identified during India G-20Presidency for acclerating the growth of tourism sector to achive the targets for the 2030 Sustainable Development Goal. These five areas are green tourism, digitalization, skills, tourism MSMEs, and destination management [24]. The players in the tourism industry in Siliguri expressed their excitement and optimism in this respect, feeling certain that the second TWG G20 policy meeting will result in the anticipated outcomes. The North Bengal belt, which includes Darjeeling, Kurseong, and Sikkim, is hoped to become even more well-known for tourism because of the G20 summit. Following the inactivity brought on by COVID, the tourism industry is still in recovery mode. According to Samrat Sanyal, a tourism stakeholder in Siliguri, "people here live as well in the belief that the tourism sector will receive an adequate boost through the G20 event" [25]. Thus, it indicates that all five factors mentioned in the G20 Presidency of India will also be applicable to the sustainable development of all tourist destinations in West Bengal. In this context, it is mentioned that, as per destination management, all the national parks and wildlife sanctuaries in West Bengal provide fantastic opportunities for outdoor adventure, ecotourism, and ecological education. While not in operation by forest department officials, magnificent forest bungalows and rest cottages that are situated at viewpoints

inside the boundaries of the sanctuary are made accessible to tourists. These accommodations are designed for travelling forest personnel. Visitors are urged to go on the hiking and trekking paths, for which local forest authorities provide permits. The government's tourist office arranges guided trips to Dooars and Sunderbans. Neora Valley National Park in Lava, Mahananda Wildlife Sanctuary in Sukna, Jaldapara Wild Life Sanctuary in Madarihat, Sunderban Tiger Reserve in Sajnekhali, Buxa Tiger Reserve in Rajabhatkhawa, Lataguri National Park in Gorumara National Park, Kalimpong Division Forests, and the Bengal Natural History Museum in Darjeeling, West Bengal, have extremely informative wildlife and nature centres [26]. In time, the criteria for ethical ecotourism will be established, and both tourists and the tourism sector will be aware of what an environmentally and culturally responsible enterprise looks like. An Ecotourism Task Force was established in West Bengal with the goal of promoting ecotourism while preserving the environment. Its duties include defining the nature and extent of interdepartmental synergy necessary for this goal, developing a methodology for the systematic development of ecotourism in the State, and creating an action plan or roadmap for its growth [27]. In the year 2021, the number of domestic travellers entering the state of West Bengal was over 24 million, compared to around 34 thousand international travellers [28]. The West Bengal government has taken a number of actions to improve the tourist sector. By regularly hosting tourist fairs, it is boosting travel. The concept of homestay is currently being promoted by the government in a variety of locations, like Kurseong, Kalimpong, and Darjeeling. There are currently tourism hubs in the areas of Jalpaiguri, Alipurduar, Howrah, and Hooghly. We all know that mobile applications are increasingly necessary for travellers to find a certain location or to get other travel-related information. A travel app called 'West Bengal Tourism' has been released by the West Bengal government's department of tourism. This software can locate a list of tourist attractions in any neighbourhood and offer elaborate information about tourist guides. This tool can locate a list of tourist attractions in any neighbourhood and offer comprehensive information about tourist guides. Several travellers who have been interviewed claim that this app is an excellent government endeavour because it offers useful information on a variety of known and undiscovered locations in Bengal. To support the tourism business, new places are constantly needed. The government has named a number of new places, including Raichak, Lataguri, Jaldhaka, and Hemnagar. These locations are a focus for several travel businesses. Yet for these locations to improve their tourist infrastructure and connections, proactive government intervention is required [29]. Pralay Ganguly stated in his research that there is scope for improvement among the many stakeholders in the study region of Shantiniketan regarding the views and attitudes of various stakeholders towards the benefits of tourism, which is a very important factor in making plans and policies for successful future tourism growth. It is also important to apply information and communication technologies in order to maintain all of these resources for long-term or future use, in addition to using the already existing resources, such as infrastructure, advertising, communication amenities, environmental and climatic challenges, etc. [30]. India's G20 Task Force on Digital Social Infrastructure for Economic Change, Financial Participation, and Development has been established by the Union government [31].

