

STUDY OF ICT AND TOURISM LED GROWTH IN INDIA AND THAILAND

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ABSTRACT

Worldwide tourism has been able to be a one of the important factors with respect to economic growth. Tourism is being seen as an opportunity for the economic growth of developing economies as its demand is still growing. Over the years tourism mediation has experienced major changes, including the arrival of the Internet and the application of Information and Communication Technologies (ICTs). This paper will investigate the ICT and tourism-led growth hypothesis in the case of India and Thailand by employing the cointegration, error correction models, and Granger causality tests using annual data for the last two decades. Major focus is to test the existence of the long-term equilibrium relationship between international tourism, ICT, and economic growth. Once a relationship is identified then the direction of the relationship was studied. In this research work, we have observed that economic growth in Thailand is led by tourism and ICT, but in the Indian economy, it seems that tourism is led by economic growth, and we are not able to transform our strength in ICT to the expected level. Study also concentrates on suggesting a model where tourism can be made a leading factor to influence GDP through optimum use of ICT.

Keywords: 1) ICT, 2) tourism, 3) economic growth, 4) conditional causality, 5) cointegration

1. Introduction

Tourism has turned into a vital area on the planet as a developing wellspring of outside trade stores and vocation in the course of the most recent couple of decades. With its recorded social qualities and nature, these nations have turned out to be most imperative traveler destinations in Asia. Travel and tourism's dedication to world GDP created for the sixth successive year in 2015 a total of 9.8% of world GDP (US\$7.2 trillion) as per the WTTC's latest yearly research. Tourism now supports around 284 million people in employment, i.e., one in eleven jobs on this globe. Travel and tourism figures all through the accompanying ten years similarly look extraordinary with expected advancement rates of 4% consistently. The Oxford Economics' Global Industry Model expects

travel and tourism GDP to grow 4.7% every annum (compound yearly development) throughout the following decade.

- This is more noteworthy development than gauged for other sectors with the exception of the managing an account industry.

- At 4.7%, travel and tourism is estimated to outpace the development of the aggregate Asian economy (3.8%).

The most commonly used measure of tourism demand is international tourist arrivals (Song, Witt, and Li, 2009). Measurement of tourism demand by international tourist arrivals in the study by Sheldon (1993, pp. 13-20) identified the great purpose server of suppliers of products and services. Supply capacity gets adjusted according to the size of recorded arrivals. In some of studies researchers used the tourist participation rate

which ultimately can be derived as the ratio of number of total tourism arrivals to population of the host country of tourism (Song, et al., 2010).

In a large number of studies, demand of tourism has been broadly explored in cases of various nations (Crouch, 1994; Lim, 1997; Li, Song, and Witt, 2005). Salary and relative costs are the variable used much of the time. Tourism costs are, when all is said and done, not accessible. Trade rates have been utilized as an intermediary variable for cost. Different exogenous variables are likewise viewed, for example, expense of transportation and a few qualities of the destination (see Crouch, 1994; Lim, 1997; Li, Song, and Witt, 2005 for the utilization of extra exogenous variables).

Balaguer and Manuel (2002, pp. 877-884) in their research found that tourism has played a vital role in the economic development of Spain. Dritsakis (2004, pp. 305-316) conducted a study on the development of Greece and revealed that tourism influenced long-run economic development while utilizing the causality examination among real GDP, a genuine compelling conversion standard, and universal tourism income. Brida and Risso (2009, pp. 178-185) researched conceivable causal connections among tourism consumption, genuine conversion scale, and monetary development, utilizing quarterly information from 1986 to 2007. The experimental results bolster a tourism-driven economic development. Brida, Barquet and Risso (2010, pp. 87-98) investigated the causal relationship between the development of tourism, relative costs, and financial extension for a locale of upper east Italy bordering Switzerland and Austria. Co-integration analysis examination demonstrates the presence of a co-incorporated trajectory between GDP, tourism, and relative costs where the comparing flexibilities are certain. It was also observed that tourism and relative costs are thinly exogenous to real GDP. In one study, Kreishan (2010, pp. 229-234) used causality analysis to understand

