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## Article

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# Is tourism expansion the key to economic growth in India? An aggregate-level time series analysis

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## ABSTRACT

The paper aims to probe the tourism-economic growth nexus in the case of India. The paper incorporates a more structural view of sector-specific macroeconomic variables like central government expenditure on tourism (CGET), investment in the tourism industry (IOT), foreign tourist arrivals, and foreign tourist visits as explanatory parameters. Johansen's cointegration and error correction model results support the long-run relationship among the variables. All the independent variables are unidirectional causal on GDP except investment in tourism, which shows long-run bidirectional causality. Thus, the long-run unidirectional tourism-led growth hypothesis is supported. The empirical implications support government and private sector-based resource allocation towards tourism expansion, thereby escalating the country's economic growth.

## 1. Introduction

### 1.1. Background

In recent years, the tourism sector has been considered one of the most promising, dynamic, and intensively growing areas on the international and national stage and in the local or regional domain. Therefore, much attention and policy-making processes are being initiated to reap the optimum benefits of tourism economically and socially. Tourism is gaining importance in recent research, especially among less developed economies, due to the tourism-led economic growth hypothesis (TLEG) and tourism-based export-led growth hypothesis (ELG). According to the TLEG hypothesis, tourism-derived development stimulates economic growth, and therefore, an ample number of resources should be allocated to the tourism industry relative to other sectors. An enormous level of investment in the tourism industry is required to induce economic growth because it not only increases the income of the current workforce but also creates new job opportunities for those willing to work within the tourism and related industries. In other words, as tourism expansion takes place, it leads to overall aggregate economic growth. The words and implications of this hypothesis set the fundamental framework for this study.

Initially, researchers started to explore the economic impact of tourism on international trade instead of economic growth (Shan & Wilson, 2001; Durberry, 2004). The research work by Shan & Wilson

(2001) can be considered one of the first steps in investigating the possible relationship between international trade and tourism in China based on time series data. Results supported a bidirectional causality nexus between international trade and tourism. Durberry (2004) conducted a similar causality test for Mauritius's output growth and tourism-based services exports. The results supported a unidirectional Granger causality between the variables of interest. However, Balaguer & Cantavella-Jorda (2002) were the first to publish a paper that theoretically and empirically validated the tourism-led growth hypothesis, thus shifting focus away from the export-led growth hypothesis. The relationship exists in the short run, sometimes in the long run, and sometimes both. Sometimes, the causality also follows bidirectional and sometimes unidirectional (Khoshnevis & Khanalizadeh, 2016; Ohlan, 2017; Badulescu, Badulescu, Simut, & Dzitac, 2020; Manzoor, Wei, Asif, Haq, & Rehman, 2019) causal nexus between tourism and the growth of the economy. Jimenez and Pulina (2009) carried out a time series analysis for Italy and Spain together from 1954 to 2000 1964 to 2000, respectively, where Spain showed bidirectional while Italy only supported long-run unidirectional relationship moving from international tourism to output growth.

Shreds of evidence from the literature also support some contrary views, supporting no association between economic growth and tourism (Ozturk & Acaravci, 2009; Tang & Jang, 2009). Oh (2005) explored the causal time series-based relationship between tourism growth and the Korean economy. VAR-based estimation confirms no causation from

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tourism to economic development; however, one-way causality exists from economic output to the tourism sector. [Katirciaglu \(2009\)](#) has researched Turkey to examine the impact of international tourism on real GNP and exchange rates. Standard ARDL method with bounds testing approach and Johansen integration were carried out. The trace test statistics showed statistical insignificance and thus no long-run cointegration between real GDP, exchange rates, and international tourists' arrival. [Jackman and Lorde \(2010\)](#) tried a unique approach to dig at the relationship between tourism and the economic growth of Barbados via domestic consumption using the dynamic ordinary least squares method (DOLS) with Granger causality. Variables chosen were real GDP per capita, GDP deflator indicating household expenditure, consumer price index, tourist arrivals, and minimum deposit rate. Only income and prices impact domestic consumption, and tourism has no impact. Thus, tourism cannot influence domestic people's growth patterns and income.

### 1.2. Theoretical pieces of evidence in past literature and work

The initial theoretical supporters were [Eadington and Redman \(1991\)](#), who considered tourism as the source of revenues for a country. They classified the economic benefits into direct(primary) and indirect (secondary) effects. The direct benefits are the rise in income of people directly involved in the tourism sector and the job opportunities generated for them. In contrast, benefits generated through the sale of goods, raw materials, and services related to tourism and associated industries (hotels, transport, catering) form part of the indirect effects. Other traditional economists who have supported the role of tourism in their work are [McKinnon \(1964\)](#), [Balassa \(1978\)](#), and [Sinclair \(1998\)](#). [McKinnon \(1964\)](#) considered tourism as a source of foreign exchange earnings that can be used to purchase or import capital goods and thus boost production and economic growth. International tourism(inbound) is insinuated as a type of non-standard export item in economics. In his new growth theory, it can be inferred that [Balassa \(1978\)](#) supported tourism as a source of economic growth. His theory explains that exports can contribute to economic growth by increasing the efficiency of factors of production in allocation and raising the level of investment.