2.3 About the study area and its need for smart ecotourism development

Dooars, or Duars, are the name for the eastern Himalayan Mountains in northeast India, which border Bhutan. The region that acts as Bhutan's entry point from India is called Duar, which means "door." While the Eastern Dooars are referred to as the Assam Dooars, the Western Dooars are known as Dooars region of West Bengal. The study area is the western Dooars of West Bengal. The term "Dooars" is derived from "doors" or "Dwar," since the area serves as a doorway to Bhutan and north-east India. Politically, Alipurduar district, the entirety of Jalpaiguri district, and the Darjeeling Himalayan lowlands all belong to Dooars area. Tea, tourism, and timber are the three "Ts" on which Dooars' economy is founded, but the fourth T could be technology, which will be beneficial for the locals in creating awareness and developing their skills in the technological field so they will know the technique of enhancing social and economic status as well as contributing to environmental conservation in Dooars region as the government of India tries to focus on technologies in the tourism industry. Dooars region's primary industry is the tea business. The factories and tea gardens employ thousands of people. Also, a number of people work at growing betel nuts, which benefits the local economy. Some crops are mostly grown for local consumption. Many national parks and wildlife sanctuaries are situated across the region, drawing numerous travellers from both domestic and international regions. As a result, the area plays a significant role in the economy and employs a number of people. As Dooars serve as a gateway to Bhutan, a thriving export-import business has developed there. The export-import sector has significant centres in the cities of Jaigaon, Siliguri, Alipurduar, and Phuntsholing [32]. The research region has a lot of potential for ecotourism to grow, which might help the local economy. Employment possibilities have also been produced via ecotourism. It provides a significant amount of direct and indirect employment each year. The Forest Service now operates a Nature Interpretation Centre (NIC) close to the area's natural woods, which are drawing an increasing number of visitors who enjoy the outdoors [33]. Using our natural resources responsibly is necessary today, with an emphasis on reducing their pollution and depletion. It is necessary to remember that the sustainable use of resources is directly tied to the wellness of human society. Although ecotourism has many uses in the travel and tourism industry, it is important to incorporate environmentally friendly innovations in corporate and managerial strategies, organisational behaviours, workplace enhancements, and relationships with stakeholders in order to support the development of sustainable tourism in the research area [23].

3. METHODOLOGY

This study has been carried out through standard interviews based on a set of questionnaires among respondents in Dooars region. As a new addition to the questionnaire survey, many interviews were done by visiting the research region, i.e., Alipurduar and Jalpaiguri District, during the rainy, winter, autumn, and summer seasons so that problems faced by stakeholder groups in different aspects with different seasons may be evaluated properly. There are 204 respondents in total through random sampling, including tourists, transporters,

homestay owners, local shopkeepers, tourist guides, etc. The survey was conducted to study the need for innovative ideas for resource convergence, provide new opportunities for local residents to promote their service products, such as homestay services, transport services, and handmade local handicrafts, and implement innovative ideas for improving tourist satisfaction levels, like types of holidays and available facilities. The survey contained several sections. Questionaries' had been prepared mainly focusing on the need of various stakeholders for the development of infrastructure, including digital infrastructure, the interests of local people involved in ecotourism activities, the need for education of local people, including transporters, hotels, homestays, tourist guides, etc., for understanding the use of ICT applications as well as the preservation of resources for the environment and ecotourism for their betterment, tourists opinions about their experiences, and suggestions for further development of Dooars region for ecotourism.

