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Infrastructural Determinants of Tourism in India

Suraj V Ayyappan*, Santhosh Kumar P K† and Jerlin Jose‡

Abstract

This paper investigates the significance of infrastructure as a factor in destination development. The classical demand for international tourism function is extended to include a proxy for infrastructure. An application involving India is presented whereby total tourist arrivals as well as arrivals from Europe/America, Asia and Africa are modeled. The findings show that tourists are sensitive to the infrastructure of India, particularly those from Europe/America and Asia. Tourism infrastructure, income of tourists, distance, and relative prices are important ingredients in their own respect in the tourism demand equation.

Keywords: India, Tourism, Infrastructure, Tourism, OLS

Introduction

Travel and Tourism is the activity done outside one's usual environment with a maximum duration of one year. It is one of the largest industries in India today and continues to grow. The economic contribution of travel and tourism is such that it not only makes a direct impact on the economy, but may affect it in indirect and induced manners as well. Some of the direct effects known are

* Student, Department of Economics, Christ University, Bangalore, India; soorajvenugopal94@gmail.com
† Assistant Professor, Department of Economics, Christ University, Bangalore, India; santhosh.kumar@christuniversity.in
‡ Assistant Professor, Department of Professional Studies, Christ University, Bangalore, India ; jerlin.jose@christuniversity.in

in terms of the growth in commodities, such as accommodation, transportation, attractions and entertainment. This direct contribution may also be referred to as the "internal spending." Travel and Tourism has linkages with a number of other industries, namely accommodation services, food and beverage services, retail trade, transportation services, and cultural / recreational services. The expenditure sources, to name a few, are the residents' domestic tourism spending, businesses' domestic travel spending, visitor exports, and the government tourism spending on culturally significant structures, such as museums, parks and so on. Travel and tourism investments by the public and firms, collective government investments, and the growth in revenue for suppliers from purchases may be some of the indirect contributions. Investments may be made in new aircrafts, roads, or in the construction of new hotels and resorts. Induced contribution refers to the changes that arise for the final consumer or in other words, it is the spending of direct and indirect employees. These may include food and beverages, recreation, housing, clothing, and household goods.

Infrastructure is no less crucial for Indian tourism and has improved over the years. However, gaps still exist and require further improvement as acknowledged by the Ministry of Tourism in its survey at five tourist destinations, looking into components such as road quality, hygiene, garbage disposal, power supply situation, public utilities, sewerage, rail connectivity, telephone services, airport conditions, and so on.

The focus is on the different types of infrastructure that may influence the tourism demand in India. While past studies have taken infrastructure as a whole or categorized into transport and non-transport or taken certain infrastructures while excluding others, this paper attempts to assess the relationship between both the foreign and domestic tourism demand with the different infrastructures, namely railways, telecommunications, health, urban facilities, roads, aviation, and ports. Here it is essential to study the impact of infrastructure on tourism. The objective is to identify which all infrastructures are significant and the nature of their relationship to both Foreign Tourist Arrivals and Domestic Tourist Visits, so that it can be understood which infrastructures

need to be developed to meet future tourism demand. This research will help to understand better which all infrastructures are significant and where investment or capital expenditure should be directed toward. Domestic tourism demand is also taken into account here since it is also very important for the industry as a whole apart from foreign tourism demand.

Review of Literature

Various researches and studies have been done to determine the relationship between tourism and infrastructure, and some of the papers highlight the need for infrastructure for a better performance in the tourism sector. Several studies have clubbed together infrastructure with a multitude of other factors that affect tourism competitiveness of a region or nation. While many studies have first-hand information on tourists' perception of a destination's infrastructural amenities, other studies are empirical analyses using existing data to create a tourism demand function, in which infrastructure is a key variable. Research in this field has picked up in more recent years as can be seen from the studies from 2003 onwards.

