



Assessing The Role Of Homestay Tourism In Achieving Sustainable Development Goals In The Darjeeling Himalayan Region Using Structural Equation Model (SEM)

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Abstract: Community-Based Homestay Tourism is an alternative to traditional tourism where tourists or guests stay in the local community's own houses. The paper aimed to address the relationship between Homestay tourism development and achieving sustainable development goals in the Darjeeling Himalayan Region. For data collection, face-to-face interviews were organized, and 264 respondents participated in the study. After the data collection, four hypotheses were assessed using Structural Equation Modelling (SEM). It was found that economic sustainability, Socio-cultural Sustainability and Health and well-being were positively influenced by the community-Based homestay tourism development. On the other hand, environmental sustainability is insignificantly affected by the community-Based homestay tourism development, and it may be caused by a lack of government campaign, a lack of training, improper waste management, stress on natural resources, etc., in this region. The present study gives a theoretical implication and meaningful insights with a directional future research pathway.

Keywords: Community-Based Homestay Tourism (CBHmT); Economic Sustainability (ES); Socio-Cultural Sustainability (SCS); Environmental Sustainability (EVS); Health and Well-being (HWS); Sustainable Development Goals (SDGs)

1. Introduction

Globally, homestay tourism (HmT) is defined as a type of tourism where tourists can stay with family members, and do social and cultural interaction while exploring various tourist destinations (West Bengal Homestay Tourism Policy, 2022). Community-Based Homestay tourism improves the economic and social life of homestay members as well as the local community (Tavakoli et al., 2017). To learn the local culture, customs, and traditions Community-Based Homestay tourism is a great opportunity for the homestay guest. According to Adhikari & Joshi (2025), local cultures and ways of life play a crucial role in the development of homestay tourism. Homestays are an important element of rural tourism and community-based ecotourism, which explores the principles of economic, socio-cultural, and

environmental sustainability with participation of the local community and owners, which improved the cross-cultural as well as mutual respect between household members and tourists (Tiwari et al., 2013). Compared to developed countries, developing countries viewed tourism as fostering and encouraging sustainable development (Scheyvens & Laeis, 2019). Particular focus has been placed on tourism's potential contribution to poverty reduction (Shereni et al., 2022) as well as on the conservation of the natural environment (Edgell, 2019). When the United Nations adopted Agenda 2030 and the Sustainable Development Goals (SDGs) in 2015, tourism was naturally recognized as an important sector for achieving these goals. This role of tourism was further strengthened when 2017 was declared the International Year of Sustainable Tourism for development. Community-Based Tourism (CBT) is closely related to sustainable development. CBT is simply an alternative form of tourism that emphasizes active community involvement at every stage, including idea generation, planning, implementation, management, monitoring, evaluation, and the sharing of benefits (Schott & Nhem, 2018). It is closely related to sustainable tourism as it addresses social, cultural, environmental, and economic aspects (Dangi & Jamal, 2016). Natural and cultural environment largely offers tourists in rural communities, which improves homestay tourism (Anand, Chandan, & Singh, 2012; Gu & Wong, 2006). Such a type of tourism also pressures the local environment as well as social dynamics and traditions, yet it can be minimized through appropriate, eco-friendly, and prudent management. In countries such as Nepal, Malaysia, India, and Thailand, stakeholder collaboration and government regulation contributed significantly to overcoming these challenges. Furthermore, increasing global awareness and initiatives aimed at environmental protection have contributed to the promotion of community-based rural tourism as a low-impact and environmentally sensitive form of travel (Anand et al., 2012; Honey, 1999; Jones, 2005; Kiss, 2004), while also supporting poverty alleviation, environmental conservation, and social equity (Holden, 2010; Mowforth & Munt, 1998). Interconnected principles such as environmental protection, identification of poverty eradication, and social equity are identified by the World Commission on Environment and Development (WCED, 1987). Community-based homestay tourism contributes to poverty eradication, women empowerment, income generation, as well as sustainability, destination competitiveness, which are widely recognized (Izurieta et al., 2021; Pasanchay et al., 2020). An international study also shows that community-based tourism promotes local empowerment as well as cultural preservation (Pasanchay et al., 2020). A study shows that homestay tourism improved the livelihood of the local community and contributes to tourist satisfaction with the help of sustainable practices (Basak et al., 2021). Participation of the local community and collaboration strengthen the sustainable homestay tourism and conservation behaviour (Bhalla et al., 2016). Although existing studies have explored sustainability and tourist satisfaction (Basak et al., 2021), limited attention has been given to homestay tourism development and achieving sustainable development. Furthermore, research on community-based homestay tourism remains inadequate, particularly from a sustainable development perspective. From the above writing, some key research gaps have been identified, such as: i. Insufficient focus on homestay tourism as a mechanism for advancing the SDGs, especially compared to other sectors. ii. Lack of empirical research on how HmT can directly contribute to sustainable development, particularly in indigenous and biodiverse regions like the Darjeeling Himalayan Region. iii. Limited exploration of how homestay tourism affects Indigenous communities in terms of cultural heritage preservation, socio-economic development, and forest conservation. iv. Although community-based tourism has been studied, there is a need for more research into the nuanced ways in which HmT intersects with Indigenous populations and contributes to multiple SDGs. v. The current literature primarily highlights the scientific and conservation benefits of HmT, but lacks assessment of its broader socio-cultural and economic impacts on indigenous communities. In this study, the impact of community-based tourism on achieving Sustainable Development Goals were analysed. In this paper, the contribution of homestay tourism (HmT) to the sustainable development goals were examined. The role of HmT in forest conservation, socio-economic impact on the indigenous community of HmT were assessed. Also challenges and opportunities in integrating HmT with indigenous knowledge, the potentiality of homestay tourism as a model for

sustainable development, provide policy recommendations for promoting sustainable homestay tourism were evaluated.

2. Background of the study area

The Darjeeling Himalayan Region is located in the north-western part of West Bengal and north-eastern India, encompassing selected blocks of the Darjeeling and Kalimpong districts. The present study was conducted across the eight blocks of Darjeeling and Kalimpong districts, namely- Darjeeling Pullbazar, Jorebunglow Sukiapokhri, Kurseong, Rangli Rangliot, Mirik, Kalimpong-I, Kalimpong-II, and Gurubathan. Together, the selected blocks cover approximately 2,376.12 km² area (Fig. 1). These areas are widely recognized for their picturesque landscapes, pleasant hill stations, and the globally known tea industry. The West Bengal interim Report indicates that the Darjeeling Himalayan region (excluding Siliguri) ranks as the most visited tourist place in West Bengal. This region attracts over 500000 domestic and about 50000 foreign tourists every year. Almost 42% of the tourists expressed interest in rural and adventure tourism. Community-based homestay tourism acts as a key factor in economic activity in the Darjeeling and Kalimpong districts, contributing to income generation for the region (Fig. 2). The study area is very sensitive to the environment, not only because of natural hazards but also rapid tourism development and rapid urbanization. During the peak season, different services and facilities degrade dramatically, such as water shortage, traffic congestion, and medical problems, etc. Tourists are not only suffering but also aggravating the local community (Bhutia, 2022).