To measure the perceptions of the tourists and local stakeholders about the sustainable ecotourism practices and the need for the innovation in this practice, respondents were first asked to rate their satisfaction levels on a scale of 1 to 10 (where 1-4 =very dissatisfied; 8-10= very satisfied) and a 5-point Likert scale (where 1= very dissatisfied; 5= very satisfied). The sample location was also chosen because a majority of the guests come to experience wildlife, and the local stakeholders are hardworking but also face some challenges. In addition to that, it has also observed that in one hand studied on ecotourism and technological innovation to develop this tourism more sustainable without having any harmful effect on wildlife and the natural environment is very less but on the other hand sustainability practices have become crucial for the social and economic development of local communities and improving tourists' satisfaction. To determine the factors that could predict the perceptions of tourists towards available infrastructural facilities in the study area and also to know the perceptions of numerous stakeholders involved and the difficulties they are having even after the epidemic in Dooars Region of West Bengal, a multinomial logistic regression method was used to examine the reactions and forecast the likelihood of various potential outcomes in terms of establishing new eco-friendly technologies in ecotourism in this area. A multinomial logistic regression model was applied in the study of Fuente-Mella et al. [34] to the responses and used to forecast the probability of the various possible outcomes in order to identify the variables that would affect the people's opinion of companies of how to handle the pandemic in the Nuble Region [34, 35]. Do not use capital letters for prepositions, articles, or conjunctions unless one is the first word.

3.1 Results and findings

A multinomial logistic regression model was fitted to the study aim in order to understand how visitors and local stakeholders perceive the area and to estimate the need for innovative infrastructure and marketing initiatives for small business owners. Tables 1-3 show the sample of tourist responses on their satisfaction level while travelling in Dooars region of West Bengal, where 40.7% of respondents gave satisfaction levels within 4-6 and 59.3% gave satisfaction levels within 6-8 [36].

The chi-squared ratio test result for the fitted model data in Table 2 is 57.891 (p = 0.000), suggesting a strong model fit.

Additionally, acceptable outcomes were found for the pseudo-R-squared (Cox and Snell: .247; Nagelkerke: .333). The final result with all independent factors and the intercept-only model's -2 log likelihood is generated in Table 2, and the chi-square is calculated by subtracting the two log likelihoods (69.935 - 12.045 = 57.890). A higher difference between the two models shows a better match between the two data sets. A significance level of less than 0.05 indicates that the outcome is satisfactory. Here, we observe that there is a highly significant (p <.001) difference between the final model and the intercept-only model. As a result, the independent factors work well together to predict the outcome. The resulting model's lower Akaike's Information Criterion (AIC) compared to the intercept-only model implies a satisfactory match [37, 38].

Table 1. Case processing summary

		N	Marginal Percentage
Tourists level of satisfaction on a scale of 1 to 10	4–6	83	40.7%
	6–8	121	59.3%
Valid		204	100.0%
Missing		0	
Total		204	

Table 2. Model fitting information

Model	Model Fitting Criteria			Likelihood Ratio Tests		
	AIC	BIC	-2 Log Likelihood	Chi-Square	Df	Sig.
Intercept	71.935	75.253	69.935			
Final	18.045	27.999	12.045	57.890	2	.000

The SPSS output provides a goodness-of-fit Table 3 and uses Pearson chi-square and deviance statistics to evaluate the result of goodness of fit. Statistical significance is not required in this situation since it would show that the final model differs from a perfect model. Non-significance "proves that the final model successfully matches the observed frequencies at the different levels of the result," according to the interpretation [37, 38]. Wherein the Chi-Square result for Pearson is 2.152 and that of Deviance is 1.919.

Table 3. Goodness-of-fit

	Chi-Square	Df	Sig.
Pearson	2.152	3	.542
Deviance	1.919	3	.589

The likelihood ratio values for the model's effects and fractions are shown in Table 4, and their low p-values highlight the great significance of the model's factors. It is clear that there is a structural issue based on how tourists and local stakeholders perceive infrastructure advancements and the need for more promotional activities using information and communication techniques in Dooars Region of West Bengal, India. Assuming the tourist satisfaction level and the socio-economic development of local stakeholders in terms of economic expectations prior to the new innovative development of ICT or technological infrastructure, the preparedness of the region to deal with the challenges is associated with a number of aspects discussed further [38].

