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DETERMINANTS OF INTERNATIONAL TOURISM DEMAND IN INDIA: AN AUGMENTED GRAVITY MODEL APPROACH

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Abstract: This study examines the determinants of international tourism demand in India using time series data from 1991-2019 from the top 15 source tourist countries. To do this, the study employed an augmented gravity model estimated using a two-step panel fixed-effect model to identify the factors affecting tourism demand in India. These factors include the income of both India and its origin countries. The domestic exchange rate of both India and the source country is included to capture the impact of the cost of living and prices of goods and services. Supporting variables like distance, common border, and common language between India and source of origin country were also identified. Further, it includes the impact of similarity and common membership to SAARC. Empirical results indicate that the level of Indian income, language, and similarity have a positive impact on tourism inflow to India. On the other hand distance and the domestic exchange rate of India have negative impacts. Further, the income level of origin countries has a significant positive impact. Also, common membership to SAARC and the common border between India and the origin country have a significant positive impact on tourism demand in India. Furthermore, international demand for Indian tourism is not affected by the relative price in the origin country.

Keywords: Tourism; India, gravity model, GDP; SAARC; distance.

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1. Introduction

Before the COVID-19 pandemic, the tourism industry contributes US$ 9.2 trillion of global GDP comprising 10.4%, and with international tourism, visitors spending to US$ 1.7 trillion in 2019 contributed 6.8% of total world exports or 27.4% of world total service exports. It provides 334 million jobs comprising 10.6% of total employment through direct, indirect, and induced impacts (World Travel and Tourism Council, 2021), Tourism boosts the economic growth of the host country through the creation of infrastructure (Liasidou, 2012; Becker & George, 2011), development of new attractions (Getz, 2008; Waitt, 2001), human capital, increased competition (Blake et al., 2006), and therefore an important source of investment. It is a significant source for foreign exchange earnings, increasing government tax revenue (Mihalic, 2002), It also generates positive externality (Andriotis, 2002; Balassa, 1978), and finally, as income increases, one can assume that growth of GDP may lead to further increase in tourism inflow (Brida JG et al., 2016),

The other indirect benefits of tourism for destination countries are that it develops socio-economic conditions and improves their value system by enhancing people's quality of life and lifestyle (Hall & Page, 1999), It increases the racial and cultural tolerance of people (Goossens, 2000), People learn to know and understand each other while moving across the globe, developing international understanding and improving world peace (D'Amore, 2010), It also brings happiness to the host country due to increased per capita income, reduced poverty, and increased demand for local products (Mishra et al., 2016), Given the various socio-economic benefits of tourism inflow to the host country, present papers attempt to find various determinants of the tourism demand of India.

India is a sovereign country centrally located between East and West Asia. The Indian Ocean provides connectivity to European countries and East Asia. It is blessed with 5 lakh plus heritage sites and monuments; 30 out of 38 cultural sites are declared under World Heritage Sites by UNESCO; and about 3,691 monuments are declared monuments of national importance by the Archaeological Survey of India (Niti Aayog, 2019), Besides these, India has a suitable climate, a growing tourism infrastructure, and the hospitality nature of people. Various tourism products like medical, sports, Bollywood, ecotourism, cultural tourism and religious tourism play an important role in tourism inflow to India.

The number of foreign tourist receipts in India was 10.56 million in 2018, and it increased to 10.93 million in 2019. The growth rate of tourism was 3.5% during 2019 as compared to 5.29% in 2018. The share of India was 1.23% of the entire world's total foreign tourist receipts and 4.9% in the Asia Pacific Region, with a

rank of 7th during 2019 (Ministry of Tourism, 2021), Foreign tourism receipts contributed US$ 191.3 billion, comprising 6.9% of GDP, and provides 8.8% of total employment during 2019 (World Travel and Tourism Council, 2021), Foreign exchange earnings from foreign tourism inflow were US$ 28.59 billion in 2018 and increased to US$ 30.06 billion in 2019 and therefore a growth rate of 5.1%. The top 15 sources for foreign tourism receipts in 2019 were Bangladesh (23.58%), followed by the USA (13.83%), UK (9.15%), Australia (3.35%), Canada (3.21%), China (3.11%), Malaysia (3.06%), Sri Lanka (3.02%), Germany (2.42%), Russia (2.29%), France (2.26%), Japan(2.18%), Singapore (1.73%), Thailand (1.55%), and Nepal (1.51%), as given below Figure I. These countries accounted for about 76.3% of total foreign receipts in 2019 (Ministry of Tourism, 2021),

