Economic Contribution and Infrastructure as Mediators of Tourism-Led Development in Sudurpaschim, Nepal

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Abstract

This study examined the role of the tourism industry in enhancing economic development in Sudurpaschim Province, Nepal, focusing on the mediating effects of economic contribution and infrastructure development. This study utilized a cross-sectional approach, gathering 657 valid responses from individuals involved in tourism activities. Descriptive data were analyzed using SPSS 26, while inferential relationships were tested using SmartPLS 4 through structural equation modeling (SEM).

The results show that tourism significantly impacted economic contributions, infrastructure development, and economic development. The mediation results of economic contribution and infrastructure development showed partial mediation, with VAF values of 28.077% for economic contribution and 35.58% for infrastructure development. The HTMT and Fornell–Larcker criteria verified the reliability and validity of the model.

The findings suggest that tourism directly and indirectly contributes to economic development by strengthening infrastructure and increasing economic activity, thus

offering valuable implications for regional development strategies. The parallel mediation model verified partial mediation, tourism influence entirely transmitted through its impact on economic and infrastructure improvements.

The findings suggest that destination managers should implement data-driven segmentation strategies aimed at age groups and nationalities that demonstrate the highest levels of engagement.

Keywords: Tourism, economic contribution, infrastructure, SmartPLS 4, Sudurpaschim Nepal, structural equation modeling

Introduction

Tourism has become a vital element of economic development, particularly in developing countries that seek to diversify their economies and promote inclusive growth. In addition to its contribution to foreign exchange earnings and employment, tourism supports infrastructure development, stimulates local businesses, and facilitates regional integration (UNWTO 2023; Li et al. 2023). In the context of post-pandemic recovery, the significance of tourism in revitalizing economies has become increasingly evident, with global tourism flows steadily recovering and attention shifting towards resilience, sustainability, and regional equity (Gössling et al., 2022).

Nepal, renowned for its abundant natural landscape, cultural heritage, and spiritual significance, has historically depended on tourism as a crucial driver of national development. Nevertheless, the majority of tourism activities and scholarly research have focused on well-established regions such as the Kathmandu Valley, Pokhara, and the Everest Trail. In contrast, less-developed provinces such as Sudurpaschim has not received sufficient policy or academic attention. Situated on Nepal's far western periphery, Sudurpaschim has significant tourism potential, encompassing biodiversity hotspots, scenic landscapes, pilgrimage sites, and indigenous cultural experiences. However, the region continues to grapple with economic underdevelopment, limited infrastructure, and low accessibility to tourists (Sharma et al. 2023; Paudel & Kunwar 2024).

While tourism activities in Sudurpaschim are gradually increasing, there is a significant paucity of empirical evidence regarding the translation of these developments into economic benefits for the region. More critically, the mechanisms through which tourism contributes to economic development in geographically marginalized areas remain largely unexplored. Specifically, infrastructure development and economic contribution are frequently identified as pivotal mediators in the tourism–development nexus (Aziz et al., 2022; Chen & Rahman, 2023); however, their roles are under-researched within the Nepalese provincial context. The absence of such insights constrains the efficacy of tourism policies and may result in missed opportunities for

inclusive growth.

This study aims to address existing gaps by investigating the impact of tourism on economic development in Sudurpaschim Province, Nepal, with an emphasis on the mediating roles of infrastructure and economic contribution. Infrastructure, including roads, transportation, communication networks, and accommodation, facilitates tourism growth and generates broader economic spillovers. Concurrently, tourism's direct economic contribution serves as a crucial mechanism for local business revenue, employment, and community income (Basnet & Pant, 2022). This study aims to assess the direct and indirect impacts of the tourism industry on economic development in Sudurpaschim, Nepal.

This study contributes both theoretically and practically to this field. Theoretically, this enhances the understanding of tourism-led development in underrepresented regions of Nepal. It offers region-specific insights into policy interventions, local planning, and tourism investment strategies. Given that Sudurpaschim exemplifies the typical case of a low-income, resource-rich, yet infrastructure-poor region, the findings from this study may also provide valuable lessons for other similar contexts across the Global South.

Literature Review

Theoretical Review

The role of tourism in economic development has been widely analyzed through various economic theories, most notably the Tourism-Led Growth Hypothesis (TLGH), which asserts that tourism drives long-term economic growth by generating income, employment, and investment opportunities (Tang & Tan, 2022). This suggests that increased tourism activities can lead to enhanced GDP and improved standard of living, especially in developing economies.

Complementing this, Endogenous Growth Theory highlights the importance of internal factors such as human capital, innovation, and public infrastructure in promoting sustainable economic growth. This theory is particularly relevant to tourism because it emphasizes the role of government policies and reinvestment in infrastructure as key to maximizing the benefits of tourism (Romero & Fernández, 2023). When tourism revenues are reinvested locally, whether in education, roads, or entrepreneurship, it can lead to compounding developmental outcomes.