(Lehtolainen, 2003) identified one of the major sectors of the Finnish tourism industry to be the nature-based tourism in the Finnish lake region. A relationship between public infrastructure and tourism growth is established through insights from the paper, wherein the objective was to find the effect of public infrastructure investment in the water trail network on tourism and whether the small business in the sector had utilized effectively these investments. These were achieved through a series of interviews with tourism developers, as well as through secondary sources of data. Initial findings suggest a well-developed water trail network. One of the best ways to increase tourist numbers is to encourage small businesses in the sector. Infrastructure, or water trails in this case, can be considered as a 'development factor in development processes.'

(Proenca and Soukiazis, 2005) studied tourism activity in Portugal and its determinants in an empirical analysis over the period 1977-2001. The important demand factors are real personal income,

using the variable of per capita GDP and relative prices, given by the ratio of the price index level of Portugal to the price index level of the sending nation. The supply factors are infrastructure, measured by public investment to GDP ratio, and accommodation capacity, measured by the annual number of available beds. The study also uses a dynamic specification, with a lagged dependent variable introduced in order to explain the process of adjustment of the true variation in the tourism demand to its accepted level. This is the renowned 'partial adjustment principle.' This study revealed the per capita income to be the most important demand determinant, while accommodation capacity served as the most important supply determinant of tourism movement in Portugal. Public investment ratio in Portugal shows no significance in the tourism demand for Portugal, carrying an incorrect inverse correlation.

In "Transport Infrastructure and Tourism Development" (Khadaroo and Seetanah, 2007) research the relationship between transport infrastructure and tourism development in Mauritius through empirical analysis. The relationships between tourism development, measured in tourist arrivals, and other determinants, which included exchange rates, rooms, income of source country, distance and non-transport infrastructure, were also studied using a random-effects model and a dynamic panel data model with 26 major source countries, which were categorized regionally into Europe, America, Asia and Africa. The panel data study covered the time period 1978-2003. The results of the research methodology revealed a significant positive relationship between tourist arrivals and transport infrastructure, which was measured in capital stock value of air, land and water transport. The contribution of transport infrastructure to tourist numbers applies to those from Asia, Europe and America, while non-transport infrastructure concerned only those from Europe and America. Khadaroo and Seetanah also conducted the same study in 2007 for multiple small island economies to find that both types of infrastructure mattered on the whole for tourism.

In a research study, (Phakdisoth and Kim, 2007) both the dynamic and static demand models of Ordinary Least Squares have been used for the period 1995-2004, with the main determinants of

tourism to Laos being variables that measure communication and transportation infrastructure, destination risk, bilateral trade, and the distance between Laos and the source countries in the long run. Tourism to Laos is also found to be income and price inelastic, annulling the perception of this product being a luxury good. The dynamic models conclude relative prices and infrastructure to be superior determinants than income in the short-run adjustment of tourist inflow. Price is significant at the 1 percent level and carries a negative sign. The determinant of distance is inversely related to tourism demand of Laos. Bilateral trade is positively correlated but an insignificant determinant. And, destination-related variables along with the destination stability play a considerable role in tourist inflows.

(Singh and Singh, 2007) chose the city of Amritsar to discuss its tourism potential and tourist infrastructure. The paper attempts to evaluate the prevailing scenario with regard to tourist infrastructure at different levels and puts forth practical strategies for pushing tourism to its maximum potential in the city. Tourist infrastructure at various spots is analyzed using certain parameters on the qualitative and quantitative aspects, such as accessibility, parking facility, monument condition, and other amenities. A matrix analysis has been performed for this by giving weight age of 1 to 5 for each amenity with the Golden Temple being the most important site, scoring the highest. Some of the tourism issues brought to light include: lack of an approved master plan, lack of information on other tourist spots other than Golden Temple, Jallianwalla Bagh, and Wagha border, and incompatible land uses. Some of the inputs given for accommodating increasing tourist inflows are: treating tourism as an industry, tourist information centers at different sites, improvement in connecting routes, incentives to the hotel industry, financial viability of the maintenance of the tourist sites, and a better traffic and transport system.