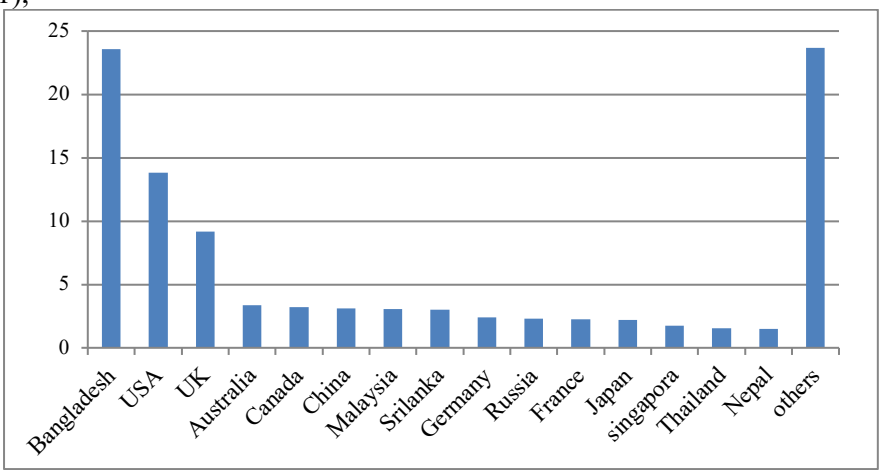

Figure 1 Top 15 source countries for tourism inflow to India during 2019
Source: Ministry of Tourism, 2021

Destination country needs to determine the factors for specific policy interventions that help effective tourism management (Papp and Raffay, 2011), Various determinants of India's tourism demand should be identified and measured for tourism strategy. Therefore, attention should be given to identifying the factors that influence the tourist inflow. To the authors' best knowledge, no attempt has been made to investigate India's determinants of tourism demand. Therefore, the present paper attempts to fill the gap in the existing literature. In the present study, the application of the gravity model is used to determine the factors that impact foreign tourist receipts in India. The paper highlights the importance of economic size, distance, exchange rate, and dummies like SAARC membership, common language, common border, etc., in determining the tourism demand of India while taking the

sample of the top 15 sources/destination countries. The results of the present study may be helpful for policy-makers and professionals in decision-making to enhance tourism inflow in India.

The structure of the paper is as; first part presents the introduction about the importance of tourism in the country's economic development. Also, it provides the present scenario of India's international tourism inflow data and the importance of the theme for policymaking. The second part deals with the literature review of various previous empirical research papers related to the theme of the paper. The third part of the paper discusses the gravity model as an approach for determinants of tourism inflow. It presents the variables for the augmented gravity model and their importance. The fourth part of the paper presents the data sources for variables of the augmented gravity model approach. Also, it gives the sample of study and descriptive statistics of variables used. The fifth part deals with the empirical results of an augmented gravity model. Lastly paper presents the conclusion. The conclusion summarises the findings and explains the various policy implication based on empirical results.

2. Literature Review

The gravity model as an approach of determinants of tourism demand has re-emerged to tourism demand when the role of structural variables on tourism has to be estimated (Morley et al., 2014), Several authors have applied the gravity model to determine the international flow of trade, investment, and people (Visar, 2020), Various authors have used the gravity model to examine the determinants of tourism. One of these is Garin and Amaral (2000) that applied the gravity model while measuring the impact of various factors of tourism inflow in Spain from 17 countries during 1985-1995. The authors found a significant impact of real GDP per capita, prices, and real exchange rate on tourist inflow in Spain. However, it is negatively affected by the Gulf war. Saray and Karagoz (2010) applied the gravity model for tourist flow in Turkey and the significant impact of economic size, distance, and population on tourist inflow of Turkey.

Hanafiah et al., (2010) examined the tourism inflow demand function of Malaysia during 1997-2008 from Asian countries. The authors found a significant impact of income, distance, bilateral trade, population, and tourism prices on the tourism demand of Malaysia. Habibi and Abbasinejad (2011) in their study on tourist demand of Malaysia from 19 European countries from 1998-2007 found a significant impact on income, political stability, habitat persistence, and accommodation capacity. Another study conducted by Othman et al., (2018) to examine tourism demand in Malaysia from Muslim countries using cross-sectional data of the year 2012, found a positive impact of GDP and population while the negative impact of distance on tourist demand function.