The Multiplier Effect in tourism economics further explains how tourism spending flows through the different sectors of the economy. For instance, a single tourist's expenditure can stimulate hospitality, agriculture, retail, and construction (Lee & Brahmasrene, 2022). This cascading effect contributes to both direct and indirect economic benefits, reinforcing the view that tourism is a strategic development sector, particularly in underdeveloped regions.

Tourism and Economic Development

A growing body of research supports the idea that tourism contributes significantly to economic development, particularly in low-income and emerging economies. Studies across South Asia, Africa, and Latin America have consistently found a positive correlation between tourism growth and macroeconomic indicators, such as GDP, employment, and foreign direct investment (Li et al., 2023; Alam et al., 2022). However, the magnitude of the economic impact of tourism varies depending on factors such as institutional support, investment in infrastructure, security, and accessibility.

Scholars also caution that the tourism-development relationship is not automatic. Context-specific factors, such as local capacity, environmental sustainability, and regional inequality, can moderate or constrain the effectiveness of tourism as a development tool (Nketiah et al., 2022). Moreover, one of the persistent challenges in evaluating tourism's contribution lies in the measurement difficulties. Informal employment, seasonality, and leakage of tourism revenue often lead to underestimation of their actual impact (OECD, 2023).

Infrastructure and Tourism Development

Infrastructure serves as a critical foundation for tourism. Efficient transportation systems, reliable utilities, quality accommodations, and digital connectivity not only enhance the tourist experience but also improve access to remote destinations (Gao et al., 2023). Infrastructural development reduces travel time, lowers costs, and increases safety factors, which directly influence tourist arrival and spending.

Studies have increasingly recognized infrastructure as a mediating factor in the tourism–development nexus. In other words, tourism's ability to contribute to economic development is significantly enhanced when infrastructure is in place to support visitor flow and business operations (Rahman & Aziz, 2023). For example, recent research in South Asia shows that regions with strategic investments in roads, airports, and Internet connectivity see greater returns from tourism than poorly connected areas, even when tourism potential is similar (Basak et al., 2022).

Economic Contribution of Tourism

The economic contribution of tourism can be understood through three interconnected channels: direct, indirect, and induced effects. Direct effects include the income generated by hotels, tour companies, and transportation services. Indirect effects occur through supply chains, such as local food suppliers catering to hotels. Induced effects arise when tourism sector employees spend their income on the local economy (WTTC, 2023).

Various quantitative techniques have been employed to evaluate the economic impact of tourism, which helps quantify the extent to which tourism spending remains in

the region and how it flows across sectors (Song & Liu, 2021). Recent studies, Sharma et al. (2023), found that in remote areas in Nepal, the presence of locally owned businesses significantly strengthened the developmental impact of tourism by ensuring greater income retention and community reinvestment.

Tourism in Nepal and Sudurpaschim

Nepal's tourism industry is one of its leading economic sectors, contributing around 6.7% of the national GDP in recent years and providing employment to hundreds of thousands (MOCTCA, 2023). The country's tourism appeal lies in its unique blend of Himalayan landscapes, cultural diversity, and spiritual sites. However, the distribution of tourism benefits remains uneven and heavily skewed towards the central and eastern regions such as Kathmandu, Pokhara, and Everest.

Sudurpaschim Province, located in Nepal's far west, is rich in untapped tourism resources, from Shuklaphanta National Park and the Khaptad Plateau to religious hubs, such as Badimalika and Ugratara, and many other historical, natural, and religious places. However, the region faces multiple challenges, including poor infrastructure, limited promotion, weak institutional capacity, and outmigration of skilled labor (Thapa & Pandey, 2023). Several studies have underscored the potential of Sudurpaschim as a future tourism hub if infrastructure and local entrepreneurship are strategically developed. Policies like the Sudurpaschim Tourism Master Plan (2022-2030) are designed to deal with these gaps by integrating the development. The problem is that the introduction of their use is slow due to budget limitations and structural decentralization (Paudel & Kunwar, 2024).

Conceptual Framework and Hypotheses Development

The theoretical framework applied, therefore, relies on these conventional economic and tourism development theories, involving the Tourism-Led Growth Hypothesis (TLGH) (Tang & Tan, 2022), the Endogenous Growth Theory (Romero & Fernandez, 2023), and the Multiplier Effect in tourism economics (Lee & Brahmasrene, 2022). All these theories explain how tourism leads to economic growth both directly and indirectly by the expansion of infrastructure and creating an economic input. The addition of infrastructure and economic contributions as mediators was justified by the previous empirical studies, such as Gao et al. (2023), Li et al. (2023), and Rahman and Aziz (2023). As a result, the proposed model can be discussed as a unique synthesis that is specific to the situation in Nepal, in the Sudurpaschim Provincial region.