The variance between the finished model and a reduced model's -2 log-likelihoods is the chi-square value. By removing an impact from the finished model, a reduced model is created. The default hypothesis is that all of those effects' values are 0.

In Table 5, β are the estimated multinomial logistic regression coefficients for the models. The main feature of the multinomial logit model is that it calculates k-1 models, where k is the number of levels in the factor that impacts the result. SPSS generated a model for inadequate good infrastructure developments relative to adequate good infrastructure developments in this case by using the tourists and stakeholders level of satisfaction as the reference group and a model for lack of promotion or need of promotional activities in Dooars region for ecotourism developments relative to no lack of promotion or need of promotional activities in Dooars region for ecotourism developments. Table 4 shows the likelihood ratio results for the model's outcomes and partials. The tests' low p-values show how crucial the model's variables are. It is clear that there is a structural issue based on how tourists and local stakeholders perceive infrastructure advancements and the need for more promotional activities using information and communication techniques in Dooars Region of West Bengal, India. According to the commonly accepted interpretation of multinomial logic, assuming that the model's variables are kept constant, the logit of the results relative to the category of reference is expected to change by their respective parameters (which are expressed in log-odds units) for every unit of variation in the factor used as a predictor. Due to the parameter values' relation to the reference group, this is the case. The calculated standard errors of the two separate regression coefficients for each model. The degrees of freedom for each of the variables in the model are listed in the Wald chi-square test, which examines the null hypothesis that the calculated value is equal to 0.df. For each of these elements, the degree of freedom is 1. The phrase "significance analysis" describes the use of statistical techniques to determine if a sample drawn from a predicted population is truly representative of the population as a whole or was randomly chosen. Often, the specified alpha level, which is often fixed at .05, determines statistical significance. The test results and the significance level of the analysis are provided by inferential statistics, and the analysis is considered statistically significant if the related p value (or significance) value is less than the established alpha level. The Wald test statistics for the indicators, which are derived by dividing the predicted outcome of the variables by the square of the standard error, serve as the foundation for these calculations. The p-value indicates the likelihood that the particular Wald test statistic is as severe as or more severe than what was determined under the circumstances of a null hypothesis. The meaning of the parameter estimate in multinomial logistic regression is restricted to the equation in which the parameter

estimate was determined. The likelihood ratios for the variables are represented by Exp (β). They are the factors exponentiated. Since the variable (which has two degrees of freedom) was not included in the logistic regression calculation, there is no chance ratio for it. Further it has been observed that the odd ratio of a coefficient indicates how the variable in question affects that an event will occur in the reference group as opposed to the referent group. When the odd ratio is greater than 1, it indicates that as the variable rises, there is a greater chance for occuring the result of comparative groups than that of the referencegroups. To put it another way, the comparative result is more probable. If the odds ratio is less than 1, it means that as the variable is increased, there is a lower chance of the event occurring in the comparative group compared to the benchmark group. It would say that, with a degree of 95% confidence, the "true" population multinomial odds ratio lies between the lower and higher bounds of the range of values for outcome m compared to the benchmark group for a given variable. It is calculated as the Exp (β (zα/2)*(Stand.Error)), where zα/2 is a critical value on the standard normal distribution [39].

The results of this research show how eco-tourism and smart tourism technology can work together to improve the tourist experience and location loyalty. They also show how essential this combination is for the local Dooars area community's livelihood. It has been found that technological instruments like information and communications technology (ICT) and other innovative, environmentally friendly technological ideas can be inventive in how the area can manage and distribute knowledge for critical decision-making. Innovation was encouraged through the use of information and communications technology by assisting in improving knowledge of the tourist product, tracking, quantifying, and evaluating it, predicting trends, establishing partnerships, and engaging with and sustaining relationships between stakeholders. Smart tourism technological infrastructure would offer fresh ideas for promoting destinations, energy-saving devices, electric or battery-powered transportation, renewable energy sources like solar energy, technology for communication, and the development of technical community skills, all of which would be beneficial for the growth of ecotourism in Dooars area. However, there may be a reason for the low volume of tourists in that area, as well as a lack of training for the betterment of skills among the numerous local communities that are associated with the tourism activities of the study region's popular tourist attractions, due to the absence of banks, ATM facilities, and medical facilities in the nearby forest area.