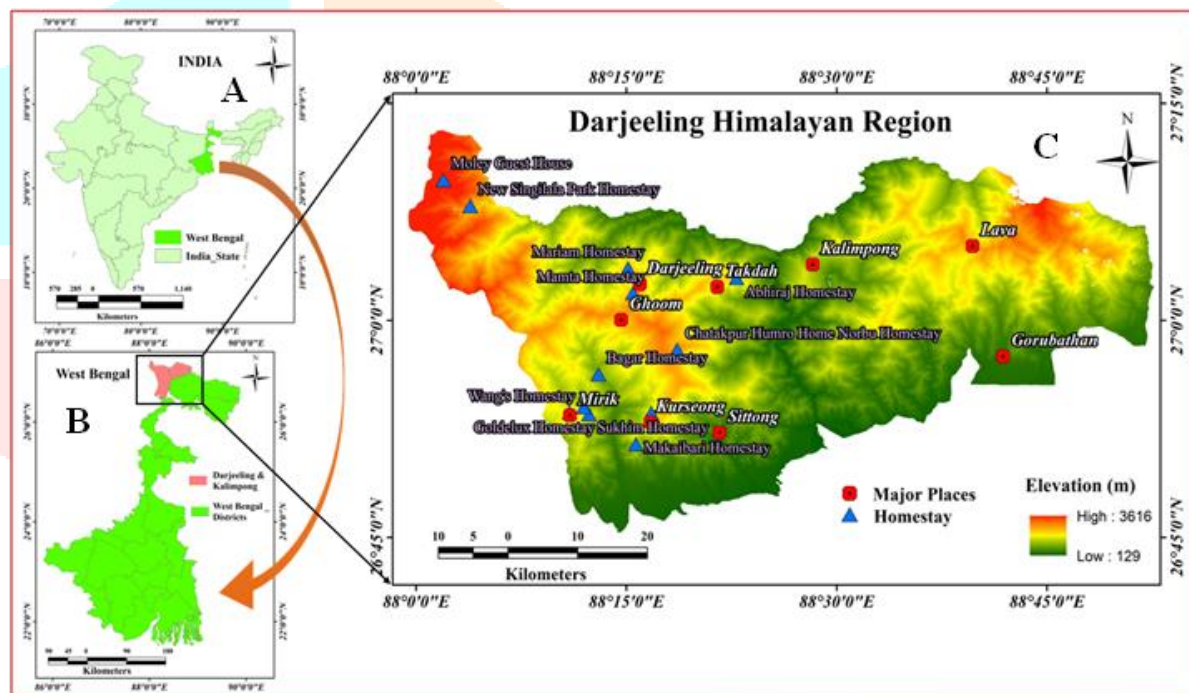


Figure 1. Location map of the study area (A) India, (B) West Bengal, (C) Darjeeling Himalayan Region

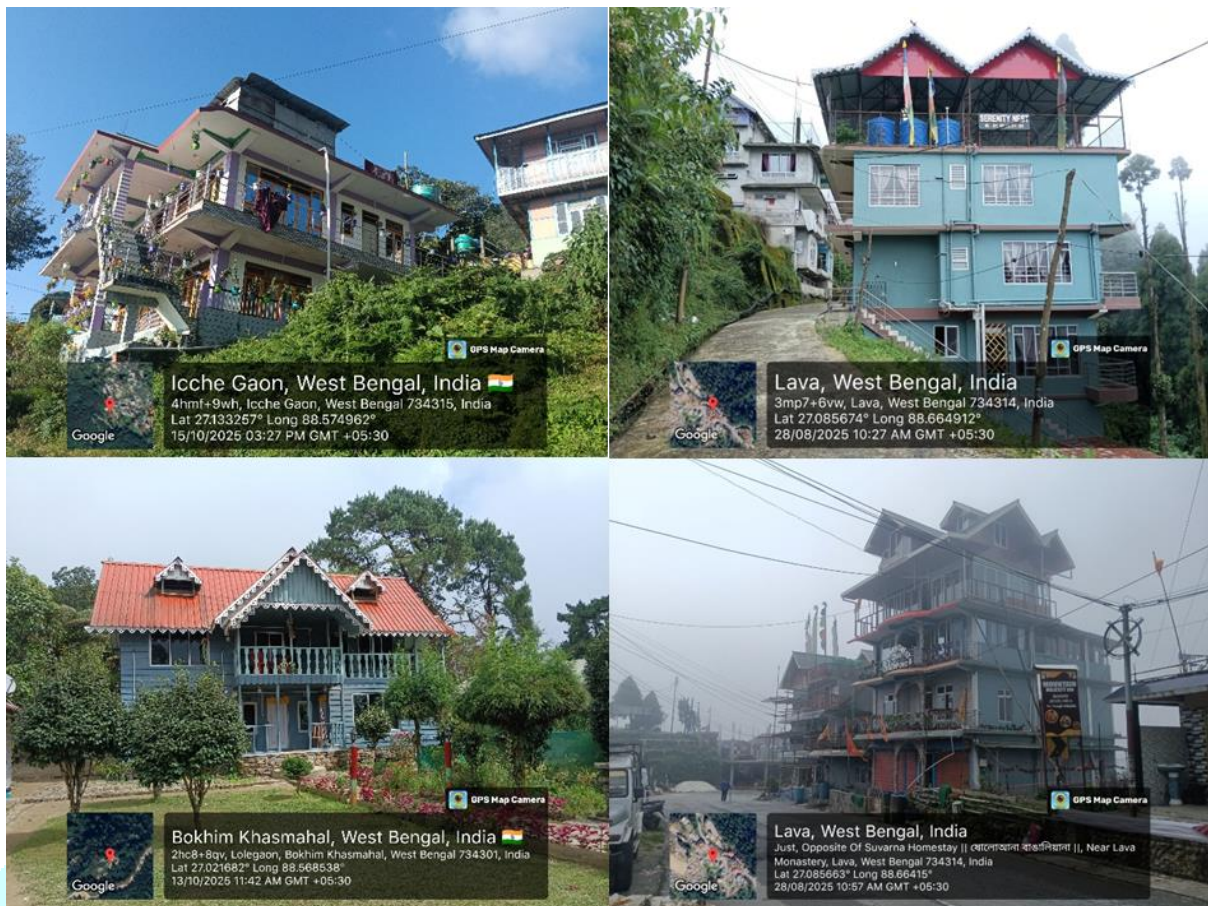


Figure 2. Glimpses of some homestays during a field visit located in Darjeeling Himalayan region