the relations between tourism income and financial development in the case of Jordan, utilizing yearly information of the period 1970-2009. Some other studies concentrate on the commitment of tourism to monetary development in a few nations and areas. To investigate the potential commitment of tourism to economic development and advancement inside the traditional neoclassical structure, Fayissa, Nsiah, and Tadasse (2007) employed a panel data study of 42 African nations for twenty years by taking data from 1995 to 2004. Their outcomes demonstrate that the contribution of tourism receipts has significant influence on GDP as well as the financial development of countries in Sub-Saharan Africa. In another study, Lee and Chang (2008, pp. 180-192) reinvestigated the long-running relationship by applying the heterogeneous panel co-integration method and causal connections between tourism improvement and monetary development for OECD and non-OECD nations (counting those in Asia, Latin America and Sub-Sahara Africa) for the 1990-2002 period. Fayissa, Nsiah, and Tadasse (2009) further utilized panel data of 17 Latin American nations (LACs) for the years that range from 1995 to 2004 to explore the effect of the tourism business on the monetary development and advancement in Latin American nations inside the structure of the traditional neoclassical development model. Most studies show that there is a co-integration relationship amongst tourism and financial development. Knowing the direction of causality is also essential for planning of a fitting strategy.

The world has just turned into a global village due to the use of advanced information and communication technology. Maden and Savage (1998, pp. 173-195) and Roller and Waverman (2001, pp. 909-923) examined the strong relationship between “Any reception, emission or transmission, writing, images and sound or intelligence of any definition applies to at least two different kinds of communicating at a distance, traditional telecommunications and broadcasting” and financial development.

The improvement of information transfer structure brings down correspondence costs which results in diminished asset assignment choice expenses and in addition quality and amount of data extended to expand arbitrage opportunities so that financial markets turn out to be more effective (Norton, 1992 p. 177). The causal relationship implies that economic development leads to a rise in telecommunication investment and in addition opposite telecom speculation leads to monetary development. The causation direction amongst ICT and monetary development may be bi-directional or both, showing autonomous conduct to each other. Yoo and Jung (2001, pp. 141-158) found the presence of unidirectional causality from telecommunication investment to growth which suggests that if it brings down the telecommunication investment, there will be a fall in economic development. Hardy (1980, pp. 278-286) and Cronin, et al. (1991, pp. 529-535) also revealed the bi-directional causality between the US economy and telecommunication investment. These past studies on causality relationships build up the premise for our exploration issue, the causality investigation of the Indian and Thailand economy.

These two nations have a distinctive atmosphere, society, and monetary status, yet one thing is the same: developing tourism on a world scale. Indian tourism is known for its legacy and landmarks, where Thailand is rising as a great travel destination because of its friendliness and wellbeing tourism advancement. India's tourism industry is encountering a solid time of development, driven by the expanding Indian white collar class, development in high spending of outside voyagers, and facilitated government crusades to advance 'Incredible India.' The tourism business in India is considerable and dynamic, and the nation is quickly turning into a noteworthy worldwide destination. India's travel and tourism industry is one of the most productive commercial enterprises in the nation, furthermore credited with contributing a generous

measure of foreign exchange. As per the recent report of the WTTC, the direct contribution of travel & tourism in India to its GDP was INR2,668.3bn (2.0% of total GDP) in 2015 and is forecast to rise by 7.1% in 2016 and to rise by 7.9% pa, from 2016-2026 to INR6,115.5bn (2.4% of total GDP) in 2026. Bangkok, the capital of Thailand, is a vivacious city loaded with energetic and bright individuals. Thailand is currently a standout amongst the most developed urban communities on the planet. The amazing government, the experimental and mechanical headways, and the socially rich masses have sustained this intriguing nation called Thailand. Tourism in Thailand is best in class and vacationer cordiality. This city has now turned into one of the overwhelming focuses of common development and progression. In the case of Thailand, the direct contribution of travel & tourism to GDP was THB1, 247.3bn (9.3% of total GDP) in 2015 and is forecast to rise by 4.3% in 2016 and to rise by 6.7% pa, from 2016-2026, to THB2, 482.9bn (14.0% of total GDP) in 2026.

2. Objective

1) To investigate the causal relationship between gross domestic product (GDP), information and communication technology (ICT) and tourism (TRM) in the case of India and Thailand.

a) To examine long-term and stable equilibrium relationships.

b) To examine short-term equilibrium relationships.

2) To study the direction of the relationships of variables under consideration.

3. Data

Annual data for the period 1995-2014 are used for estimation. The span of data reflects data availability. Data series of gross domestic product (GDP) measured with GDP at market prices (constant 2010 US\$), information and communication

technology (ICT) measured as Internet users (per 100 people) and tourism (TRM) international tourism, number of arrivals used as a proxy of tourism development, were collected from websites of World Data Bank and World Tour and Travel Council. In order to avoid the impact of heteroscedasticity, all variables are expressed in natural logs. Unit root test (Dickey and Fuller, 1979) needs to be employed to determine the stationarity of the variables.