Ecotourism and smart tourism are dependent on each other for the growth of sustainable ecotourism in Dooars area of West Bengal, as explained in the below-mentioned conceptual structure (Figure 1) [40].

Table 4. Likelihood ratio tests

Effect	Model Fitting Criteria			Likelihood Ratio Tests		
	AIC	BIC	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept	21.633	28.269	17.633	5.588	1	.018
Adequate good Infrastructure development	73.552	80.189	69.552	57.508	1	.000
Lack of promotion or need of promotional activities	16.697	23.334	12.697	.653	1	.419

Table 5. Parameter estimates

Tourists & Stakeholder Level of Satisfaction on the Scale of 1 to 10?[a]	β	Std. Error	Wald	df	Sig.	Exp(β)	95% Confidence Interval for Exp(β)	
							Lower Bound	Upper Bound
Intercept	-7.35	3.31	4.92	1	.026			
Adequate Good Infrastructure Development	2.50	.788	10.11	1	.001	12.24	2.61	57.31
Lack of Promotion or Need of Promotional Activities	.468	.586	.63	1	.42	1.59	.507	5.032

The reference category: [4-6].
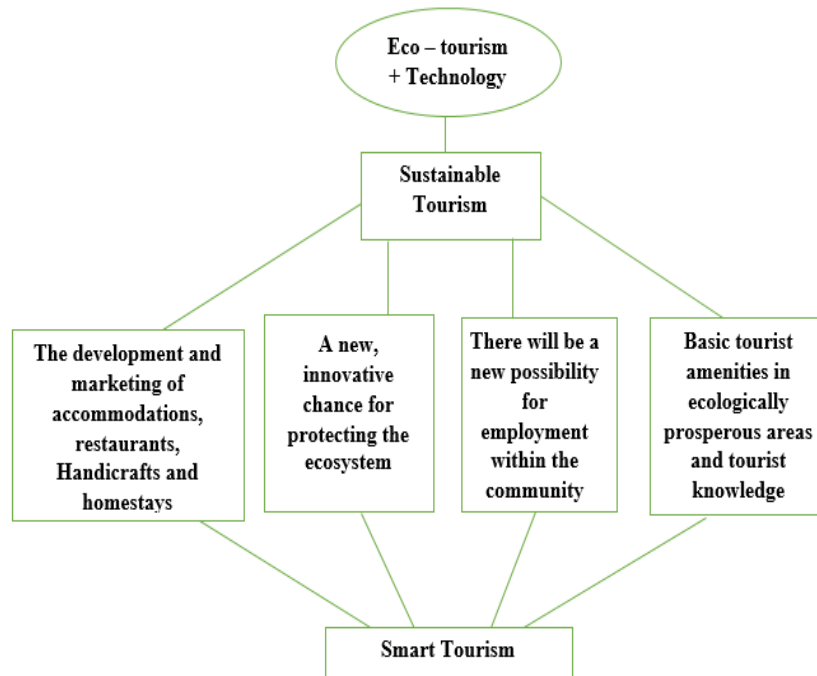
Figure 1. Presents a summary of the benefits of smart tourism infrastructure, which integrates ecotourism and technology, for the protection of ecological resources, employment opportunities, fundamental comforts, and awareness
Source: Author

4. CONCLUSION

This analysis helps effectively realise the positive impact of the fourth industrial revolution. It is essential to use technology to bridge the gap between skilled and unskilled tourism workers in Dooars region. This paradigm change will have an important positive effect on the rural and semi-urban populations, many of whom have never benefited from modern industry and whose lives still centre on subsistence living in forest areas or remote, logistically challenging areas, despite being in the middle of our natural heritage. Since the tourism business of the country grows over time, the Tourism Department of Government of India has identified the necessity of using cutting- edge technology in order to provide new eco-tourism goods and services to tourist so that they may explore more effectively and make their trip more enjoyable.