3. Community-Based Homestay Tourism: A Pathway to Sustainable Tourism

Community-based homestay tourism is one type of tourism where tourists or guests stay in a local community's own house, thus enabling benefits within the community. The homestay tourism is known as different name in different country as mentioned in table 1. The homestay households provide food, accommodation, and hospitality, which contribute to the participation of the local community in tourism activities and enhance their livelihoods (Schott, C., & Pasanchay, K., 2025). Economic empowerment is one of the major keys to the sustainability aspects of homestay tourism. In the conventional tourism sectors, most of the profits are earned by external corporations, but in the case of community-based homestay tourism, revenue directly flows to household members and local people, which improves income generation and livelihoods of the community and contributes to inclusive development. Thus, this means this type of tourism reduces rural poverty and creates alternative job opportunities for the marginalized populations (Tiwari, 2025). Another major dimension of sustainability is the social and cultural traditions of the communities. Community-based homestay tourism promotes cross-cultural exchange between tourists and rural homestay communities. Tourists obtain actual cultural insights from the local communities and hosts consolidate community cohesion as well as cultural identity. Various studies show that stakeholder participation in the planning and decision-making process increases inclusive collaboration and cultural sustainability (Acharya & Halpenny, 2017). In the context of environmental sustainability, resource conservation, eco-friendly practices, waste management, and afforestation are given more importance by the local community (Dahal, B., Anup, K. C., & Sapkota, R. P., 2020). Yet achieving sustainability mostly depends on impactful governance, a beneficial policy framework, and improvement of communities' competencies (Ijose & KC, 2025). In brief, the community-based homestay tourism is a sustainable form of tourism that contributes to improving economic inclusion, environmental protection, cultural preservation, and community empowerment.

Table 1. Concept of homestay in different countries

Country	Homestay Concept
United States of America	Agricultural Homestay, Educational Homestay (Ahmad et al. 2011)
Japan	Home Visit, Educational homestay (Ahmad et al. 2011)
Bhutan	Cultural immersion in traditional Bhutanese households (Nyaupane, G. P., & Timothy, D. J. 2010)
New Zealand	Farm stay, Cottage homestay (Ahmad et al., 2011: 491)
Vietnam	Community-based tourism (Kontogeorgopoulos et al., 2014)
Nepal	support rural livelihoods and cultural preservation (Acharya, B. P., & Halpenny, E. (2013)
Switzerland	Farm-based accommodation (Agrotourism) (Lane, B., & Kastenholz, E. 2018)
Indonesia	Cultural homestay, Leisure Homestay (Ahmad et al., 2011)

4. Community-Based Homestay Tourism as an Element of Sustainable Development Goals

Community-based homestay tourism contributes to Sustainable Development Goals (SDGs) by income generation, community participation, and sustainable practices (Dangi & Jamal, 2016; Goodwin & Santilli, 2009) (Fig. 3). Since Community-based homestay tourism works as a broad framework that is an alternative of mass tourism by providing profits at the household level as well as facilitating inclusive rural development, in developing regions compared to developed regions (Okazaki, 2008; Isaac, 2010). SDG 1 is directly influenced by HmT because it provides multiple benefits and expands livelihood through generating employment, income to the local people, and household hosts (Ashley, 2000; Lama, 2013; Mbaiwa, 2011). The income earned by the local community serves primarily utilized during off season of agriculture and particularly during environmental disasters- by ensure their food security and enabling them to safeguard essential long-term supplies for future use (Ellis, 2000; Scoones, 1998). The increase in income not only serves to alleviate poverty among the local community but also plays a significant role in their health and well-being—a factor that specifically impacts SDG 3 (Good health and Well-being) . It plays a pivotal role in fostering healthcare, nutritious diets, and an improved standard of living for families—collectively serving an indispensable function in enabling the local people to lead healthy and fulfilling lives (Chambers & Conway, 1992). Women play a pivotal role in community-based homestay tourism. Their contribution is particularly emphasized in this context, as they perform essential functions ranging from guest hospitality and meal preparation to housekeeping and maintenance. Consequently, homestay tourism fosters women's empowerment; by enabling them to participate in decision-making across various spheres, it effectively contributes to SDG 5 (Gender Equality) (Leh & Hamzah, 2012; Kayat, 2010). Various studies have demonstrated that community-based tourism, through the direct participation of women, has significantly enhanced their self-confidence, self-esteem, and decision-making capabilities, while simultaneously exerting a profound influence on the eradication of prevailing gender inequality within society (Lenao, 2015; Regmi & Walter, 2016). With the health and hygiene of tourists in mind, the provision of advanced water infrastructure, including access to clean water and proper waste management systems, enhances the health and sanitation standards of the local community, thereby contributing to the achievement of SDG Goal 6 (Clean Water and Sanitation) (Shukor et al., 2014; UNEP and WTO, 2012). In respect to SDG 8, it becomes evident that the growth of tourism is leading to an increase in employment opportunities within integrated areas. Small-scale entrepreneurs are emerging, the local economy is strengthening, and the income generated is being retained within the respective communities (Benur & Bramwell, 2015; Goodwin & Santilli, 2009). The growth of homestay tourism has enriched the cultural heritage of the respective region; local residents have been able to showcase their ancient traditions to tourists—a heritage that is gradually coming to the forefront across the entire country (Timothy, 2011). The aspects deeply intertwined with homestay tourism—specifically, reducing waste

generation and disposing of it in appropriate locations through proper management, utilizing handmade products that are environmentally friendly, and implementing community-based waste management systems—make a significant contribution toward achieving SDG 12 (Kayat, 2010; Shukor et al., 2014). Environmental awareness, the use of eco-friendly products, proper waste management, and the judicious utilization of natural resources help maintain a balance between local climatic variability and environmental resilience—factors that play a pivotal role in achieving SDG 13 (Scoones, 1998; Newsome et al., 2012). In conclusion, the growth of homestay tourism fosters a strong impetus for biodiversity conservation, sustainable forest management, and the protection of the natural habitats that serve as the primary attractions of this form of tourism, which play a major role in achieving SDG 15 (Reimer & Walter, 2013). Despite these contributions, many researchers have offered various perspectives and caveats regarding this subject, noting that the attainment of Sustainable Development Goals through homestay tourism will depend on a multitude of factors—such as inclusive governance, the equitable distribution of benefits, environmental awareness, the management of operational challenges and community conflicts, and sustained cooperation among various institutions (Tosun, 2000; Kontogeorgopoulos et al., 2015).

In the present study, based on the above details, four hypotheses were developed and evaluated to analyse the association between Community-Based Homestay Tourism and achieving the Sustainable Development Goals. These are—(1) There is an association between Homestay development and Economic sustainability (H1). (2) There is an association between Homestay development and Socio-Cultural sustainability (H2). (3) There is an association between Homestay development and Environmental sustainability (H3). (4) There is an association between Homestay development and Health and Well-being (H4).