Ibrahim (2011) examined the determinants of tourism demand of Egypt from some countries during 1990-2008. The authors found a significant positive impact on income and a significant negative impact on the cost of living for tourists in Egypt, real exchange rate, and real prices. By employing the double log gravity model, Deluna and Jeon (2014) found income, distance, relative prices, market size, prices of goods and services, and cost of living in the Philippines as an important determinant for tourism demand of the Philippines. Further, Chasapopoulas et al., (2014) conducted foreign tourism demand of Greece from 2001-2010 and found trade between Greece and destination countries as a significant factor for determining tourism demand.

Alawin and Abu-lila (2016) examined the determinants of tourism demand of Jordan from 22 countries using annual times series 200-2014. The authors found a significant positive impact on the level of Jordanian development, infrastructure, and language. Cost of living, distance, uncertainty and the exchange rate has a significant negative impact on tourist inflow to Jordan. A study conducted by Mariyono (2017) for Indonesia during 2002-2011, found a significant positive impact of GDP origin and GDP destination country while distance harms tourism demand. Also, the authors found a positive impact of population on tourism demand. Further, Wardani and Handayani (2019) conducted a study on determinants of foreign tourism demand to Indonesia from eight countries during 2009-2016. Authors found GDP per capita of both Indonesia and origin country positively impacts the tourist demand while distancing and appreciation of domestic exchange rate impacts negatively.

3. A Gravity Model Approach of Tourism Inflow

The gravity model was originally proposed by Newton's gravitational law. Its application is widely used in economics and other social sciences to explain the trade flow, capital flow, and migration between countries. It illustrates the flow of goods, capital, and people between countries as a function of origin characteristics, destination characteristics, and various other measurements. Tinbergen (1962) initially used the application of the gravity model to explain the international trade flow. Sheldon and Var (1985) applied the gravity model to predict international tourism flow between countries. The basic assumption of the gravity model is that tourism inflow is positively related to the GDP of countries and inversely related to the distance between them. The basic equation of gravity model of tourism inflow in panel data can be expressed as:

$$TI_{ij,t} = A\frac{GDP_{i,t}GDP_{j,t}}{Dis_{ij,t}} \quad (1)$$

For estimation/econometric purpose, equation (1) is formed to a linear equation with the application of logarithm as:

$$\log(TI_{ij,t}) = \alpha_0 + \alpha_1 \log GDP_{i,t} + \alpha_2 \log GDP_{j,t} - \alpha_3 \log Dis_{ij,t} + \mu_i \quad (2)$$

Where TI_{ij} is international tourism inflow from country j to country; α_0, is the intercept; GDP_i is the gross domestic product of receiving country; GDP_j is the gross domestic product of origin country; Dis_{ij} is the distance between two countries; and μ_i, is the error term of the model; t is the number of years. However, tourism inflow is a multivariable problem. It depends on various pull and push (or supply and demand) factors. We, therefore, augment the basic gravity model of tourism inflow by various factors as given in the equation:

$$\log(TI_{ij}) = \beta_0 + \beta_1 \log GDP_i + \beta_2 \log GDP_j - \beta_3 \log Dis_{ij} + \beta_4 \log(Exc_{it}) + \beta_5 \log(Exc_{jt}) + D_1(Lang_{ij}) + D_2(Smct_{ij}) + D_4(SAARC_{ij}) + D_5(Contig_{ij}) + \varepsilon_i \quad (3)$$

Where Exc_i is the exchange rate of country i(Destination country); Exc_j is the exchange rate of j (origin country); $Lang_{ij}$, is the dummy variable of a common language. Its value is 1 if countries are having the same languages and 0, otherwise. Further, $Smct_{ij}$ is the dummy variable of common similarity. Its value is 1, if $i = j$ and 0, otherwise. $SAARC_{ij}$, is the dummy variable of SAARC members. Its value is 1 if countries belong SAARC regional agreement, and 0, otherwise. $Contig_{ij}$ is the dummy variable of the common border. Its value is 1 if countries have a common border with India and 0, otherwise. Other variables are the same as explained in equation (1).