Furthermore, because this form of developmental process, in which eco-tourism developments and technological innovations work together, remains in its early stages, many areas in India are less knowledgeable about environmentally friendly technologies, such as Dooars district of West Bengal, where a number of tourist attractions lack internet connectivity. Many souvenir store owners struggle to sell their goods because tourists prefer to make digital payments. Innovative

infrastructure developments in West Bengal's Dooars region will make it easier for many local entrepreneurs who are unaware of new technological advancements in the tourism industry to understand this so that they can easily understand technology through government skill development schemes and know the technology, such as online payment facilities. The process of technology creation, adoption, transfer, and dissemination is intricate. Environmentally friendly technology must, however, be in line with national environmental, socioeconomic, and cultural interests as well as development objectives. The need for channels to enable the transfer of technology is stressed in a number of multilateral environmental accords and intergovernmental resolutions in the region, including the 2030 Agenda for Sustainable Development [41]. Also, it is difficult for telecommunications services to operate in this area since phones have trouble picking up signals, especially in inclement weather. Even with all these odds, it has been observed that stakeholders like hotels and homestays are using ICT facilities to promote their services by creating their own website and providing online booking and digital payment facilities. Not only these, the Department of Forest, Government of West Bengal at Dooars is also offering online booking and digital payment facilities for availing visiting opportunities by domestic as well as

foreign tourists to different areas of wildlife sanctuary situated in Dooars region, like Garumara Reserve Forest, Jaunty River Forest, etc. These facilities help the tourists plan their visit meticulously and effectively so that they can enjoy their tour without any hindrance or difficulties. Also, it has been noted that the neighbourhood is striving to employ modern technology to reduce pollution by establishing an e-rickshaw operation for tourists visiting nearby sites. With the use of an e-rickshaw, visitors may discover new locations and have fantastic experiences while travelling Dooars. They may explore and get to locations that are off-limits to automobiles by hiring an e-rickshaw (toto-rickshaw in the local language in West Bengal). Not only this, even after the introduction of encouraging the purchase of electrical cars by the Government of India, it is now expected that very soon tourists in Dooars will find electrical vehicles for their transportation from the airport, railway station, or bus stand to their destination, as well as vehicles for jungle safari. It has been reported that several government hotels in this region employ solar power systems, which are not only eco-friendly but also power-saving and cost-effective. Hence, it has been concluded that, as per the analysis and interviewing of the local stakeholders like local show owners, transporters, homestay owners, and tourists, ICT has a significant role to play in solving many challenges that are now obstacles for local communities as well as tourists while on a trip or while making a purchase at this tourist destination. Additionally, because they may accept payments via conventional methods like cash in addition to online and through ATM facilities, local communities that rely on small enterprises linked to handicrafts, food products, homestay services, and souvenir stores are able to promote their business activities and generate enormous amounts of financial resources. They don't face any issues with both online and offline transactions. Local residents who run homestays face an issue because tourists are now aware of their services because they couldn't promote their homestays online due to a lack of awareness and the lack of availability of adequate IT infrastructure and the skills to use modern innovative ideas and had to rely on tour operators, who may or may not suggest these homestays to the tourists. If the area is upgraded with innovative technologies and turns into an attractive destination for smart tourism, India's G20 Task Force on Digital Social Infrastructure for Economic Change, Financial Participation, and Development has been established by the Union government. The G20 Presidency of India presents a special chance to direct this important global agenda through international digital collaboration. In order to implement digital public infrastructure, it is important to focus equally on technologies, the governance of technologies, and local digital ecosystems. The design of digital transformation must be inclusive and fuelled by a perspective on the entire society. It functions best when public and private partnerships are combined, like when the public sector defines structural protections and the private sector frees up the forces of invention [42].

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