However, [Sinclair \(1998\)](#) has tried to stretch forth the tourism sector's contribution to the economy by restricting the benefits received and the costs incurred in terms of negative economic impacts. Tourism increases personal income, job opportunities, tax revenue provisions for the government, and thus the overall gross national product. Nevertheless, it may also lead to forced land acquisition for tourism-related construction activities, cause depletion of natural resources, and influence local people's consumption habits, leading to demonstration effects and thus creating inflationary pressures. [Mason \(2003\)](#), in his book, clearly mentioned both sides of tourism impact, which, according to him, may be positive(beneficial) and negative(detrimental). The researchers value position and judgment and decide which impact he or she wants to consider and assess.

### 1.3. Justification and articulation for the variables used in the study

Researchers are also advancing their time series analysis work on tourism and growth nexus by incorporating many other macroeconomic variables into their research work ([Shahbaz, Kumar, Ivanov, & Loganathan, 2015](#); [Ohlan, 2017](#); [Tang & Tan, 2015](#); [Li, Mahmood, Abdullah, & Chuan, 2013](#); [Georgantopoulos, 2013](#)). [Shahbaz et al. \(2015\)](#) have tested the nexus between tourism and Malaysia's economic growth while incorporating trade and financial development as additional variables. Results supported bidirectional causality between tourism and output per capita, financial development and tourism, and trade and tourism. [Tang and Tan \(2015\)](#) also tried to reinvestigate the nexus and role of the tourism sector in the Malaysian economy using the VECM model. Variables chosen were per capita real GNP and real tourist receipts per capita, political stability, actual gross national savings,

population growth, growth of technical progress, and depreciation rate. Tourism granger causes the economy's growth both in the long and short run.

[Brida and Risso \(2009\)](#) shared a similar framework for Chile, where the relationship between the two variables is considered with the real exchange rate. Results supported the tourism-led growth hypothesis (TLGH) and tourism granger causes real exchange rate. [Li et al. \(2013\)](#) enhanced the pace of research level by finding the possible Granger triangular causality between tourism receipts, economic growth, and certain selected macroeconomic variables like government tourism expenditure ([Khan, Bibi, Lorenzo, Lyu, & Babar, 2020](#); [Rout, Mishra, & Pradhan, 2016](#)), education, health, and exports. The results showed bidirectional causality between the various variables (tourism receipts, economic growth, and health). However, the outcomes depicted unidirectional causality towards economic growth for variables such as government tourism-based expenditure, exports, and education. [Kumar et al. \(2019\)](#) has used the ARDL procedure for Fiji to test tourist arrivals, per capita income, and capital investments—unidirectional causality observed from economic growth to tourism. Additionally, the mutual causal impact between capital investment and tourism is noted.

Theoretical models such as Solow swan growth models, Romer model, and other classical economic growth theories usually combine macroeconomic variables such as capital, labor, and technological progress and tourism as variables in TLEG (tourism-led economic growth) studies ([Ahmad, Menegerki, & Muharrami, 2020](#)). However, tourism is a sectoral flow variable that reflects a small part of the economy. Mixing either stock or economywide variables will lead to incongruity in the economic modeling ([Song & Wu, 2021](#)). Therefore, government expenditure and investment in this study are tourism-specific and thus belong to the same system of variables and represent a more realistic model ([Stiglitz, 2002](#)). Although the role of government expenditure is always essential, especially in the case of developing countries, it has yet to be explored empirically for the tourism sector ([Li et al., 2013](#)). Since the government allocates a limited amount of expenditure on tourism, it becomes crucial to analyze its efficiency and return. The variables, such as tourism expenditure by tourists, are standard, but tourism expenditure by the government is rare. Similarly, the investment in tourism is less used for time series due to its data unavailability, and its more usage is seen in panel data-based regional research. According to [WTTC \(2020\)](#), the direct contribution of tourism is the value added in terms of income, while indirect contributions can be measured by tourism capital investment and government collective spending on tourism, which justifies the selection criteria of the variables in this study.