Figure 1

Conceptual Framework
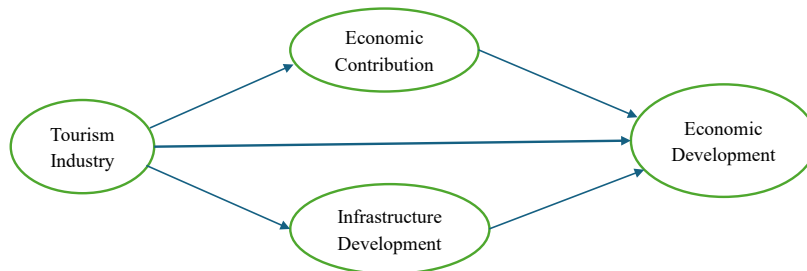
Note. Adapted from theoretical foundations and prior studies (Gao et al., 2022; Romero & Aziz, 2023; Tang & Tan, 2023; Rahman & Fernández, 2023).

The above figure provides a coherent framework for analyzing the role of tourism in regional development. By incorporating both the direct linkages and mediating processes, the model reflects the context-specific and multifaceted nature of the role of tourism in economic transformation. In underdeveloped regions like Sudurpaschim, it is important to comprehend such interactions to create effective and viable tourism policies that are inclusive, infrastructure-driven, and sustainable. Based on the above framework, this study posits the following hypothesis:

H1: The Tourism industry positively influences economic contributions.

H2: The tourism industry positively influences infrastructure development.

H3: The Tourism industry positively influences economic development.

H4: Tourism-induced economic contributions positively influence economic development.

H5: Tourism-induced infrastructure development positively influences economic development.

H6: Tourism-induced economic contributions mediate the relationship between the tourism industry and economic development.

H7: Tourism-induced infrastructure development mediates the relationship between the tourism industry and economic development.

Research Methodology

Research Design

The research methodology employed in this study was a quantitative, cross-sectional survey research design, which is particularly helpful for understanding the relations between other variables at a single point in time and allows for the systematic measurement of the major constructs. Quantitative techniques are beneficial in hypothesis-testing, pattern-detection, and generalization about the results to wider

populations (Levitt et. al, 2018). Also, cross-sectional surveys are economical and time-saving, which makes them applicable in the real world. The cross-sectional survey design that will be adapted to conduct the study is sound both methodologically and strategically.

Study Area

The survey was conducted considering the three districts of Sudurpaschim Province in Nepal, including Doti, Dadeldhura, and Kanchanpur. They were chosen as these districts are gaining popularity among the domestic and regional tourists. The study focused on the stakeholders who are actively involved in the tourism economy, including hotel proprietors, government officials, business operators, and local stakeholders.

Population and Sampling

This research targeted individuals involved in tourism-related activities in the districts of Dadeldhura, Doti, and Kanchanpur, in the state of Sudurpaschim, Nepal. Purposive sampling, as a non-probability approach, was taken to gather informed views of locals, entrepreneurs, and tourists who were involved in tourism in one way or another. This method was considered to provide input from a wide range of stakeholders and allow easy implementation in different regions where a comprehensive sampling frame is unavailable. The number of valid responses collected was 657, which is higher than the minimum sample size needed in a PLS-SEM approach guided by Hair et al. (2021).

Instrument Design and Measures

A structured questionnaire was then developed for the collection of the data, having two parts (demographic information, construct-related information) based on the earlier established validated measurement scales available in the literature. These scales were carefully adjusted so that they will resonate with the local context of Sudurpaschim Province, Nepal, being culturally- and regionally-relevant. The questionnaire was designed based on four major constructs, as part of the research, consisting of: Tourism Industry (TI) with three items; Economic Contribution (EC) with four items; Infrastructure Development (ID) with five items; and Economic Development (ED) with four items, measured on a five point Likert-like Scale as used where respondents could indicate using a scale of 1 (Strongly Disagree) to 5 (Strongly Agree). To ascertain the clarity of language used as well as the consistency, the questionnaire has been made in both English and Nepali.

Procedures of Data Collection

Data was collected within a month using online questionnaires via the KoBoToolbox, a platform that is effective in collecting field data in low-resource settings. The selection of a sample was aimed at delivering ethical and consistent administration of the study by informing all the respondents of the purpose of the study and offering

informed consent. This research was conducted in accordance with ethics, and thus, the consent of the participants was informed and voluntary, and the privacy of the participants was guaranteed.

Data Analysis Technique

The collected data were included in descriptive and inferential statistical processing. To outline the demographic information about the participants and the general trends of their answers, the descriptive statistics were calculated, including frequency distributions and percentages, using SPSS 26. Inferential analysis was conducted using SmartPLS 4.0, the most comprehensive software package of partial least squares structural equation modeling (PLS-SEM).

Results

Respondents' Demographic Profile Analysis

A sample of 657 people involved in tourism-related activities was surveyed in Sudurpaschim Province of Nepal. Demographic characteristics are informative in questions of the background of the participants and are helpful in putting the findings of a study in a context. The gender distribution is shown in Table 3, wherein the majority of the respondents were male (67.6%), followed by females (32%), and a very small number of them (0.5%) identified as others. This implies that the male respondents are more actively involved in tourism and/or more reachable by the sampling approach provided.

The age distribution revealed a concentration of respondents in the 31–40 years category, comprising 36.1% of the sample. This group was followed by those aged 21–30 years (25.3%) and 41–50 years (20.7%), indicating a dominance of economically active individuals likely involved in or benefiting from tourism. Only 6.5% were younger than 20 years, and 11.4% were older than 50 years.