The elasticity coefficient of tourism inflow for GDPs of the origin and destiny countries is expected to be positive. Distance between the two countries has a negative impact on tourism inflow. The exchange rate of the origin country is expected to have a positive impact: an appreciation of the origin country's currency reduces tourism costs while an appreciation of destiny country increases the costs of tourism. Therefore, the exchange rate of the destination country is expected to have a negative impact. Language is important for tourism and therefore is expected to have a positive impact. The regional agreement, SAARC, is expected to have a positive effect on tourism inflow. Dummy variables of the common border and historical colonial relationship are also expected to have a positive sign.

4. Data and Data Sources

The present study analyzed the tourism inflow to India from topmost 15 countries from 1991 to 2019. The samples countries are given in Table 1. Variables used in the present study are the following equation (2) of the augmented gravity model. The dependent variable is tourism inflow from these 15 countries. Researchers use various proxies to describe the tourism demand of a country, like a tourist expenditure, tourism inflows, or tourism nights in the destination country (Deluna &

Jeon, 2014; Ouerfelli, 2008), Due to the data constraints, the present study uses tourism inflow as a measure of tourism demand. The data of tourism inflow are obtained from India's Ministry of Tourism website (https://tourism.gov.in/market-research-and-statistics), GDP is calculated at constant 2010 prices to avoid inflation and measured in US$ for international comparison. The data of GDP is obtained from World Bank development indicators (https://data.worldbank.org/), There are various indicators of the exchange rate. The present paper uses the exchange rate, national currency/USD. Data of exchange rate is obtained from Penn World (https://febpwt.webhosting.rug.nl), Dummy variable SAARC is constructed after calculating the official members of SAARC (https://www.saarc-sec.org/), The data of other gravity dummy variables are accessed from database CEPII (http://www.cepii.fr/), The descriptive statistics of variables are given in Table 2.

Table 1 Sample countries

Bangladesh	USA	UK	Australia	Canada
China	Malaysia	Sri Lanka	Germany	Russia
France	Japan	Singapore	Thailand	Nepal

Source: Authors calculation

Table 2 Summary statistics

Variables	Mean	Std.	Dev.	Min
$\log(TI_{ijt})$	5.28	.409	4.14	6.411
$\log(GDP_{it})$	12.21	.157	11.96	12.46
$\log(GDP_{jt})$	11.89	.819	10.05	13.26
$log(Dis_{ij})$	3.71	.239	3.15	4.07
$\log(Exc_{it})$	1.71	.075	1.61	1.84
$\log(Exc_{jt})$	.823	.871	-.301	2.25
$Lang_{ij}$	.333	.472	0	1
Smct	.066	.249	0	1
SAARC	.2	.401	0	1
Contig	.133	.341	0	1

Source: Authors calculation

5. Empirical Results

Gravity models traditionally use cross-sectional data for a one-time period or averaged data. However, panel data models might provide more insights while capturing relationships between variables over time and capturing unobservable individual effects between the countries (Deluna & Jeon, 2014), Therefore present study uses a panel of 15 countries over time from 1991 to 2019 comprising 256 observations. There are three approaches to studying panel data in econometrics.

These are pooled ordinary least square (OLS), fixed effect model (FEM), and random effect model (REM), Pooled OLS model assumes no country-specific and time effect. The random effect model is based on the assumption that country effects are uncorrelated with regressors. The fixed-effect model controls the correlation between explanatory variables. To decide which panel model is suitable for the present study, the Hausman test is used to choose an efficient model. Hausman test has a null hypothesis that random model is appropriate (i.e, no correlation between the individual effects) and an alternative hypothesis that fixed effect model is appropriate (Elite, 2008),

In the case fixed-effect model, time-invariant variables like distance and other dummies of the present paper cannot be estimated directly as transformation wipes out these variables in the fixed-effect model. These time-invariant variables can be estimated by using the second step regression equation. First, we regress the fixed effect model with time-variant variables and save individual effects of the fixed model. In the second step, we run individual effects as a function of time-invariant variables of distance and dummies (Zarzoso & Lehmann, 2003),

Before estimating the regression model of the paper, first, we examine the panel unit root test to examine the univariate characteristics of time-variant variables. This test helps to determine the appropriate model for equation (3) and helps to avoid the problem of spurious regression coefficients. If all time-variant variables are stationarily then the static panel models like OLS, fixed effect, and random effect models can be used to estimate the equation. If variables are non-stationarily then we will perform a panel co-integration test.