(Aslan, Kaplan and Kula, 2008) used an empirical analysis methodology to estimate the international tourism demand model for Turkey, to which little focus has been given before and more specifically to the supply factors. A dynamic panel data approach has been employed with respect to Turkey's nine main tourist

sources (namely Germany, Russia, The U.K., Holland, France, Austria, Iran, Bulgaria and Ukraine) over the period from 1995 to 2004 with the help of the GMM-DIFF estimator projected by Arellano and Bond (1991). The explanatory variables can be classified into demand and supply dynamics. The authors have identified that infrastructure of the host nation has been ignored in similar studies earlier. The study concludes that the economic conditions of tourists are not key factors in the tourism demand, of which these include personal income and prices. An unexpected result is that public infrastructure, measured in the proxy of ratio of public investment to GDP, was found to be negatively related to tourism demand, while the incident of Marmara Earthquake is positively related.

(Chaitip, Chaiboonsri, and Rangaswamy, 2008) conducted a panel unit root and panel co integration test to model international tourism demand in India in order to find the long-run relationship between tourist arrivals and economic variables such as GDP, transportation costs and the exchange rate for the period 2002-2006. The Panel Co-integration Test, the OLS estimator, and the DOLS estimator were the bases for the co-integration techniques to determine India's international tourism demand model. Five standard method tests for the Panel Unit Root Tests were run to obtain the results. The empirical results reveal a strong correlation between GDP of tourist source countries (namely England, America, Canada, France, Germany, Japan, Malaysia, Australia, Singapore, and Korea) and tourist arrivals to India with a long-run positive relationship. However, this study ignored the variable of infrastructure in its modeling.

Objectives

The objectives of the research undertaken may be summarized as:

i. To study the strength and significance of the relationship between foreign tourism demand and the different infrastructures
ii. To study the strength and significance of the relationship between domestic tourism demand and the different infrastructures

iii. To identify which transport infrastructure is the most significant to foreign tourism demand and to domestic tourism demand

Data and Methodology

Secondary sources have been used to collect data. The website from which the data has been collected is IndiaStat.com. While data on Foreign Tourist Arrivals and Domestic Tourist Visits are originally sourced from the statistics of the Ministry of Tourism, the data on the public capital expenditures on the different infrastructures is originally sourced from the Indian Public Finance Statistics reports. The tool of analysis used is the Ordinary Least Squares method to derive the strength and significance of the relationships between the Foreign Tourist Arrivals and the different infrastructures as well as between the Domestic Tourist Visits and the different infrastructures.

Results

Model 1: OLS, using observations 1995-2010 (T = 16)
Dependent variable: Foreign Tourist Arrivals
HAC standard errors, bandwidth 1 (Bartlett kernel)

	Coefficient	*Std. Error*	*t-ratio*	*p-value*	
Const	5.14667	0.159398	32.2882	<0.00001	***
Railways	-0.251797	0.0531547	-4.7371	0.00147	***
Telecom	0.0389621	0.0261281	1.4912	0.17425	
Health	0.000777882	0.26594	0.0029	0.99774	
Urban	0.123599	0.0509003	2.4283	0.04131	**
Roads	0.450914	0.222994	2.0221	0.07781	*
Aviation	-0.00749957	0.0146004	-0.5137	0.62137	
Ports	0.010473	0.0703436	0.1489	0.88533	

Mean dependent var	6.509602	S.D. dependent var	0.155637
Sum squared resid	0.012013	S.E. of regression	0.038751
R-squared	0.966937	Adjusted R-squared	0.938007
F(7, 8)	508.1740	P-value(F)	5.92e-10
Log-likelihood	34.85172	Akaike criterion	-53.70343
Schwarz criterion	-47.52272	Hannan-Quinn	-53.38693
Rho	0.099055	Durbin-Watson	1.742937

Model 2: OLS, using observations 1995-2010 (T = 16)

Dependent variable: Domestic Tourist Visits

HAC standard errors, bandwidth 1 (Bartlett kernel)