Table 3

Demographic Characteristics of Respondents

Variable	Category	Frequency	Percent (%)
Gender	Male	444	67.6
	Female	210	32
	Others	3	0.5
Age Group	Below 20 Years	43	6.5
	21–30 Years	166	25.3
	31–40 Years	237	36.1
	41–50 Years	136	20.7

	51 and Above	75	11.4
Profession	Hotel Business	347	52.8
	Government Employee	72	11
	Business	146	22.2
	Other	92	14
District	Dadeldhura	244	37.1
	Doti	220	33.5
	Kanchanpur	193	29.4

In terms of professions, business owners (22.2%), government employees (11.0%), and others (14.0%) were included, indicating a diverse mix of engagement with the tourism economy. Regarding the distribution of respondents by district, the sample was relatively well distributed across three key districts, Dadeldhura (37.1%), Doti (33.5%), and Kanchanpur (29.4%), ensuring regional representation within Sudurpaschim Province.

Inferential Statistics

Measurement Model Analysis

The measurement model was evaluated using factor loading, reliability, convergent validity, and multicollinearity of the constructs associated with tourism's impact on economic development. The factor loadings for all observed items exceeded the recommended threshold of 0.70 for the majority of indicators, with values ranging from 0.694 to 0.853. This result suggests that the observed variables effectively represent the underlying latent constructs (Hair et al. 2022).

Figure 2

Measurement Model (Generated from Smart PLS 4)
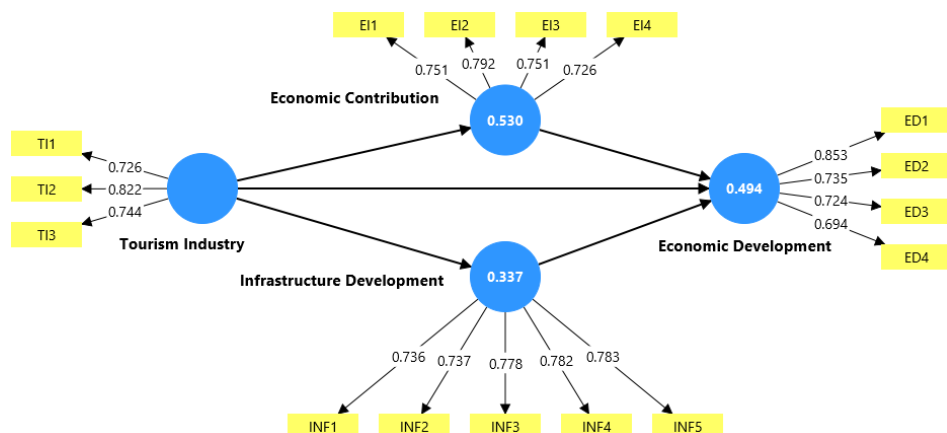
As suggested by Fornell and Larcker (1981), the Average Variance Extracted (AVE) for all constructs surpassed the minimum threshold of 0.50, thereby confirming convergent validity (Hair et al. 2022). The AVE values ranged from 0.568 to 0.586, indicating that more than half of the variance in the indicators was attributed to the respective constructs rather than to measurement errors.

Table 4

Items Loadings, Reliability, Validity, and Multicollinearity

Construct	Items	Factor Loading	Cronbach's (α)	CR	AVE	VIF
Tourism Industry	TI1: Tourism has contributed to the development of my community.	0.726				1.736
	TI2: The number of tourists visiting my area has increased significantly in the past few years.	0.822	0.809	0.812	0.586	1.699
	TI3: Tourism contributed to improving local infrastructure (e.g., roads, hotels, transportation).	0.744				1.893
Economic Contribution	EI1: I believe that tourism has economically benefited my household.	0.751				1.871
	EI2: Tourism has improved the overall economic well-being of our community.	0.792				1.787

				0.842	0.571	
	EI3: The arrival of tourists favors all the economic sectors.	0.751	0.842			1.832
	EI4: Tourism is attracting investments in my area.	0.726				1.909
	INF1: Tourism has improved roads, transport, and communication facilities.	0.736				1.813
	INF2: Tourism has led to better public services (health, sanitation, etc.).	0.737				2.056
Infrastructure Development	INF3: New hotels and tourism services have been developed in the area.	0.778	0.875	0.875	0.583	2.120
	INF4: Government investment in infrastructure has increased due to tourism.	0.782				2.156
	INF5: The government should allocate more funds to the tourism sector.	0.783				1.885
	ED1: The tourism industry is a key driver of economic development in Far West province.	0.853				2.027

Economic Development	ED2: Local economic activities depend on the development of tourism.	0.735		1.674
	ED3: Tourism has positively influenced sectors, such as agriculture and handicrafts.	0.840	0.839	0.568
		0.724		1.709
	ED4: Economic development in this region would decline without tourism.	0.694		2.054

Both Cronbach's Alpha (α) and Composite Reliability (CR) values were within the acceptable ranges. Specifically, Cronbach's Alpha values ranged from 0.809 to 0.875, while CR values fell between 0.809 and 0.875, exceeding the 0.70 benchmark (Hair et al., 2022). These results confirmed the internal consistency of the indicators used to measure the constructs.