The paper uses panel unit root tests of Im, Pesaran, and Shina (IPS) and Levin, Lin, and Chu (LLC) to examine the stationarity of time-variant variables of equation (3), LLC method assumes coefficients are identical across all cross-sections while IPS allows heterogeneity across cross-sections. The null hypothesis of both methods is that variables have unit roots against the null hypothesis variables are stationary. The results of the stationarity of variables are presented in Table 3. LLC test confirms that all time-variant variables are stationarily at level, while the IPS test all variables are stationary except $\log(GDP_{jt})$ and $\log(Exc_{it})$. But one test rejects the null hypothesis of unit root, we can conclude variables are stationary. Therefore, we can estimate equation (3) by static panel models.

The estimation results of equation (3) are presented in Table 4. Hausman's test rejects the null hypothesis that there is no correlation between individual effects as shown in Table 4. Therefore, the fixed-effect model is most appropriate for the present study.

Table 3 Panel Unit Root test

Variables	LLC test	IPS test
$\log(TI_{ijt})$	-11.389***	-5.812***

$\log(GDP_{it})$	-3.964***	-5.145***
$\log(GDP_{jt})$	-1.966**	1.632
$\log(Exc_{it})$	-2.817***	1.691
$\log(Exc_{jt})$	-49.305***	-28.547***

** p<0.05, *** p<0.01
Source: Authors calculation using STATA 16

Table 4 Regression equation estimation

Variables	OLS	Random effect	Fixed effect
$\log(GDP_{it})$	1.508*** (.113)	1.408*** (.079)	1.291*** (.087)
$\log(GDP_{jt})$	.422*** (.021)	.646*** (.072)	.853*** (.098)
$\log(Exc_{it})$	-.803*** (.234)	-.853*** (.141)	-.832*** (.138)
$\log(Exc_{jt})$	-.126*** (.017)	-.014 (.027)	-.009 (.028)
$log(Dis_{ij})$	-.431*** (.084)	-.782** (.401)	
$Lang_{ij}$	.298*** (.031)	.465*** (.135)	
$Smct_{ij}$	.749*** (.061)	.683** (.308)	
$SAARC_{ij}$	.768 *** (.045)	.951*** (.194)	
$Contig_{ij}$	-.481*** (.044)	-.664*** (.213)	
Constant	-15.33*** (1.093)	-15.53*** (1.55)	-19.21 (.793)***
F-statiscts	181.95***	1724.41***	438.08***
Adj R-sq:	0.851	0.861	0.859
Hausman test			25.82***
Modified Wald test Heteroskedasticity			4272.88
Wooldridge test			10.543
Observation	285	285	285

1. Standarad errors in parentheses. 2. ** p<0.05, *** p<0.01
Source: Authors calculation using STATA 16

All the variables in all three models have almost the same expected sign but coefficients vary across different models. Based on the results of the Hausman test, the interpretation of coefficients will be based on a fixed effect. In a fixed-effect

model, the coefficients and signs of distance and other dummy variables are examined by taking a two-step regression model. In first we run regression as a function of time-variant variables and save the fixed effect. In the second step, we run a regression equation in which fixed effect is a function of distance and other dummy variables through OLS as:

$$FE_{ij} = f(c, logDis_{ij}, Lang_{ij}, Smct_{ij}, SAARC_{ij}, Contig_{ij})$$

Where FE_{ij} represents the fixed effects, c is the constant, and other symbols are discussed earlier. The results of the second step regression equation are shown in Table 5.