4. Research Methodology

Ordinary regression analysis depends on stationary time series. Generally, time series information is non-stationary. Since nonstationary time series don't have constrained fluctuation and can't accord with Gauss-Markov Theorem, the Ordinary Least-Squares (OLS) Estimators are conflicting and afterward the spurious regression wonder may happen, hence mistaken causality can be drawn. Co-integration investigation can conquer the inadequacy of strategy said above and manage nonstationary time arrangement adequately. The general stride of co-integration analysis is as follows: At the initial step, we apply a unit root test created by Dickey and Fuller (1979, 1981) to explore the stationarity of data series whether they are stationary. On the off chance that they are non-stationary, we ought to acquaint co-integration hypothesis with investigation of the relationship between them. On the premise of co-integration test, we utilized Granger causality test to look at whether there was causal relationship between these variables. Granger (1987, pp. 199- 211) contends that there is a restricted Granger cause in any event if these variables are co-integrated.

This study used the cointegration and error-correction models to test the causal relationship between gross domestic product (GDP) measured with GDP at market prices (constant 2010 US\$), information and communication technology (ICT) measured as Internet users (per 100 people), and

tourism (TRM) with the number of arrivals used as a proxy of tourism development.

In order to avoid spurious regression in time series analyses, whether variables are integrated of order zero or in other words, that the series are stationary—this must be tested. This was accomplished by performing the augmented Dickey-Fuller (ADF) test. To investigate stochastic trends of the stationary series we used the Johansen-Juselius (JJ) technique for cointegration between variables. During the period of 1995-2014, the Granger Causality Test (Granger and Newbold, 1974, pp. 111-120) was applied to examine the causal relationship between all selected variables of India and Thailand.

5. Empirical Results

The analysis shows that there is an increasing trend of tourism, ICT and GDP. In the case of India, there is a gradual increase in tourism up to 2009. Subsequently, there is a sudden growth in tourism up to 2013 and then a fall in value after 2013. But in case of Thailand, this number is growing with significant pace, particularly after 2002 till 2014. As can be observed from data in the last decade, use of ICT has increased in both countries exponentially. For the last one and half decades both the nations have been growing to a considerable extent. There is a rapid and considerable growth in GDP in the case of India as compared to Thailand.

6. Test of Stationarity

The Augmented Dickey-Fuller (ADF) test (Dickey and Fuller, 1979) was used to examine the stationarity of data series GDP, ICT and TRM and found their first log differences are stationary series. Table I shows the result of the test of stationarity. In most of the cases the ADF test statistics are significant at the 5% level, indicating the absence of unit root in the data.

Table 1: Results of test of stationarity

Country	Data Series of India (1995-2014)				Data Series of Thailand (1995-2014)			
Test	Augmented Dickey-Fuller test				Augmented Dickey-Fuller test			
	Statistic	Critical values			Statistic	Critical values		
		1% level	5% level	10% level		1% level	5% level	10% level
D(GDP)	-4.17504 (0.0221)	-4.616209	-3.71048	-3.29779	-3.61539 (0.0163)	-3.85738	-3.04039	-2.66055
D(ICT)	-4.88092 (0.0014)	-3.88675	-3.05216	-2.66659	-2.82648 (0.0743)	-3.85738	-3.04039	-2.660551
D(TRM)	-3.68201 (0.0425)	-4.61620	-3.71048	-3.29779	-3.34264 (0.0300)	-3.92035	-3.06558	-2.67345

Using Johansen Cointegration model and Vector Error Correction Estimates, we identified the following model with long run equilibrium in case of India as:

$$D(ICT) = C(17)*(GDP(-1) - 0.630181202482*TRM(-1) - 0.114259494952*ICT(-1) - 18.1686749253) + C(18)*D(GDP(-1)) + C(19)*D(GDP(-2)) + C(20)*D(TRM(-1)) + C(21)*D(TRM(-2)) + C(22)*D(ICT(-1)) + C(23)*D(ICT(-2)) + C(24)$$