Variance Inflation Factor (VIF) values were analyzed to evaluate multicollinearity. All values were well below the critical limit of 5, ranging from 1.674 to 2.156, suggesting no significant multicollinearity. This result confirms that the structural paths remain unaffected by any overlapping explanatory powers among the constructs.

The findings affirm the adequacy and reliability of the measurement model for capturing the essential constructs associated with tourism-led development. The robustness of the model corroborates previous empirical studies that highlight tourism as a transformative agent in regional development, particularly in underdeveloped or rural areas (Sharpley & Telfer, 2023). The model is deemed suitable for advancing structural model analysis, wherein the hypothesized relationships between constructs are examined.

Discriminant Validity Assessment

Discriminant validity refers to the extent to which a construct is truly separate from others, in terms of both concepts and statistics. In this study, the Fornell-Larcker criterion and the Heterotrait-monotrait (HTMT) ratio were employed to evaluate discriminant validity.

Discriminant Validity: Fornell-Larcker Criterion

To assess discriminant validity, the Fornell-Larcker criterion entails comparing the square root of the Average Variance Extracted (AVE) for each construct with the correlations between that construct and all others. The findings, as shown in Table 5, revealed that the square roots of AVE (displayed on the diagonal) were Economic Contribution (0.756), Economic Development (0.754), Infrastructure Development (0.763), and Tourism Industry (0.765). These values are higher than their corresponding inter-construct correlations, indicating that the indicators of each construct share common variance with its indicators more than they do with the other constructs, which suggests adequate discriminant validity as proposed by Fornell and Larcker in 1981 (Sharpley & Telfer, 2023).

Table 5

Discriminant Validity (Fornell-Larcker Criteria)

	Economic Contribution	Economic Development	Infrastructure Development	Tourism Industry
Economic Contribution	**0.756**			
Economic Development	0.625	**0.754**		
Infrastructure Development	0.714	0.656	**0.763**	
Tourism Industry	0.728	0.558	0.581	**0.765**

Discriminant Validity (HTMT RATIO)

Heterotrait-monotrait (HTMT) ratio of correlations is recognized as one of the most promising approaches to assessing discriminant validity in partial least squares structural equation modeling (Henseler et al., 2024). Table 6 confirms the adequate discriminant validity of all the HTMT values with values well below the conservative cut-off of 0.85. The maximum value of the HTMT was found between the constructs of the Tourism Industry and Economic Contribution, with a value of 0.728, indicating an acceptable but strong degree of correlation.

Table 6

Discriminant Validity (HTMT Ratio)

	Economic Contribution	Economic Development	Infrastructure Development	Tourism Industry
Economic Contribution				
Economic Development	0.624			
Infrastructure Development	0.714	0.655		
Tourism Industry	0.728	0.556	0.580	

HTMT values on the construct relationships obtained were within acceptable limits, indicating strong discriminant validity. The measurement model was validated and served as a strong basis to interpret the relationship of the path and mediation effects in the further analysis (Henseler & Schuberth, 2025).

### Structural Model Results: Path Coefficients and Hypothesis Testing

The structural model analysis evaluated the interrelationships among the constructs of the Tourism Industry, Economic Contribution, Infrastructure Development, and Economic Development, focusing on Path coefficients (β), t-values, p-values, and effect sizes (f^2), which offer a comprehensive understanding of these relationships.

Figure 3 and Table 7 demonstrate a significant positive impact of the Tourism Industry on Economic Contribution ($\beta = 0.602$, t = 18.786, $p < 0.001$) with a substantial effect size ($f^2 = 1.129$). This suggests that tourism plays a crucial role in enhancing economic contributions within the studied region. Furthermore, the Tourism Industry also exerts a significant influence on Infrastructure Development ($\beta = 0.490$, t = 11.954, $p < 0.001$) with a moderate to large effect size ($f^2 = 0.509$), indicating that tourism is a key driver of infrastructural improvements.

Structural Model (Path Coefficient and Hypothesis Testing)