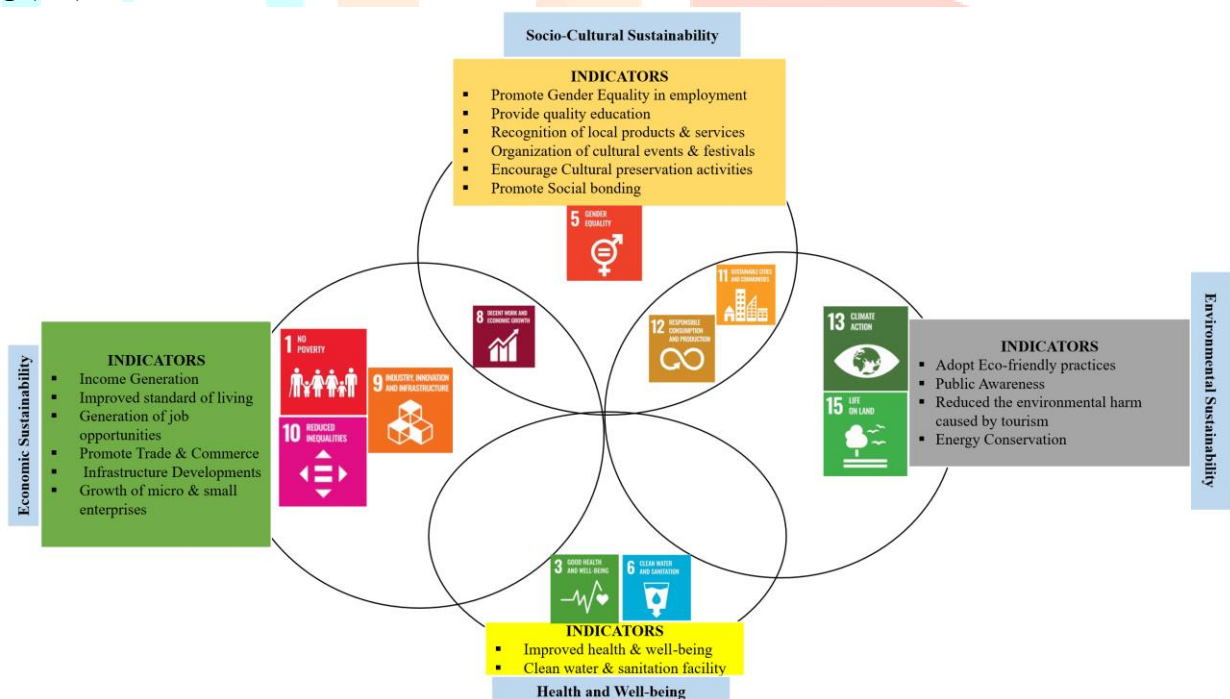


Figure 3. Sustainable Homestay Tourism Model showing how the four factors of sustainable tourism are interrelated with each other to achieve Sustainable Development Goals.

5. Database and methodology

5.1 Research design, sampling methods, and data collection techniques

The Darjeeling Himalayan region, as a study area, was chosen for its latent community-based HmT. The ultimate questionnaire as well as hypotheses are selected based on multiple literature reviews and experts' opinion (Razovic, 2013; Acharya and Halpenny, 2013; Biswakarma, 2015; Juandi et al., 2018; Huete-Alcocer et al., 2019). A detailed, structured questionnaire comprising closed-ended and open-ended questions is designed for this proposed study. To develop the questionnaire, various sustainability-related items were first identified from previous studies. Data were collected by asking respondents to rate their

satisfaction with different aspects of HmT in the study area. A five-point Likert scale was used, ranging from strongly agree, simple agree, neutral, simple disagree, and strongly disagree. Besides the five-point Likert scale, Yes/No-type questions were also formed to collect data. Approximately 264 questionnaires are handed to homestay members and the local people as respondents, and face-to-face interviews (Fig. 4) and group discussions are also conducted. After collecting the data, all the data are verified by a statistical package, which reflects the general methodology (Fig 5) adopted in the study. After that, an exploratory factor analysis was conducted to assess internal consistency using Cronbach's alpha in IBM SPSS Statistics. Before running the SEM model, a Confirmatory factor analysis (CFA) was performed using IBM SPSS Amos to evaluate dataset validity and reliability, based on convergent and divergent validity, which confirms the model's fitness. Finally, using the R Lavaan Package, SEM are performed to test the hypothesis, relationships between the variables, and the association between community-based homestay tourism and achieving sustainable development goals.



Figure 4. Face-to-face interview during field visit

5.2 Data screening and multivariate normality analysis

The Mahalanobis Distance method is widely used in multivariate analysis to find outliers and detect multivariate normality, in particular before running SEM analysis (Byrne, 2010). Mahalanobis Distance method was performed in SPSS; the results show that the data follow a linear pattern and are normally distributed. Before the SEM was performed the dataset was precisely checked and missing values are replaced by the arithmetic mean value (Byrne, 2010).

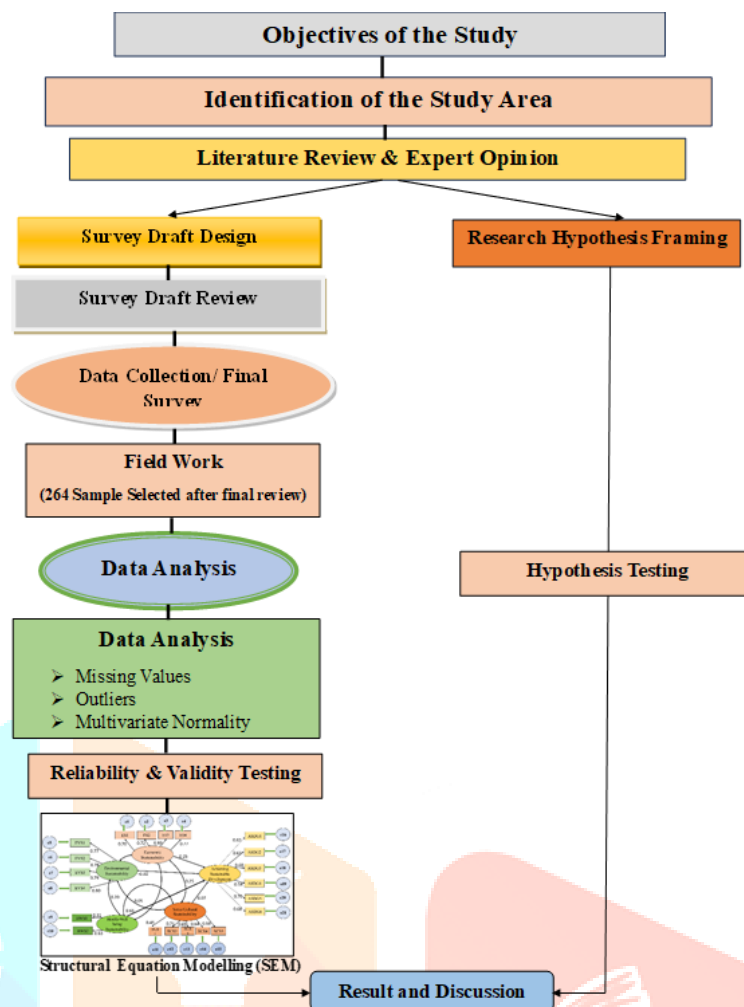


Figure 5 Methodological flow chart of the present study

6. Results

6.1 Descriptive statistics

Table 2 represents the socio-economic characteristics of the participants in the study area. Socio-economic factors are essential in research as they reveal participants' backgrounds, daily lives, and living conditions. The respondents from the Darjeeling Himalayan region were categorized based on gender, age, religion, social category, education, occupation, and income (Table 2). Table 2 begins with the gender distribution, showing that males account for 59.25% while females make up 40.75%. Although males constitute the larger portion of the sample, females still represent over 40% of participants, ensuring significant input from both genders. This balanced representation allows researchers to capture perspectives from both men and women. The slight male majority may be attributed to local work practices or levels of social engagement in the study area.