TLEG-based research has used tourist arrival, expenditures, receipts, and visits as the most commonly used tourism parameters. [Osinubi and Osinubi \(2020\)](#) have focused on inclusive growth while finding the possible causal linkages between tourism and the inclusive growth of the Nigerian economy. Indicators of tourism chosen are tourist arrivals, foreign tourist receipts, tourism-based expenditures, and a tourism activity index. The tourism-led growth hypothesis is supported only with tourist receipts and tourism activity index as indicators. Thus, the validity of the tourism-led growth nexus also depends on the indicator chosen. Two of these commonly used tourism demand parameters, foreign tourists' arrivals and foreign tourists' visits (used by the government in India), have been taken for this study.

When it comes to choosing the indicator of economic growth as a dependent variable, some of the studies do not directly use GDP growth rate or real output growth as a parameter of economic growth but rather choose some other variables like output per capita, per capita real GNP, GDP deflator, domestic consumption as the determinants of economic growth ([Aktar, Sadekin, & Saha, 2014](#); [Jackman & Lorde, 2010](#); [Osinubi and Osinubi \(2020\)](#)).

1.4. Tourism in India-Current scenario and the importance of this research

“Athiti Devo Bhava” is the one-line ancient philosophy of Indian culture reflecting the importance of tourism. The line in Sanskrit means guest is like our God. In present times, the contribution of Tourism as per the various data shows that tourism is scaling up the government’s hopes in terms of growth and development, which is why, in recent years, various initiatives have been taken up by the government in this direction. Campaigns like “Incredible India,” an e-tourist visa facility with multiple entries and reduced visa fees, “Swadesh Darshan,” “PRASHAD,” and “India Tourism Mart” have emphasized strengthening and expanding the tourism sector. As per the [WTTC report \(2020\)](#), India has been ranked in the 10th position for the contribution of its travel tourism sector towards GDP. The contribution has been 6.8% of the total GDP, approximately US\$194.30 billion. Additionally, for 2018–2028, the total contribution to GDP will be around 7.1% annually. The World Travel and Tourism Index based on natural and cultural resources ranked India at 34th. India’s second and third tourism satellite accounts (TSAs) have given more authentic figures, with tourism contribution to aggregate GDP as 6.8% and 5.2%, respectively. This contribution includes both direct as well as indirect shares. From 2015 onwards, the Indian government has been more conscious of its tourism-based marketing and flexible policy initiatives ([Sujith & Jisha, 2017](#)).

[Georgantopoulos \(2013\)](#) applied the VAR model with error correction term to explore the role of tourism expenditure in India on real GDP and the real effective exchange rate (REER) during 1988–2011. The results support bidirectional causality in the long but not the short run. [Rout et al. \(2016\)](#) tried to analyze tourism’s socio-economic impact and economic growth using a non-stationary time series between 1990 and 2015. The estimates of the Fully Modified Least Square (FMOLS) model support the long-run positive and significant impact of the tourism sector on macroeconomic growth. [Ohlan \(2017\)](#) has given a similar attempt concerning India by giving relative significance to financial development. Inbound tourism will boost India’s economic growth not only in the short but also in the long run. [Sharma \(2018\)](#), in their most recent work on India, attempted to find the causal relationship between tourism receipts and the GDP from 1991 to 2017. Results support tourism-led growth, but the converse is different.

However, evidence in support of no long-run relationship is also available in the Indian context, as claimed by [Ghosh \(2011\)](#), who used a multivariate framework of variables that includes real GDP, tourist arrivals in India, and exchange rate in real terms from 1980 to 2006. Supporting his results, ([Sujith and Jisha, 2017](#); [Prakash, Kumar, & Gautam, 2020](#); [Tang and Tan, 2015](#)) concluded, based on their multivariate regression approach, that there is no significant impact of foreign tourist arrival on India’s GDP in the long run. However, foreign exchange earnings do have a significant effect on GDP.

Literature on empirical evidence, including that of India, must be more varied regarding region, period, and tourism parameters. Most countries support TLEG-based hypotheses, but in a few contexts, tourism also proved ineffective in causality analysis supporting neutrality in the hypothesis. No research showed a negative relationship, thus making it essential to note that tourism does not deteriorate the economic growth of a nation. Therefore, this study fills the existing loopholes in the literature and receives more recent, more exhaustive insights about the tourism-led growth hypothesis (TLG).

At the macro level, nations look forward to international tourists and the impact of their arrival on economic growth. Therefore, this research focuses on inbound tourism, testing the tourism-led growth hypothesis and finding the causal impact of tourism-related macroeconomic variables. The study aimed to investigate the tourism-growth nexus in India with the following testable hypothesis:

H<sub>01</sub>: There is no relationship between the tourism sector and economic growth in the Indian context.

H<sub>02</sub>: Government tourism expenditure has no impact on India’s

economic growth.