Figure 3

Structural Model (Developed from Smart PLS 4)
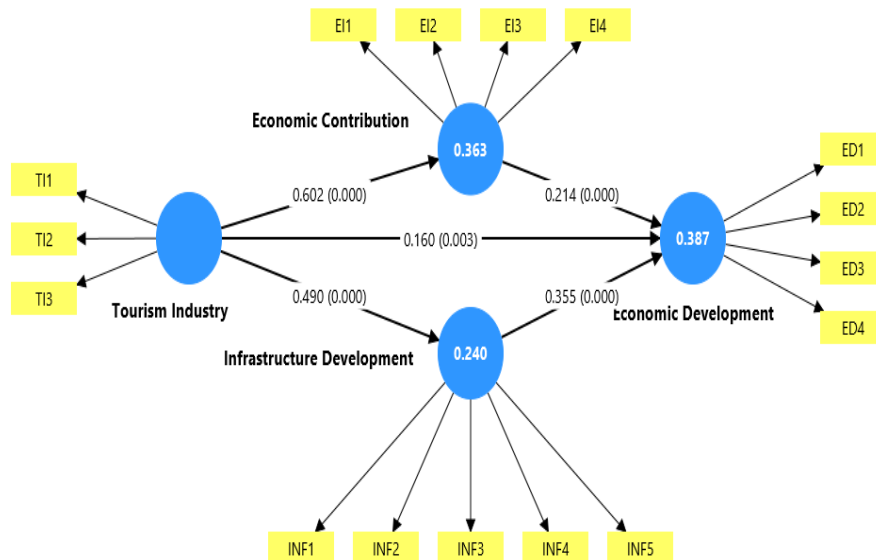
The tourism industry exerts a direct influence on economic development (β = 0.160, t = 3.007, p = 0.003), albeit with a modest effect size (f² = 0.025). This finding suggests the presence of both direct and indirect mechanisms through which tourism facilitates economic progress. Furthermore, economic contribution itself exerts a significant, though comparatively low, positive impact on economic development (β = 0.214, t = 3.863, p < 0.001; f² = 0.031), indicating that economic inputs from tourism and related sectors contribute to overall economic advancement. Furthermore, infrastructure development exerts a positive influence on economic development (β = 0.355, t = 7.036, p < 0.001), demonstrating a moderate effect size (f² = 0.158). This underscores the pivotal role of infrastructure in the promotion of comprehensive economic growth.

Table 7

Structural Model (Path Coefficient and Hypothesis Testing)

Hypothesis	Path	β (Beta)	t-value	p-value	f² Effect Size	Results
H1	Tourism Industry -> Economic Contribution	0.602	18.786	0.000	1.129	Supported
H2	Tourism Industry -> Infrastructure Development	0.490	11.954	0.000	0.509	Supported

H3	Tourism Industry -> Economic Development	0.160	3.007	0.003	0.025	Supported
H4	Economic contribution -> Economic Development	0.214	3.863	0.000	0.031	Supported
H5	Infrastructure Development -> Economic Development	0.355	7.036	0.000	0.158	Supported

These findings collectively affirm the hypothesized relationships and demonstrate the central role of the tourism industry in driving economic and infrastructural development, consistent with recent empirical studies that emphasize tourism's multifaceted impact on regional economies (Li et al., 2023). The hypothesized relationships within the model are statistically substantiated, thereby affirming the structural framework employed in this study.

Analysis of Mediation Effects

The study used a parallel mediation model, focusing on economic contribution and infrastructure development. The presented methodology is informed by both the Tourism-Led Growth Hypothesis (TLGH) and Endogenous Growth Theory, which assert that the economic advantages of tourism are not necessarily direct and mediated through sectoral linkages and infrastructural spill-overs (Tang & Tan, 2022).

It was established that the overall effect of the tourism industry on economic development was statistically significant with a path coefficient of 0.463 (t = 0.523, p = 0.000) and thus confirmed the first working assumption of the Tourism-Led Growth Hypothesis (TLGH), that tourism is a highly valuable driver of regional development. This observation indicates that tourism as a factor has a positive contribution to economic growth in Sudurpaschim Province and therefore justifies the findings of the earlier researchers working in a similar environment (Li et al., 2023). When broken down into particular indirect effects, both of the hypothesized mediating pathways perform in a statistically significant way. The tourism industry, through its contribution to economic development, had shown a coefficient of 0.130 (t = 3.839, p = 0.000). This substantiates H6, which states that the ability of tourism to boost local job creation, entrepreneurship, and business revenue has an indirect positive impact on the development of the overall economy. This observation is in line with the contributions of Lee and Brahmasrene (2022), who emphasize basing the multiplier effect in tourism economics on the direct,

indirect, and induced effects, which occur in tourism within the local economy.

The mediation effect through infrastructure development was notably more substantial, as evidenced by the coefficient of 0.174 (t = 5.800, p = 0.000), thereby corroborating H7. This finding suggests that tourism-driven infrastructure investments, such as enhancements in transportation, energy supply, and hospitality services, serve as catalysts for broader economic transformations. The existing literature posits that infrastructure plays a crucial enabling role in tourism-led growth by improving accessibility and stimulating other sectors (Gao et al. 2023; Rahman & Aziz 2023).

The direct impact of the tourism industry on economic development remains statistically significant at 0.160 (t = 3.007, p = 0.003) even after controlling for both mediators. This finding suggests that, in addition to its indirect pathways, tourism independently influences development, potentially through intangible mechanisms such as enhanced regional visibility, increased investor confidence, and socio-cultural exchange.