Next, the table outlines the age distribution, a critical factor influencing individuals' life experiences, responsibilities, and economic roles. The largest group is those aged 40-50, representing 40.75%, indicating a strong presence of middle-aged individuals who are typically productive and experienced in society. The next largest group is those aged 30-40 at 25%, followed by the 50-60 age group at 16.5% and the 20-30 age group at 13.5%. A small percentage, 1%, are under 20, and 5.5% are over 60. Overall, the sample predominantly consists of middle-aged adults, reflecting the insights of those in their most productive working years. The table further breaks down respondents by religion, a significant factor influencing cultural norms, beliefs, and community ties. Hindus form the largest group at 43.5%, closely followed by Buddhists at 42.75%. Their nearly equal representation highlights the religious diversity of the area. Christians account for 8.75%, and 5% identify with other faiths. This varied religious distribution means the study incorporates perspectives from multiple cultural and social backgrounds, likely influencing participants' views and experiences. The table then details the social group, a major socio-economic factor affecting status, resource access, and job prospects. Scheduled Tribes (ST) make up the

largest portion (60%), emphasizing their significant presence in the study region. Other Backward Classes (OBC) account for 18.75%, followed by the General category at 13.25% and Scheduled Castes (SC) at 8%.

Table 2. Descriptive statistics showing respondents characteristics

Socio-Economic Variable		Numbers (%)
Sex	Male	59.25
	Female	40.75
Age	Below 20	1.00
	20-30	13.50
	30-40	25.00
	40-50	40.75
	50-60	16.50
	Above 60	5.50
Religion	Hindu	43.50
	Buddhist	42.75
	Christian	8.75
	Others	5.00
Social Group	General	13.25
	OBC	18.75
	ST	60.00
	SC	8.00
Education	Illiterate	5.50
	Primary	15.25
	High School	50.25
	Graduate	17.50
	Postgraduate	11.50
Occupation	Private business	32.00
	Service in the government office or non-government or private institutions	25.70
	Tour guide	10.30
	Agriculture	5.00
	Labor	15.00
	Foreign Employment	2.00
	Others	10.00
Income	Below 30000	10.50
	30000-49999	26.50
	50000-69999	32.75
	70000-89999	20.50
	Above 90000	9.75

Education level is another key variable, serving as an indicator of social progress and skill development, which affects knowledge, capabilities, and employment opportunities. High school completers constitute the largest group at 50.25%, indicating that half the sample has achieved this educational milestone. Graduates follow at 17.5%, with postgraduates at 11.5%, showing a substantial portion with advanced qualifications. Primary-educated individuals account for 15.25%, and 5.5% are illiterate. Although illiteracy is low, it highlights existing disparities. Overall, the sample demonstrates that most participants have at least a basic education, often extending to high school or beyond. The table also outlines respondents' occupations, a crucial socio-economic factor that shapes earnings, social standing, and daily life. Private businesses are the most represented group at 32.00%, followed by Service in the government

office or non-government or private institutions (25.70%), labour (15%), tour guide (10%), others (10%), agriculture (5%), and foreign employment (2%) respectively. In summary, tourism, service jobs, farming, and manual labour are the primary occupations among the community. Lastly, the table provides information on respondents' income levels, revealing their financial status. The largest group, 32.75%, earns between 50,000 and 69,999, placing them in the mid-tier income bracket. Those earning between 30,000 and 49,999 represent 26.5%, another moderate group. About 20.5% earn between 70,000 and 89,999, a higher income range, while 10.5% earn less than 30,000 (low end) and 9.75% earn over 90,000 (top tier). Overall, the income distribution centres around middle-income levels with smaller groups at the extremes. In summary, the table offers a comprehensive overview of the socio-economic profiles of the study's participants. Most respondents are middle-aged males from Scheduled Tribe backgrounds. Educational attainment is generally moderate, with many completed high school. Occupations are largely centered around tour guiding, service roles, farming, and manual labour. Income levels predominantly fall in the middle range. This information provides researchers with essential demographic and economic context to analyze findings and draw meaningful conclusions.

Participants were asked to express their level of agreement with a set of statements related to sustainable homestay tourism. In addition, they evaluated their level of satisfaction using five items designed to measure this concept. The results are presented in Table 3. To examine the progress of community-based tourism, six indicators were considered, including the notable increase in the number of homestays within the locality ($M = 4.19$, $SD = 0.541$), homestay facilities in this area have improved over the past few years ($M = 4.18$ and $SD = 0.548$), adequate basic infrastructure (Roads, Electricity, Water Supply, Medical facility) supports homestay operations ($M = 4.17$ and $SD = 0.566$), government or local authorities actively support homestay development ($M = 4.15$ and $SD = 0.564$), homestay accommodations are properly organized and maintained for Tourists ($M = 4.2$ and $SD = 0.606$) and standard guidelines or regulations exist for operating homestays ($M = 4.18$ and $SD = 0.553$).

Respondents' perceptions of economic sustainability were assessed using four indicators. The analysis shows that the mean scores for all four items fall within a positive range, indicating a favorable overall perception. Extra income opportunities has created for local residents by the HmT, where Mean (M) is 4.21, Standard deviation (SD) is 0.589, followed by the development of homestays has increased employment opportunities in the community ($M = 4.2$, $SD = 0.57$), Local businesses benefit from tourists staying in homestays ($M = 4.23$, $SD = 0.647$), Homestay activities help diversify the local economy, the score is $M = 4.23$, $SD = 0.58$

Table 3. Exploratory factor analysis (EFA), descriptive statistics, and reliability results.

Sustainability Indicators	FI ^a	M ^b	SD ^c	a ^d
Community-Based Homestay Development				0.815
HD1 The Number of homestays in the locality has increased significantly	0.673	4.19	0.541	
HD2 Homestay facilities in this area have improved over the past few years	0.685	4.18	0.548	
HD3 Adequate basic infrastructure (Roads, Electricity, Water Supply, Medical facility) supports homestay operations	0.681	4.17	0.566	
HD4 Government or local authorities actively support homestay development	0.677	4.15	0.564	
HD5 Homestay accommodations are properly organized and maintained for Tourists	0.731	4.2	0.606	
HD6 Standard guidelines or regulations exist for operating homestays	0.677	4.18	0.553	
Economic Sustainability				0.834