Table 5 Second step regression equation estimation

$log(Dis_{ij})$	-1.15*** (.115)
$Lang_{ij}$	.539*** (.041)
$Smct_{ij}$	.609*** (.094)
$SAARC_{ij}$	1.21 *** (.051)
$Contig_{ij}$	-.846*** (.062)
Constant	3.93*** (.432)
F-statistics	400.22***
Adj-Rsq	0.874
Observation	285

1. Standard errors in parentheses. 2. ** p<0.05, *** p<0.01
Source: Authors calculation using STATA 16

The results of the fixed effect model show a significant impact of GDP of India, GDP of origin country, and the exchange rate of India on foreign tourism demand of India. However, the exchange rate of the origin country is insignificant. The impact of these variables on the foreign tourism demand of India as an increase in the GDP of India by 1% will increase foreign tourist inflow to India by 1.29%. An increase in the GDP of the origin country by 1% will increase the number of foreign tourists to India by 0.85%. the positive impact of GDP of origin and destination country is also empirically validated by Kosnam and Ismail (2012); Hanafiah and Harun (2010); and Karagoz (2008), An increase in the exchange rate of India by 1% will reduce the foreign tourist inflow to India by 0.83%. It implies that the relatively high price of goods and services, cost of living, and tourism packages in India have a negative

impact on attracting tourists. The negative impact of the exchange rate on tourist inflow is also empirically supported by (Deluna & Jeon, 2014),

On the other hand, the impact of time-invariant variables can be explained in Table 5. From the second step regression equation of the fixed-effect model, the distance and dummy variable of common language, symmetry, SAARC, and the common border have almost expected signs and are significant at 1% level. Distance reduces the tourism inflow while SAARC membership increases the tourism inflow to India. This implies that Indian tourism is affected by geographical location and depends on tourists from countries near India, particularly from SAARC countries. Further common language, common symmetry increases the tourism inflow to India. However, the common border between countries reduces the tourism flow to India. It may be due to border conflicts between countries.

Based on the value of adjusted R-square, the results of the fixed-effect model indicate that 85% of the variation in the independent variable is explained by explanatory variables. The result of the F-statistics test shows that the coefficients on the regressors of the model are all jointly significant, which implies that the augmented gravity model of the present study is significant in determining factors of international tourism receipts of India. Also, the Wooldridge test for autocorrelation confirms no autocorrelation in the model. Further, the Modified Wald test of heteroskedasticity confirms no heteroskedasticity in the model. The post estimation suggests that the model is good and fit for policy implications.

6. Conclusion and Policy Implication

The tourism sector in India has great attention in policy analysis and economic planning due to its contribution to creating employment opportunities, increasing GDP, increasing tax revenue, source of foreign exchange earnings, and improving the standard of living for individuals and society. However, tourism sectors face fluctuations because of many reasons which affect the importance of the tourism sector for economic development in India. To determine the factors that affect the process of foreign tourist inflow to India, the present paper uses annual series from 1991-2019 for 15 top source origin countries. The augmented gravity model is applied to examine the determinants of foreign tourism demand to India and examine the sign of these variables.

The findings of the paper can be summarized as: GDP of India and GDP of origin country have significant and positive impact on tourism inflow to India. This implies that the level of development and infrastructure in India plays an important role in considering India as a tourist destination. At the same time, the higher the GDP of the origin country, the greater the tourism demands to India. The higher GDP of the origin country reflects the larger tourism market and higher purchasing power. It also reflects the higher ability of tourists to travel for vacation and other purposes. The

domestic exchange rate of India has a significant negative impact on tourism demand. This implies when the exchange rate of India increases, tourism costs will increase, then tourism inflow to India decreases and vice versa. Distance reduces the tourism inflow while SAARC membership increases the tourism inflow to India. This implies larger the distance of the country, the lesser the foreign tourist arrivals to India, because of high transportation costs. This implies that Indian tourism is affected by geographical location and depends on tourists from countries near India, particularly from SAARC countries. Further common language, common symmetry increases the tourism inflow to India. However, the common border between countries reduces the tourism flow to India. It may be due to border conflicts between countries.

Based on the empirical results, we can provide some policy recommendations for the Indian government as the first government should expand investment in tourism infrastructure. Second, the government should promote tourism concerns in SAARC countries and should expand tourism advertising to the rest of the world. Third, the government should expand direct international airlines routes to countries that have high potential demand for Indian tourism. Fourth, the government of India should stabilize the domestic exchange rate and price level as a factor that hinders international tourism inflow to India. Lastly, the government should inclusion of various languages in the tourism-related syllabus. The present paper is restricted tourism inflow as a measure of the international tourism of India. Further, research should include other types of international tourism like the tourism nights or tourism expenditure spent by travelers, etc.

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Author Contributions

This study is the independent work of the three authors, from the conception of the topic to the literature review, data collection, and analysis. The authors equally participated in the making of this paper.

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