H<sub>03</sub>: Tourism capital investment has no impact on India’s economic growth.

The rest of the paper has been divided into the following parts: Section 2 covers the framework of the methodology, the data used, and its sources in the analysis. Section 3 covers the empirical tabulation and interpretation of the results. Section 4 follows the discussion section with concluding remarks, limitations and future scope.

2. Data and econometric methodology

2.1. Data and its sources

GDP represents economic growth at constant prices with base year 2011–2012. The tourism sector is represented by annual foreign tourist arrivals in India (in millions) and annual foreign tourist visits. The two additional countrywide macroeconomic variables, namely central government revenue expenditure on the tourism sector and investment in tourism by industries(aggregate), are chosen. Keeping the data available and the latest relevance, the study’s duration is from 1991 to 2019.

The various sources of the variables mentioned above are tabulated as follows: (refer [Table 1](#)).

2.2. Methodology

In their review paper [Lee, Song, & Mjelde \(2008\)](#) discussed time series models used in tourism-based demand forecasting analysis since 2000. Initially, integrated autoregressive moving-average models (ARIMAs) were used. However, due to instability in their performance, they were replaced with better alternative approaches like the Autoregressive distributed lag (ARDL) model, error correction model (ECM), vector autoregressive model (VAR), and Time-varying parameter (TVP), which are well noticeable in the present trends of time series ([Song & Wu, 2021](#)). The methodology of the Vector Error Correction Model (VECM) and Granger Causality have been used in the paper.

2.2.1. Vector error correction model and long-run causality

Vector error correction modeling is a multivariate time series regression employed in this research analysis to find information on long-run relationships/models and details regarding the adjustment parameters. The VEC-based cointegrating equation restricts the endogenous variable such that the equation converges in the long run while incorporating the short-run dynamic model adjustments, done with the cointegrating term’s help. This term is called error correction term (ECT) ([Binh, 2013](#)). Considering the case for two variables in general, the VECM gives the following form of the first cointegrating equation based on the first difference terms:

Table 1  
Variables and their Sources.

Variables Database/ Ministry/ Institute Documents referred		
GDP (gross domestic product)	Central Statistics Office, Ministry of Statistics and Programme Implementation	National Accounts Statistics Reports
Central Government Revenue Expenditure	Ministry Of Finance	Union Budget: Expenditure Budget and Expenditure Profile
Foreign Tourist Visits	Ministry of Tourism	India Tourism Statistics Annual Report
Foreign Tourists Arrivals	Ministry of Tourism	India Tourism Statistics Reports
Investment in the tourism industry	Database of Centre for Monitoring Indian Economy Pvt. Ltd. (CMIE)	Prowess Database (Aggregated from Company Wise Data)

$$\Delta y_t = \sigma + \sum_{i=1}^{k-1} \gamma_i \Delta y_{t-i} + \sum_{j=1}^{k-1} \eta_j \Delta X_{t-j} + \lambda ECT_{t-1} + u_t \tag{1}$$

In the above model, at the right-hand side, the error correction term will be zero in the equilibrium state, while if there are deviations away from the long-run stable state, then the term will be non-zero and reflect short-run adjustments. The  $\lambda$  represents the coefficient of error correction from calculating the speed of adjustment in endogenous variables towards their long-run equilibrium. The VECM model gives error correction term (ECT) of the following form:

$$ECT_{t-1} = Y_{t-1} - \eta_j X_{t-1} - \mathcal{E}_m R_{t-1} + C \tag{2}$$

This error correction term tells us how the deviation of the last period (the error) from the long-run model influences the dependent variable's dynamics in the short run.

The VECM successfully distinguishes between the long-run causality based on the t-ratios of the error correction term and the short-run Granger causality based on Wald tests. The t-ratios of the error correction term help determine the long-run causality running from the explanatory variable to the dependent variable. In the case of cointegration, the causality can be tested in the long and short run using Granger causality (Shrestha & Bhatta, 2018).

### 2.2.2. Granger Causality tests

Granger (1969) developed the procedure to statistically test the cause-and-effect relationship between the variables. Causality in the forecasting sense can be explained as If  $Y_t$  is the Granger causing  $X_t$ ; it means that the future values of  $X_t$  can be predicted well with accuracy by the past values of the trends in  $Y_t$ .