ES1 Homestay tourism has created additional income opportunities for local residents	0.777	4.21	0.589	
ES2 The development of homestays has increased employment opportunities in the community	0.791	4.2	0.577	
ES3 Local businesses benefit from tourists staying in homestays	0.829	4.23	0.647	
ES4 Homestay activities help diversify the local economy	0.808	4.23	0.58	
Socio-Cultural Sustainability				0.739
SCS1 Improved quality of education	0.361	4.14	0.683	
SCS2 Homestay Tourism promote Women Empowerment	0.8	4.26	0.592	
SCS3 Homestay tourism encourages participation of local residents in tourism activities	0.743	4.23	0.6	
SCS4 Homestay tourism promotes cooperation among local residents	0.733	4.24	0.577	
SCS5 Local traditions and cultural practices are preserved through homestay tourism	0.636	4.21	0.571	
Environmental Sustainability				0.865
EVS1 Residents are more aware of environmental protection due to tourism activities	0.833	4.00	0.581	
EVS2 Homestay tourism encourages proper waste management practices in the community	0.834	4.03	0.602	
EVS3 Sustainable practices such as reducing plastic use are encouraged in homestays	0.84	4.01	0.571	
EVS4 Natural resources in the area are better protected because of tourism awareness	0.855	4.01	0.618	
Health and Well-Being Sustainability				0.714
HWS1 Homestay development has improved sanitation facilities in the community	0.239	4.06	0.643	
HWS2 Homestay tourism contributes to improving the overall quality of life of residents	0.506	4.19	0.666	

Note: ^a Factor Loading, ^b Mean Score, ^c Standard Deviation, ^d Cronbach Alpha Value

On the other hand, five questions were used for assessing view of the respondents' on the impact of HmT on socio-cultural sustainability. It was found that in improving the quality education HmT significant role ($M = 4.14$, $SD = 0.683$), and the score of Promote Woman Empowerment ($M = 4.26$, $SD = 0.592$), homestay tourism encourages participation of local residents in tourism activities ($M=4.23$ and $SD=0.600$), homestay tourism promotes cooperation among local residents ($M=4.24$ and $SD=0.577$) and local traditions and cultural practices are preserved through homestay tourism ($M=4.21$ and $SD= 0.571$). Subsequently, for examining the impact on environmental dimension of HmT four elements were considered during the field survey. Residents show a strong awareness of the need to protect natural environments, largely influenced by tourism activities ($M = 4.00$, $SD = 0.581$). HmT encourages proper waste management practices in the community ($M = 4.03$, $SD = 0.602$). Sustainable practices such as reducing plastic use are encouraged in homestays. Besides, the score is $M = 4.01$ and $SD = 0.618$. This indicator related to natural resources in the area are better protected because of tourism awareness in the Darjeeling-Himalayan Region, regarding the numerous activities held in this region. Lastly, another important dimension is Health and well-being, which has two major indicators considered by the researcher. One is that homestay development has improved sanitation facilities in the community

(M=4.06 and SD=0.643), and the other is that homestay tourism contributes to improving the overall quality of life of residents, where the score is M=4.19 and SD=0.666.

6.2 Measurement model results

Validity in research explains the accuracy and credibility of study findings. It measures whether a research instrument truly assesses what it means to measure, ensuring trustworthy and meaningful conclusions. The reliability of data was examined thereafter. Validity refers to the extent to which an instrument accurately measures the construct it is intended to assess (Field, 2009). Convergent validity is a form of validity that examines whether different measures of the same construct are closely related (Hair et al., 2010). It is commonly evaluated using Composite Reliability (CR) and Average Variance Extracted (AVE) (Tabachnick and Fidell, 1996). Compared to the total variance AVE shows how much of the variance in the observed variables is explained by the underlying construct (Henseler et al., 2015). CR measures the internal consistency and reliability of the hypothesis (Holmes-Smith, 2001). To confirm convergent validity, the AVE value should be 0.5 or higher, and the CR value should be 0.7 or higher (Hair et al., 2010).

Table 4. Convergent Validity

Convergent Validity	Average Variance Extracted (AVE) $AVE = \frac{1}{n} \sum K^2$ (>0.5)	Composite Reliability (CR) $CR = \frac{\sum K^2}{\sum K^2 + \sum \epsilon^2}$	Convergent Validity
CBHD	0.425	0.843	Almost Established
ES	0.562	0.835	Established
SCS	0.687	0.752	Established
EVS	0.616	0.865	Established
HWS	0.493	0.524	Almost Established

Note: CBHD=Community-Based Homestay Development, ES = Economic Sustainability, EVS = Environmental Sustainability, SCS = Socio-Cultural Sustainability, HWS= Health and Well-being. $1K$ = refers to the factor loading of every item and n = represents the number of items in the data set. $2K$ = refers to the factor loading of every item, n = represents the number of items in the data set and ϵ = stands for the error terms.

Table 4 shows that sustainability indicators like Economic Sustainability, Socio-Cultural Sustainability, and Environmental Sustainability, which have higher Average Variance Extracted (AVE) values (0.562, 0.687, 0.616), are considered to construct the convergent validity, but Health and Well-being and community-based homestay development (0.493, 0.425) do not fully fulfil the criteria of Convergent Validity. In the same way, we see that our Composite Reliability (CR) is higher in Environmental Sustainability (0.865), Economic Sustainability (0.835), Socio-Cultural Sustainability (0.752), community-based homestay development (0.843), except Health and well-being (0.542). It is pointed out that most of the sustainability indicators meet the convergent validity, internal consistency, and reliability criteria.

Table 5. Divergent Validity

Latent Variables	ES	SCS	EVS	HWS	HD
ES	0.748				
SCS	.233	0.622			
EVS	0.004	0.059	0.785		
HWS	.165	.379	0.108	0.439	
HD	.306	.456	0.093	.405	0.652

Discriminant (divergent) validity refers to the extent to which measures that are theoretically unrelated remain distinct from one another (Hair et al., 2010). In this study, it was assessed using three approaches. First, the average variance extracted (AVE) for each construct was compared with the squared correlations between constructs, following the guideline of Henseler et al. (2014). The results (Table 4) show that the AVE values exceeded the corresponding squared correlations, confirming adequate discriminant validity. Second, potential item redundancy was examined through Modification Indices (MI). All MI values were below the threshold of 15, indicating no redundancy among items in the dataset (Awang, 2012). Third, correlations among exogenous constructs were analyzed. As suggested by Field (2009), correlation coefficients should remain below 0.85; values above this limit imply redundancy or serious multicollinearity. In this study, all correlations were below 0.80, and the diagonal elements were higher than the inter-construct correlations (Table 5). These findings collectively demonstrate that the constructs satisfy the requirements of discriminant validity.