Table 8

Parallel Mediation Analysis

Effect type	Relationship Between (Variables)	Path coefficient	T statistics	P value	Remarks
Total effect	Tourism Industry -> Economic Development	0.463	0.523	0.000	Significant
Specific indirect effect for Economic Contribution	Tourism Industry -> Economic Contribution -> Economic Development	0.130	3.839	0.000	Significant
Specific indirect effect for Infrastructure Development	Tourism Industry -> Infrastructure Development -> Economic Development	0.174	5.800	0.000	Significant
Direct Effect	Tourism Industry -> Economic Development	0.160	3.007	0.003	Significant
VAF = Indirect Effect/Total effect	Tourism Industry -> Economic Contribution -> Economic Development	28.077%	Partial Mediation (VAF 20%-80%)		

VAF = Indirect Effect/Total effect	Tourism Industry -> Infrastructure Development -> Economic Development	37.58%	Partial Mediation (VAF 20%-80%)

Variance Accounted For (VAF) was computed to assess the degree of mediation. The VAF for the economic contribution pathway was 28.08%, while for the infrastructure development pathway, it was 37.58%. Both values fall within the 20–80% range, indicating partial mediation (Hair et al., 2022). This suggests that although economic contribution and infrastructure development are significant mediators, they do not fully elucidate the tourism-development relationship, thereby indicating the presence of other potential mediating factors such as human capital development, policy frameworks, or technological spillovers.

The results provide significant theoretical evidence in support of the inclusion of mediators in the economic-tourism models. In line with Endogenous Growth Theory, which states that incremental intrinsic factors are critical to long-term growth, this paper has shown that tourism can be used to facilitate such internal advancements. It, therefore, confirms that whereas the role of tourism in development may largely be exogenous, it is endogenously supplemented by regional capacities and investments.

Predictive Power of the Model

The coefficient of determination (R^2) is an essential measure for evaluating how well a structural model explains the data. This reflects the percentage of variation in the dependent variables accounted for by the independent variables in the model. This research focuses on three dependent constructs: Economic Contribution, Infrastructure Development, and Economic Development.

Table 9

Coefficient of Determination (R^2)

Endogenous constructs	R-square	R-square adjusted
Economic Contribution	0.530	0.530
Economic Development	0.494	0.491
Infrastructure Development	0.337	0.336

According to Table 9, the R^2 value for Economic Contribution (0.530) indicates that the tourism industry explains 53% of the variance in tourism-induced economic contribution. For Infrastructure Development, the R^2 value is 0.337, indicating that 33.7% of the variance in infrastructure development is attributable to the tourism industry, with a moderate value. These findings are corroborated by recent studies (Rahman & Aziz, 2023), which emphasize that tourism demand incentivizes both governmental and private entities to invest in complex infrastructure (e.g., roads and electricity) as well as soft

infrastructure (e.g., digital connectivity and services).

The R² value for Economic Development, the primary dependent variable, was 0.494, indicating that 49.4% of the variation in economic development was collectively explained by the Tourism Industry, Economic Contribution, and Infrastructure Development with significant explanatory power. It affirms that tourism contributes not only directly to development but also indirectly through enabling factors such as infrastructure and economic factors.

Overall, these R² values indicate a moderate to substantial level of predictive accuracy, consistent with the standards proposed by Hair et al. (2022), suggesting that an R² value exceeding 0.50 is considered significant within the social sciences, particularly in complex, real-world models.

Model Fit Analysis

According to the analysis of the model fit, the Standardized Root Mean Square Residual (SRMR) is 0.075 of the estimated model, which suggests the value is below the standard cut-off of < 0.08 (Henseler et al., 2015). The fact that this was the average difference between the observed and the predicted correlations indicates that the model gave a close approximation to the empirical results and thus fitted very well.

Table 10

Model Fit Evaluation

Model Fit Index	Saturated Model	Estimated Model	Threshold
SRMR	0.026	0.075	< 0.08
d_ULS	0.095	0.761	As low as possible
d_G	0.061	0.094	As low as possible
Chi-square	208.509	307.087	—
NFI	0.961	0.942	> 0.90

In addition, both the saturated model (0.961) and estimated model (0.942) Normed Fit Index (NFI) results were above the recommended cut-off of 0.90, which demonstrates a good fit (Hair et al., 2022). The significant values of NFI support the assumption that the suggested model may be of great use compared to the null model, indicating its suitability. Other parsimony fit indices like d ULS (0.761) and d G (0.095) also fall within the acceptable ranges. Unlike CBT scores, these indices have no stringent cut-points, even though lower scores are desirable. The present findings indicate a slight difference between empirical and model-implied information (Hair et al., 2022). The value of chi-square, 307.087, differs from that of the saturated model (208.509), as expected. But, as chi-square is prone to distortion due to sample size, scholars must use other measures of the model fit, including SRMR and NFI, to assess the results (Stone, 2021).

The model exhibited satisfactory empirical validity, justifying its application in

subsequent hypothesis testing and interpretation. These results are consistent with the criteria established in recent structural equation modeling literature, highlighting the model's goodness-of-fit and structural integrity (Hair et al., 2022).

Discussion and Implications

The research aim of this study is to examine the impact of the tourism industry on economic development, with the mediating role of economic contribution and infrastructure in Sudurpaschim Province in Nepal. Based on a multidimensional theoretical framework incorporating confirmatory factor analysis, hypothesis testing, and mediation modeling, the findings of the study have both theoretical and practical implications for tourism-based regional development.