The Granger causality procedure follows the estimation of VAR with two stationary series assuming, say,  $\Delta Y_t$  and  $\Delta X_t$ , which are integrated of order 1 in the following form:

$$\Delta Y_t = A_1 + \sum_{j=1}^p C_j \Delta Y_{t-j} + \sum_{j=1}^p D_j \Delta X_{t-j} + u_{1t} \tag{3}$$

$$\Delta X_t = A_2 + \sum_{j=1}^p E_j \Delta Y_{t-j} + \sum_{j=1}^p F_j \Delta X_{t-j} + u_{2t} \tag{4}$$

After estimating the VAR, the significant values of coefficients are checked, and variable deletion tests are applied on the lagged X terms in eq. (3) and then in the lagged Y terms of eq. (4). The null hypothesis in eq. (3) will be  $H_0: D_j = 0$ , which implies  $\Delta X$  does not greater cause  $\Delta Y$ . For eq. (4), the null hypothesis follows  $H_0: E_j = 0$ , which implies  $\Delta Y$  does not Granger cause  $\Delta X$ . The acceptance and rejection of the hypothesis will be based on the chi-square( $\chi^2$ ) statistics since this is a based model and not VAR, which otherwise uses F statistics. Here, if the null is rejected, it implies short-run causality.

## 3. Results and discussion

### 3.1. Unit root test for stationarity

In order to formulate an econometric model, the properties of the

series are being tested by checking the stationarity of the data series. The stability of the series for all the variables is tested using the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests, where the intercept and time trends are checked on their level and first difference forms. The variables have been taken in their logarithmic form.

Table 2 and Table 3 summarize the results of the ADF and PP unit root tests. All the log values of the variables, namely central government expenditure on Tourism (CGET), foreign tourist arrivals (FTA), foreign tourist visits (FTV), investments in the tourism industry (IOT), and gross domestic product (GDP) have their  $p$  values more than 0.05. Also, the t-statistic values are more significant than the critical values; therefore, all of them are non-stationary at levels with intercept and no trend and with intercept form. When the ADF and PP test is applied to the first difference of these variables, the calculated values of their respective statistics become much lower with  $p$ -values lesser than the value of 0.05, which implies that the null hypothesis of unit root is not accepted. Thus, it can be concluded that under the ADF and PP unit root tests, the series of all the variables become stationary after their first differencing.

### 3.2. Cointegration test

After verifying the first order of cointegration of all the multivariate time series, Johansen and Juselius's technique is applied to find the long-run relationship between parameters representing the tourism sector and economic growth. This test also gives the number of possible cointegrating relations( $r$ ) between the variables.

The first null hypothesis is represented as 'None' ( $r = 0$ ), implying no stationarity in the relationship between the variables, i.e., no cointegration between the variables. At  $r = 0$ , the Trace statistic gives a value of 80.685 with the corresponding  $p$ -value of 0.005(less than 0.05), implying that the null hypothesis is not accepted and a long-run relationship exists between the chosen variables. At  $r = 0$ , the Maximum Eigen statistic with a value of 33.946 is more than the critical value of 33.870. The  $p$ -value Of 0.051 also shows statistical significance in rejecting the null of no cointegration at the 5% significance level. Thus, the presence of cointegration implies that there is an existence of at least one long-run relationship between economic growth and the tourism sector over which the selected variables will converge over a while (refer Table 4).

Since the model is naturally autoregressive and includes the lagged values of the endogenous variables, it is susceptible to appropriate lag length selection. Therefore, to wipe out the possibility of specification errors like autocorrelation in the error terms, the optimal lag length has been chosen based on the AIC (Akaike's information criterion), SC (Schwarz information criterion), LR statistics and HQ (Hannan-Quinn information criterion). All the criteria show their minimum values for the original data-based VAR Model at two lags. However, since this study proceeds with the VECM, the multivariate lag order one is recommended.

### 3.3. VECM and long run relationship

Since the variables are cointegrated, the process proceeds with the use of the vector error correction model (VECM), which will use the first

**Table 2**  
Results of ADF unit root tests.

Variable	Intercept				Trend and Intercept			
	Level		First Difference		Level		First Difference	
	t-stat	p-value	t-stat	p-value	t-stat	p-value	t-stat	p-value
Log (CGET)	-0.625	0.849	-4.062	0.004	-3.277	0.009	-3.927	0.025
Log (FTA)	0.075	0.957	-3.030	0.045	-2.301	0.419	-2.819	0.203
Log (FTV)	-0.249	0.921	-3.988	0.005	-2.492	0.328	-3.915	0.025
Log (IOT)	-3.165	0.033	-3.033	0.044	-0.889	0.943	-4.296	0.011
Log (GDP)	-0.037	0.947	-4.746	0.008	-1.823	0.666	-4.648	0.005