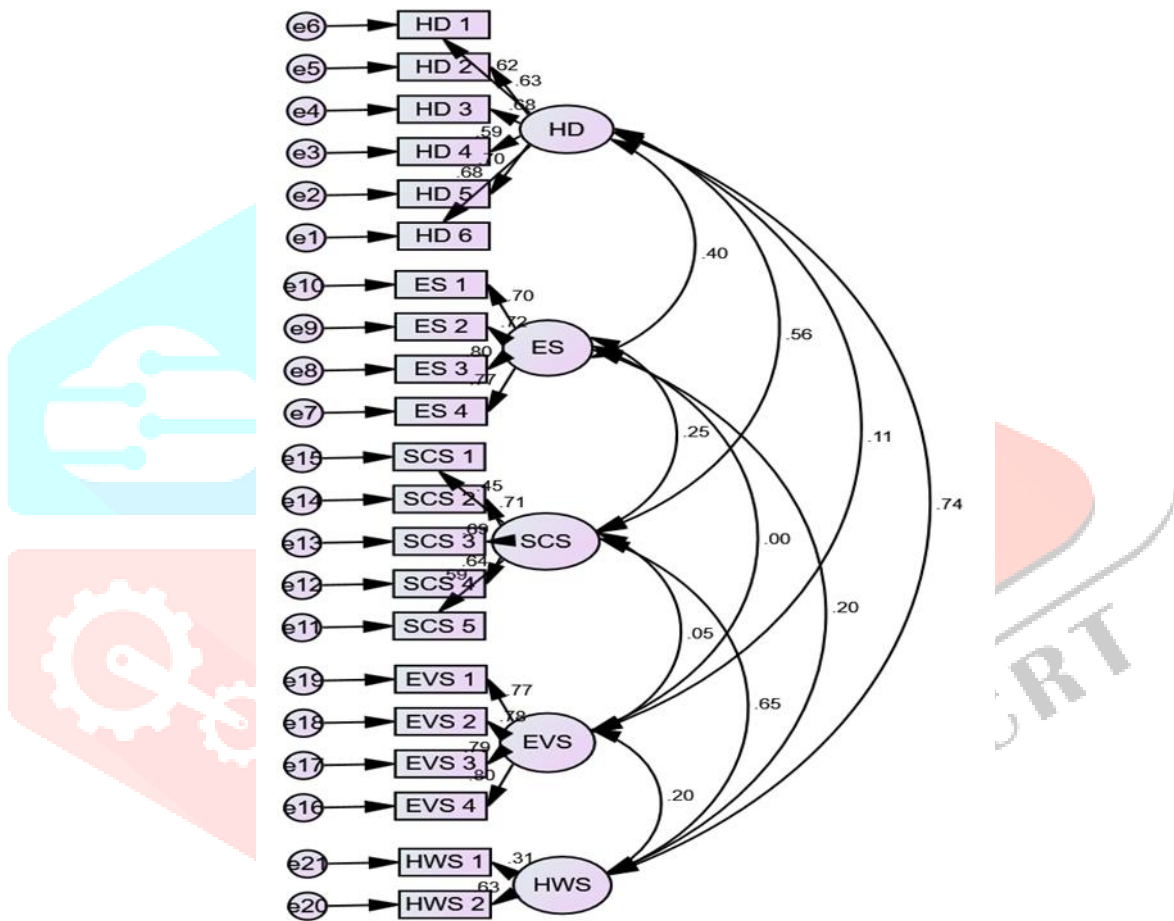


Figure 6. Confirmatory Factor Analysis is used to examine whether the data fit the hypothesized SEM model.

This measurement model consists of Homestay Development (HD), Economic, Socio-cultural, Environmental, and Health & Well-being, to achieve Sustainable Development Goals. The results (Fig. 6) reveal that all observed indicators' loading factors are positive on their respective latent constructs, confirming the theoretical structure of the model. All standardized factor loadings are greater than 0.5, except for HWS1 (0.31), indicating the validity and reliability of the model. Correlation between the latent constructs is positive, indicating an important relationship while maintaining clear conceptual boundaries among the variables.

Absolute fit sets the foundation. Chi-square ($\chi^2 = 0$, $p > 0.05$) indicates zero discrepancy between observed and predicted covariances—exceptional, as non-significance is rare in large samples due to sensitivity (Table 6). Root Mean Square Error of Approximation (RMSEA = 0.011 < 0.08) reflects minimal approximation error per degree of freedom, with values below 0.05 deemed close fit (Steiger, 1990). Goodness-of-Fit Index (GFI = 0.94 > 0.90) shows 94% of variance explained, surpassing Hu and Bentler's (1999) conservative threshold. Incremental fit compares the target model favourably to a null baseline.

Table 6. Fitness Index

Name of Category	Name of Index	Level of Acceptance	Index Value
Absolute Fit	chi-Square	$P > 0.05$	0.360
	RMSEA	$RMSEA < 0.08$	0.011
Incremental Fit	GFI	$GFI > 0.90$	0.94
	CFI	$CFI > 0.90$	0.996
	TLI	$TLI > 0.90$	0.996
	IFI	$IFI > 0.90$	0.935
	NFI	$NFI > 0.90$	0.905
Parsimonious Fit	CMIN/DF	$CMIN/DF < 3.0$	01.03

Comparative Fit Index ($CFI = 0.996 > 0.90$), Tucker-Lewis Index ($TLI = 0.996 > 0.90$), Incremental Fit Index ($IFI = 0.935 > 0.90$), and Normed Fit Index ($NFI = 0.905 > 0.90$) all accept (Table 6). CFI/TLI near 1.00 signal near-perfect relative improvement, robust even with moderate sample sizes. Chi-square/degrees of freedom ($CMIN/DF = 1.03 < 3.0$) confirms efficiency, ideal for multi-factor models without overfitting (Bentler and Bonett, 1980; Hooper et al., 2008; Kline, 2023). Overall, this CFA evidences excellent measurement model quality, reliable factor loadings presumed (report elsewhere), discriminant validity holds, and the structure suits regional tourism research.

6.3 Result of structural modelling and hypothesis testing

In this study, structural equation modeling (SEM) was employed to test the hypothesized relationships among the factors, potentially encompassing factors like homestay business performance, community socio-economic indicators, and infrastructural influences in the Darjeeling Himalayan context. Model fit was rigorously evaluated using a comprehensive set of indices categorized into absolute, incremental, and parsimonious fit measures (Table 6).

Table 7. Hypothesis testing

Hypothesis	Hypothesis	β	Std. Err	t-Value	P-Value	Decision
H_1	There is an association between Homestay development and Economic sustainability	0.695	0.112	6.189	***	Accepted
H_2	There is an association between Homestay development and Socio-Cultural sustainability	0.734	0.111	6.593	***	Accepted
H_3	There is an association between Homestay development and Environmental sustainability	0.103	0.115	0.897	0.37	Rejected
H_4	There is an association between Homestay development and Health and Well-being	0.881	0.13	6.77	***	Accepted

Note: β = Standardized Regression Coefficient, *** $P < 0.001$

The role of HmT in improving the economic sustainability, cultural sustainability, environmental sustainability and health and well-being was analyzed using SEM (Fig. 7). As per the fitness index structural model is fitted (Table 6) with IFI (0.935), NFI (0.905), TLI (0.996), GFI (0.997), CFI (0.996), RMSEA (0.011), and $CMIN/DF = 1.031$. According to SEM health and well-being sustainability ($\beta = 0.881$), followed by socio-cultural sustainability ($\beta = 0.734$) and economic sustainability ($\beta = 0.695$) were found to be the most significant predictor in achieving sustainable development goals.