The measurement model findings indicate that there is convincing evidence of the reliability and validity of the constructs. All the factor loadings were above the recommended score of 0.70 (Hair et al., 2022), and the constructs had desirable composite reliability (CR > 0.7) and average variance extracted (AVE > 0.5), which confirmed the convergent validity. This freedom from multicollinearity, which is demonstrated by VIF values less than 3.0, confirms the strength of the model further (Sarstedt et al., 2022). Moreover, it was observed that the discriminant validity (with Fornell-Larcker criteria as well as HTMT ratios) supported the fact that the constructs represent different aspects of tourism development.

The all path relationships were statistically significant and consistent with existing literature. The tourism industry exerts a positive influence on both economic contribution ($\beta = 0.602$, $p < 0.001$) and infrastructure development ($\beta = 0.490$, $p < 0.001$), corroborating the assertion that tourism can catalyze broader economic growth (Gössling and Hall, 2022). Furthermore, both economic contribution ($\beta = 0.214$, $p < 0.001$) and infrastructure development ($\beta = 0.355$, $p < 0.001$) significantly impact overall economic development, highlighting the indirect mechanisms by which tourism facilitates structural transformation.

Parallel mediation analyses provided further insights into these dynamics. Although the direct relationship between the tourism industry and economic development is not statistically significant, the total effect is entirely mediated by economic and infrastructural contributions. The variance accounted for (VAF) results (28.077% for economic contribution and 37.58% for infrastructure) confirm partial yet balanced mediation, reflecting similar structural relationships identified in South Asian tourism economies (Paudel & Kunwar, 2024).

The model fit indices further corroborated a satisfactory fit (SRMR = 0.026; NFI = 0.961), thereby affirming the efficacy of the structural model in accurately representing real-world tourism development dynamics. These statistical validations are augmented

by demographic analysis, which indicates that tourism in Sudurpaschim is predominantly supported by economically active, educated individuals, mainly men aged 31–40 years, who are engaged in the hospitality or business sectors. This demographic profile aligns with the patterns of tourism entrepreneurship observed in Nepal and other Global contexts (Baniya et. al 2022). Additionally, diversity in visitor motivations, with a substantial proportion citing cultural and natural attractions, underscores a region's potential to expand ecotourism and heritage-based offerings.

Theoretical Implications

This study contributes to the existing literature by empirically validating the multifaceted role of tourism in regional development. Mediation findings enhance the understanding of tourism's influence, which is exerted not directly but through economic and infrastructure channels, a nuance often overlooked in linear growth models (Inchausti-Sintes, 2020). In addition, the parallel mediation model offers a refined framework for future research examining the multidimensional impacts of tourism.

Practical Implications

Policymakers and regional planners should prioritize the enhancement of infrastructure and facilitation of local entrepreneurship to optimize the economic advantages of tourism. Investments in roads, sanitation, and public services not only enhance tourist satisfaction but also improve residents' quality of life, highlighted in the UN Sustainable Development Goals (UNWTO, 2023).

Furthermore, the findings suggest that destination managers should implement data-driven segmentation strategies aimed at age groups and nationalities that demonstrate the highest levels of engagement. Considering the substantial presence of domestic and Indian tourists, fostering bilateral partnerships and regional co-operation may enhance visitor experiences and facilitate the co-development of infrastructure (Thapa & Pandey, 2023).

Conclusion, Limitations, and Future Scope of the Study

This study investigates the effect of the tourism industry on economic development in Sudurpaschim Province, Nepal, by examining its association with economic contributions and infrastructure development. Employing structural equation modeling and utilizing a sample of 657 participants involved in tourism, the findings indicate that the tourism industry indirectly fosters economic development through both economic and infrastructural channels.

The analysis confirmed that tourism significantly enhanced economic contribution ($\beta = 0.602$) and infrastructure development ($\beta = 0.489$), both of which substantially promoted economic development ($\beta = 0.291$ and $\beta = 0.386$, respectively). The direct relationship between tourism and economic development was statistically significant.

However, the parallel mediation model verified partial mediation, with tourism's influence entirely transmitted through its impact on economic and infrastructure improvements. This finding is consistent with previous studies that asserted that tourism functions as a foundational economic catalyst when integrated into supportive systems (Gössling & Hall, 2022; Poudel et al., 2023).

Limitations and Future Scope of the Study

Although this study employs a robust methodology and offers valuable insights, it has certain limitations.

First, this study's reliance on cross-sectional data constrains its capacity to infer long-term causal relationships. Longitudinal studies and qualitative methodologies, such as interviews or focus groups, can yield nuanced insights into the lived experiences of stakeholders, thereby providing a richer contextual understanding.

Second, the study was geographically limited to three districts within the Sudurpaschim Province. While this focus is valuable for informing localized policy, broadening the scope of the study to include additional provinces would facilitate a more comprehensive understanding of how diverse local contexts influence the relationship between tourism and development.

Finally, although perceptions of economic and infrastructure development were assessed as mediators, future research should integrate environmental sustainability and socio-cultural factors as mediators.

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