**Table 3**  
Results of PP unit root tests.

Variable	Intercept				Trend and Intercept			
	Level		First Difference		Level		First Difference	
	t-stat	p-value	t-stat	p-value	t-stat	p-value	t-stat	p-value
Log (CGET)	-0.472	0.883	-4.016	0.005	-2.123	0.511	-3.876	0.027
Log (FTA)	-0.033	0.947	-3.967	0.005	-2.814	0.204	-3.876	0.032
Log (FTV)	-0.249	0.921	-3.975	0.005	-2.088	0.529	-3.900	0.026
Log (IOT)	-8.803	0.000	-3.109	0.037	0.306	0.997	-4.318	0.011
Log (GDP)	-0.041	0.946	-4.743	0.001	-1.993	0.579	-4.646	0.005

**Table 4**  
Johansen cointegration test results.

Unrestricted Cointegration rank test (Trace)				
Hypothesized No. of CE (s)	Eigen value	Trace Statistics	Critical Value	Prob.
None*	0.715	80.685	69.818	0.005
At most 1	0.504	46.737	47.856	0.063
At most 2	0.476	27.784	29.797	0.084
At most 3	0.249	10.322	15.495	0.256
At most 4	0.091	2.569	3.841	0.108

  

Unrestricted Cointegration rank test (Maximum Eigenvalue)				
Hypothesized No. of CE(s)	Eigen value	Maximum Eigen statistic	Critical Value	Prob.
None*	0.072	33.946	33.870	0.051
At most 1	0.504	18.953	27.584	0.418
At most 2	0.476	17.462	21.132	0.151
At most 3	0.249	7.753	14.265	0.404
At most 4	0.090	2.569	3.841	0.108

Trace and Max. Eigen test indicates 1 cointegrating eqn(s) at the 0.05 level.  
\* Denotes rejection of the hypothesis at the 0.05 level.

differenced form of variables to find the long-run behavior while considering all the variables of the series as endogenous. The first differenced eq. (1), when applied to the selected variables of this model, can be rewritten as:

$$\Delta \log(GDP)_t = \beta_{01} + \sum_{i=1}^p \beta_{11} \Delta \log(GDP)_{t-i} + \sum_{i=1}^p \beta_{21} \Delta \log(CGET)_{t-i} + \sum_{i=1}^p \beta_{31} \Delta \log(IOTH)_{t-i} + \sum_{i=1}^p \beta_{41} \Delta \log(FTA)_{t-i} + \sum_{i=1}^p \beta_{51} \Delta \log(FTV)_{t-i} + \lambda ECT_{t-1} + u_t \quad (5)$$

After applying the normalization to the cointegrating vector, EViews identifies the following relationship.

3.3.1. Long run equation of the model

$$\log(GDP)_{t-1} = 97.724 + 8.457 \log(CGET)_{t-1} + 6.632 \log(FTV)_{t-1} + 2.538 \log(IOT)_{t-1} + 2.445 \log(FTA)_{t-1}. \quad (6)$$

The above equation represents the normalized form of the equation on the GDP, which is the dependent variable. The t-statistics of the explanatory variables from Table 5 show that central government expenditure on tourism (CGET), foreign tourist arrival (FTA), and investment in the tourism industry (IOT) affect the gross domestic product (GDP) significantly at a 1% level. In contrast, the variable foreign tourist visit (FTV) as a parameter of the tourism sector turns out to be insignificant in this model. The variables are interpreted in elasticity terms and gives the following set of essential conclusions from the long-run equation normalized on GDP as follows:

**Table 5**  
Johansen cointegration estimated long-run and short-run coefficients.

Regressors	Coefficients	Standard error	t-statistics
Long run estimates of Normalized equation			
Log CGET(-1)	-8.457	2.402	-3.521
Log FTV(-1)	-6.632	8.932	-0.742
Log IOT(-1)	-2.538	0.743	-3.413
Log FTA(-1)	-2.445	11.036	-2.486
Short run estimates of VECM equation			
	Coefficients	P -value	t-statistics
ECT term	-0.008	0.096	-1.745
Δ(log GDP(-1))	-0.395	0.117	-1.638
Δ(log CGET(-1))	0.115	0.096	1.743
Δ(log FTV(-1))	0.279	0.236	1.214
Δ(log IOT(-1))	0.043	0.349	0.957
Δ(log FTA (-1))	0.205	0.518	0.657

- Foreign tourist arrivals, tourism expenditure by the government, and investment in tourism industries are positively affecting the GDP of India in the long run.
- An increment of one percentage in the tourism expenditure by the central government (CGET) will bring about a rise in GDP by 8.457% in the long run.
- A percentage increase in investment in the tourism industry (IOT) will lead to a 2.538% increase in the GDP in the long run.
- If foreign tourist arrivals increases by a percentage, it will lead to a rise of 2.445% in the country's GDP in the long run.
- The predicted long-run relationship graphically seems relatively stationary in the period of analysis (Fig. 1). Some major downward adverse shocks were observed around 2003-04 and 2011-12, with recovery after that.