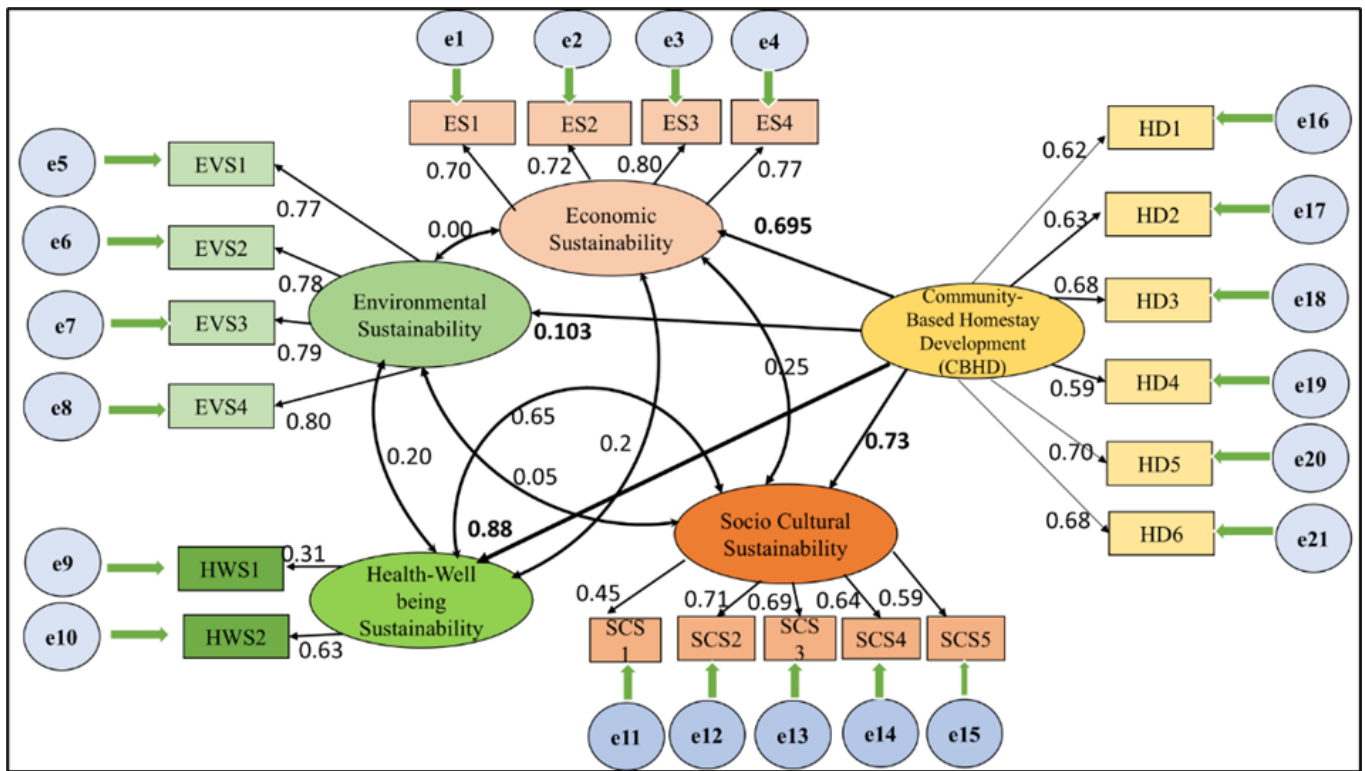


Figure 7. Structural Equation Model (SEM)

As per the SEM homestay development has no significant ($\beta = 0.103$) impact on environmental sustainability. On the other hand it was found that homestay development was a significant predictor of economic sustainability in the study area (H1 was accepted). In the context of sustainable homestay tourism, this research looked at the structural connection between two additional aspects of community-based homestay development and economic sustainability. The analysis reveals that the research shows that homestay development has a direct and beneficial impact on socio-cultural sustainability (H2 was accepted). The analysis also reveals that homestay development has a direct and strong impact on Health and well-being, thus H4 is also accepted. Lastly, it was found that community-based homestay development has an indirect impact on environmental sustainability (H3 rejected).

7. Discussion

Community-based homestay tourism contributes in achieving the SDGs by income generation, community participation, and sustainable practices (Dangi & Jamal, 2016; Goodwin & Santilli, 2009). In this study SEM was used to explore the relationships between community-based homestay development and different sustainability aspects (Economic, Socio-cultural, environmental, and health and well-being) in the Darjeeling Himalayan region. The findings of the study show that there is a strong relationship between homestay development and achieving SDGs. Homestay development must have a different level of impact on sustainability aspects. All hypotheses except H3 were accepted in this study, showing the impact of homestay development on economic (H1), socio-cultural (H2), and health and well-being (H4). Environmental Sustainability (H3) is rejected, indicating that homestay development does not significantly influence it within the study context. The community-based homestay development contributes to various aspects of economic sustainability, such as income opportunities, employment opportunities, and an increase in local business, and helps to diversify the local economy, which together help to achieve SDGs 1 (No Poverty), 8 (Decent Work and Economic Growth), and 9 (Industry, Innovation and Infrastructure). It has a significant impact on socio-cultural sustainability, such as improved quality of education, promotes women empowerment, public participation, promotes cooperation, and preserves local tradition and cultures, which together help to achieve SDGs 4 (quality of education), 5 (Gender equality), 11 (Sustainable cities and communities), 12 (Responsible Consumption and Production), etc. It has a significant and strong impact on various aspects of health and well-being, such as improved sanitation facilities in the communities, improving the overall quality of life of residents, which together help to achieve SDGs 3 (Good health and well-being), 6 (Clean water and Sanitation). On the other hand,

community-based homestay development has an insignificant impact on various environmental sustainability aspects, such as awareness about environmental protection, waste management practices, and reducing plastic use and natural resource protection, which indicates that homestay development does not help to achieve SDGs 13 (Climate Action), 15 (Life on Land), etc.

8. Conclusion

The results reflect the strong association between HmT and the sustainable development of the Darjeeling Himalayan Region. Simultaneously, some sorts of problems are there, although this region is an attraction for tourists because of its natural scenic beauty. In conclusion, it can be said that HmT has contributed to developing the livelihood of the local community of this region in many ways. But in the case of environmental sustainability, it needs more and more public awareness, participation, and government campaigns to reduce human stress on natural resources.

Sustainable homestay tourism is a method to promote the overall well-being of remote villagers with environmental concerns in mind for long-term benefits. If manage in a sustainable way, the future of the homestay tourism business in the Darjeeling Himalayan region is extremely bright. Researchers need to conduct studies on this subject, as the development of homestays paves the way for improving the livelihoods of residents; furthermore, there is a need to highlight various other environmental aspects as well. This region is an exquisite treasure trove of natural beauty. Since a large number of tourists both from within India and abroad visit this area, its future prospect of having more tourists is very high. Therefore, it is an urgent to assess the impact of HmT development on the natural beauty of the region. Indeed, this natural beauty serves as one of the most significant factors attracting visitors and tourists to the exquisitely beautiful Darjeeling. However, if the development of homestays leads to a gradual erosion of this natural beauty, the influx of visitors and tourism will eventually decline in Darjeeling Himalayan region.

All the stakeholders and local people must understand the economic, socio-cultural, health and well-being, and environmental equity, so that the significance and prominence of this region may further increase in the near future. Only then will the beauty of the Darjeeling Himalayan region be preserved for future generations in the near future and homestays in the region will undergo increasing development, and numerous tourists will come to visit the area.

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