	Coefficient	*Std. Error*	*t-ratio*	*p-value*	
Const	6.15605	0.112334	54.8014	<0.00001	***
Railways	0.0795405	0.0440749	1.8047	0.10877	
Telecom	-0.00146061	0.00982374	-0.1487	0.88548	
Health	0.265146	0.111591	2.3761	0.04482	**
Urban	0.0972356	0.0178033	5.4617	0.00060	***
Roads	0.199324	0.119208	1.6721	0.13305	
Aviation	0.00441202	0.013324	0.3311	0.74905	
Ports	-0.0238428	0.0492629	-0.4840	0.64136	

Mean dependent var	8.476112	S.D. dependent var	0.244874
Sum squared resid	0.004139	S.E. of regression	0.022747
R-squared	0.995398	Adjusted R-squared	0.991371
F(7, 8)	655.5216	P-value(F)	2.14e-10
Log-likelihood	43.37565	Akaike criterion	-70.75129
Schwarz criterion	-64.57058	Hannan-Quinn	-70.43479
Rho	-0.208722	Durbin-Watson	2.096249

Conclusion

Tourism without infrastructure would not have been able to witness the kind of growth it has seen over these years. The study has found that though infrastructure as a whole is essential to the overall tourism demand, there are certain infrastructures which have a significant relationship with foreign tourism demand and domestic tourism demand respectively. It would be advisable to increase public capital expenditure in these infrastructures. Urban,

road and railway infrastructures have significant relationships with foreign tourist arrivals, while health and urban infrastructures have significant, positive relationships with domestic tourist visits. While urban and road infrastructures possess positive coefficients with the foreign tourist arrivals, railway infrastructure is found to be negative. Further research may be done to find out the possible reason for this trend, so as to change it into a positive relationship over the years to come. Otherwise, public capital expenditure in railways may be just as insignificant as the other variables. What both the foreign tourism demand and domestic tourism demand have in common is the statistical significance of urban infrastructure. This means that more capital spending and investments are required to provide more as well as to improve the quality of amenities, such as water distribution, waste disposal, streets, public parks, museums, electricity and so on. Hence, urban infrastructure can be viewed as the most important infrastructure as far as overall tourism demand is concerned.

Although this research has drawn up some insightful results, a few limitations may be noted. Non-availability of data has been an issue, especially the data on the public capital stocks of the different infrastructures. The researches included in our review of literature have used the value of public capital stocks for measuring the transport and non-transport infrastructures. Here, public capital expenditure is the closest substitute to this measurement. The data for all the variables was only available for the given time period (1995-2010). A longer time period may have yielded different results which may have been more reliable due to more observations. This study has missed out on tourist infrastructure related to accommodation and dining facilities due to the lack of data on public capital expenditure for the same. The priority would be to direct more public capital expenditure toward this infrastructure. And, based on the R-Squared values of both the models, it can seen that the overall infrastructure explains variations in domestic tourism demand better than foreign tourism demand. Policy makers would need to keep infrastructure in mind with regard to sustaining the domestic tourism demand. Apart from the public capital expenditure, policy makers could take into consideration the need to spend more on marketing efforts to promote tourism in India. Alongside providing better

infrastructure, these marketing efforts would need to make tourists aware of these infrastructural developments which can accommodate their visits. This is likely to help tourism demand to grow in the coming years. Notwithstanding, the scope of this research is huge as further research can be done to ascertain the exact reasons for the given relationships between the different infrastructures and the foreign/domestic tourism demand. These may help answer the positive or negative signs of the coefficients as well as the confidence level for a particular infrastructure. This may be done through primary research with the help of questionnaires and surveys to the tourists. Future studies could also work on identifying the specific features of urban infrastructure that concerns the average tourist. Questions on the significance of water, electricity, and other public facilities separately are yet to be answered. It may also be essential for the Ministry of Statistics or the Central Statistics Organization to collect the necessary data for computing the public capital stock values for a number of infrastructures. This would certainly raise the scope of the research much further. Currently, data on the public capital stock values is limited to only a few infrastructures such as Electricity, Gas and Water Supply, Railways, Other Transports, Communications, and Hotels and Restaurants.

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