Fig. 1. The graphical representation of the long-run cointegrated relationship/ model.

About Table 5, some other significant results can be derived and explained as follows:

The coefficient of error correction term (ECT) is  $-0.008$ , which clearly shows a negative sign within the value range of  $-1$  and  $0$  and is significant at a 10% level of significance with the t-ratio value of  $-1.745$  ( $> |1.645|$ ). This figure represents the speed of adjustment at which the long-run disequilibrium will be corrected through a series of partial adjustments, and the correction rate will be 0.80%. The significance of this figure is also indicative of the long-run causality relationship.

The short-run coefficients based on the VECM equation gives significant value only for the variable tourism expenditure by the government. Thus, there is no short-run relationship between international tourism and economic growth. The variable 'central government tourism expenditure' is significant in the short run but only very slightly, and that too at 10%, as it holds a  $p$ -value of 0.096, which is just lower than the 0.10 level. Thus, the short-run model is only helpful for empirical implications that a 1% percentage change in CGET, i.e., central government expenditure on tourism will increase the GDP by 0.11.

### 3.4. Long run and short Granger causality test

According to Granger, if at least one cointegrating relationship exists between the variables, then one unidirectional causation exists. Therefore, it seems imperative to proceed with causality testing to determine the direction of possible causal linkages. The  $\chi^2$  test statistics give the short-run causality. In contrast, the  $t$ -test of the ECT (error correction term) gives the long-run causality, whereby if the values of  $t$ -ratios are significant, it implies the causality from the explanatory variables to the dependent variable.

Short-run causality- It is evident from the  $p$ -values of  $\chi^2$  statistics based on Granger causality/ Block Exogeneity Wald tests that there is no causal impact from any tourism parameters to GDP in the short run. Thus, no short-run tourism-led growth hypothesis exists in the case of India. However, additionally, there seems to exist short a causal impact from Foreign Tourist visits (FTV) and Foreign Tourist arrival (FTA) towards the (IOT) Investment in the Tourism Industry as their respective  $p$ -values of 0.040 and 0.023 are lower than the 5% significant level. It implies a unidirectional short-run causality between Foreign Tourist arrival to Investment in Tourism and foreign tourist visits to investment in tourism. This implies that the tourism sector has a causal impact on investment in the tourism industry, but vice-versa does not exist (refer Table 6).

Long-run Causality- In the VECM-based causality, the  $t$ -values of the error correction terms represent long-run causality. The  $t$  ratio value of  $-1.745$  is statistically significant at the 10% level in Table 6, and this

**Table 6**  
Causality test results.

Dependent Variables	Independent Variables					ECT <sub>t-1</sub>
	$\chi^2$ statistics of lagged first differenced term ( $p$ -value)					Coefficient [t-ratio]
	$\Delta \log$ (GDP)	$\Delta \log$ (CGET)	$\Delta \log$ (FTV)	$\Delta \log$ (IOT)	$\Delta \log$ (FTA)	
$\Delta \log$ (GDP)	–	3.039 (0.081)	1.476 (0.224)	0.917 (0.338)	0.4314 (0.511)	–0.008 [–1.745]*
$\Delta \log$ (CGET)	0.3579 (0.549)	–	0.133 (0.716)	0.792 (0.313)	0.011 (0.915)	0.023 [1.279]
$\Delta \log$ (FTV)	0.522 (0.469)	1.174 (0.278)	–	0.249 (0.617)	0.427 (0.513)	0.004 [0.585]
$\Delta \log$ (IOT)	0.205 (0.651)	0.615 (0.433)	4.200 (0.040)	–	5.207 (0.023)	0.047 [2.818]**
$\Delta \log$ (FTA)	0.015 (0.902)	1.520 (0.218)	0.321 (0.571)	0.138 (0.709)	–	–0.005 [–0.995]

**Notes:** \*,\*\*,\*\*\* denote rejection of the null hypothesis at the 10,5 and 1% significance levels; values in [] and () are the  $t$ -statistics and  $p$ -value, respectively.

implies long-run causality from exogenous variables to dependent variable GDP. Therefore, the long-run causal relationship runs from CGET, FTV, IOT, and FTA towards GDP. Another significant figure is 2.81, which is positive and significant at the 1% level, implying a long-run solid causal impact from GDP, CGET, FTV, and FTA towards IOT. Summarizing and extricating out some valuable results in tabulated form as follows: (refer Table 7)

All the independent variables representative of the tourism sector, including those of international tourism, show the unidirectional causal impact on economic growth in the long run. Conclusively, it implies that the growth hypothesis is also valid for India in the long run based on causality.

## 4. Conclusion, implications and policy recommendations

The research envisions a long-run relationship and causal impact between the tourism sector-based parameters and India's economic growth. The existence of possible tourism-growth nexus has been explored by incorporating the efforts of both the government and private sector towards uplifting and boosting the tourism sector. For this, cointegration-based testing has been applied to determine the possibility of long-run stable relationships among the selected variables. Foreign tourist arrivals and visits have represented direct tourism impact. In contrast, the central government expenditure on tourism (CGET) and investment in the tourism industry (IOT) by private players act as indirect macroeconomic parameters measuring the economic vigour of tourism in India.

The research digs deeper into whether tourism can act as a promising economic growth sector for India over a long period and whether the government should keep spending on the tourism sector with hopes for better benefits and outcomes. Research on this topic in the Indian context gives vague and mixed results regarding the relationship and causality between the tourism sector and focused macroeconomic variables. It means it leads to ambiguity not only in policy-making but also in allocating budget towards tourism promotion. Sometimes, tourism leads to economic growth, but when such models are tested for causality, it has been observed that the vice-versa may also be true. Therefore, interdependence is what this research work has been seeking throughout.

### 4.1. Empirical implications

All the independent variables related to the tourism sector significantly impact India's economic growth. Therefore, this research confirms the unidirectional tourism-led economic growth hypothesis for India in the long run but not in the short run (Sharma, 2018; Rout et al., 2016; Ohlan, 2017) based on cointegration and causality. This result contradicts Prakash, Kumar, and Gautam (2018) and Geor-gantopoulous (2013) for India. There needs to be directional causality from economic growth towards international tourism in both the short and long run. Economic growth does not necessarily imply a rise in international tourism in India. Another noticeable finding is related to Government expenditure on tourism, which shows a stable relationship in the short and long run.

The most significant of all the variables is the investment in the tourism industry based on causality results. Tourism and GDP

**Table 7**  
Summary of long run VECM based causality and short-run Granger causality.

Long run Causality	Short run Causality
CGET, FTV, IOT, FTA→GDP	FTV→IOT
GDP, CGET, FTV, FTA→IOT	FTA→IOT
IOT and GDP shows bidirectional long run causality i.e., IOT GDP	Tourism sector shows unidirectional Granger Causality towards Investment on tourism industry.

investments have shown bidirectional causality in the long run (Kumar et al., 2019). Therefore, it shows that the investment related to the tourism sector generates an investment multiplier effect and accelerator effect. This unidirectional causality is also valid in the short run, where foreign tourist arrivals and visits show more significant causality towards investment in the tourism industry. Thus, as international tourism expands, it will boost investment in the domestic economy.

Therefore, the results of this research successfully bring new insights about the side playing the heroic role in India: Investments in tourism by private industries based on causality results and Government expenditure on tourism based on long-run model results. Both the parameters are more significant over foreign tourist arrivals and visits.

#### 4.2. Policy and managerial implications

A significant dilemma that policymakers face is how much expenditure should be ascribed towards tourism by the government, whether private tourism activity-based industries should be supported, and, if yes, to what extent and how. One of the essential recommendations concerns private businesses' investment in the tourism industry. Investment in the tourism industry should be supported by providing tax benefits, subsidies, and incentives. Also, a portion of government expenditure allocated to the tourism sector will always reap positive outcomes in the long term and even in the short run. Thus, a decent amount of budget share for tourism and its related activities should be an essential part of the government's strategy. Not only this, the strategies related to tourism development should have both public and private intercession. Foreign investment with liberal policies in tourism-related industries should be encouraged as well.

The study must incorporate variables like exports, exchange rate, foreign exchange earnings, human capital, foreign direct investment, and other tourism activities-based data (transportation, number of hotels and restaurants), which holds an accountable position in the tourism impact-based literature. One limitation mentioned in the literature review is that tourism-based variables are not viewed separately from demand or supply side perspectives. Since the analysis is a time series, it needs help handling the structural changes over the period. It has focused on a high degree of aggregation that may cause loss of information and irregularities on seasonal trends. Future scope for other researchers lies in covering up these limitations and focusing on broader definitions of growth, such as inclusive growth and regional development. Tourism-related parameters' Total productivity should be identified to see continuous growth at countrywide and regional levels. The impact of tourism on regional growth and specific activities should be analysed.

#### CRedit authorship contribution statement

**Deepti Singh:** Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Resources, Software, Validation, Visualization, Writing – original draft, Writing – review & editing. **Qamar Alam:** Methodology, Project administration, Supervision, Validation, Writing – review & editing.

#### Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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