The above model was identified and estimated for all coefficients using the method of least square to get an idea about the long term or short term relationship among the variables. In the case of India, it was found that equilibrium exists when ICT is a dependent variable. Using Wald Test it was also established that short term equilibrium exist from GDP and TRM to ICT. Using Johansen Cointegration model and Vector Error Correction Estimates we identified the following model with long run equilibrium in the case of Thailand as:

$$D(GDP) = C(1)*(GDP(-1) + 0.24036257869*TRM(-1) - 0.390116536754*ICT(-1) - 29.4278613181) + C(2)*D(GDP(-1)) + C(3)*D(GDP(-2)) + C(4)*D(TRM(-1)) + C(5)*D(TRM(-2)) + C(6)*D(ICT(-1)) + C(7)*D(ICT(-2)) + C(8)$$

To understand the long term or short term relationship among the variables, this model identified and estimated all coefficients using the method of least square. In the case of Thailand, it was found that equilibrium exists when GDP is a dependent variable. Using the Wald Test, it was also found that short term equilibrium exists from ICT and GDP.

We developed one model for each economy. To identify a long run relationship, we applied the Johansen Cointegration Test. After that we applied the VEC model for each economy based on the outcomes of the Johansen Cointegration Test. These models

were found to be valid as δ adjustment coefficient for each model is negative. Results of the error correction model show that the magnitude of the error correction coefficient of the model indicates the speed of the adjustment of any disequilibrium toward a long run equilibrium state. The error correction term is statistically significant at $p = 0.05$, and the result shows that the coefficient of error correction in the equation indicates that the long term disequilibrium would be adjusted with a considerably minimal contribution of the residuals.

Table 2: Granger Causality test results of India and Thailand

	Data Series Thailand (1995-2014)			Data Series Thailand (1995-2014)			Data Series India (1995-2014)		
	Lag Length (2)			Lag Length (3)			Lag Length (2)		
Null Hypothesis:	Obs	F-Statistic	Prob.	Obs	F-Statistic	Prob.	Obs	F-Statistic	Prob.
TRM does not Granger Cause GDP	18	1.40645	0.2799	17	0.55892	0.6541	18	0.13723	0.873
GDP does not Granger Cause TRM		0.24354	0.7873		1.64282	0.2414		8.79412	0.0038
ICT does not Granger Cause GDP	18	10.3949	0.002	17	11.6740	0.0013	18	1.09640	0.3631
GDP does not Granger Cause ICT		4.99656	0.0246		3.12227	0.0749		0.50065	0.6174
ICT does not Granger Cause TRM	18	0.89448	0.4326	17	1.01211	0.4275	18	2.31741	0.1378
TRM does not Granger Cause ICT		3.88617	0.0475		7.07042	0.0078		2.80216	0.0973

In earlier results we detected cointegration among all the variables which lead to the existence of Granger causality between economic growth, tourism, and information and communication technology at least in one direction. Therefore, the next step was to determine the direction of the long-run relationship between these variables. To know the direction of causality, we applied the Granger causality test. As can be seen in Table X, in case of Thailand it indicates the existence of bi-directional causality running from *GDP* for the lag length (2), at 5% significance level. We have also obtained uni-directional causality running from TRM to ICT (for lag 3 this relationship has strong causality as compare to lag 2). In the Indian scenario, there is only a uni-directional causality running from *GDP* to TRM for the optimal lag length (2) at 1% significance level. On the basis of all the outcomes of the statistical analysis, we have suggested a sustainable model of tourism to achieve the desire goal.

7. Sustainable Tourism Model

After studying and analyzing the data, we can say that travel & tourism are

amongst the sunshine industries of the world; they are the largest and fastest growing industry sectors which are supporting job creation, enabling better livelihoods and economic activity while connecting people around the globe. In the year 2014, 1.2 billion international arrivals were noted, which enables travel & tourism to support 9.8% of the world's GDP, and it also enables us with 1 in 11 job, providing 23.9% growth in the past decade. This industry of travel & tourism is predicted to grow a further 3.8% per year for the next decade. By 2030, there is an estimation of 1.8 billion international travellers annually by the UN World Tourism Organization. In addition, there are expected to be billions more domestic travelers.

This research work is to showcase the role and importance of information technology in sync with the tourism industry and our national economy while comparing it with the usage of IT in tourism done in Thailand. This study is not just focusing in terms of economic growth of the countries and employment creation in this sector, but also for enhancing social stability and community development, and preserving a nation's culture and heritage.

This industry of travel and tourism has its endless history across the nations, but now it has to develop in a sustainable manner; governments of both these nations in the study need to emphasize a supportive social, physical, fiscal, and regulatory environment, which is also conducive to business development. It redirects the focus upon adequate infrastructure, incentives for private sector investment, easy access, and commutation, including good transport connectivity along with telecommunication infrastructure; the availability and implementation of which can enhance visa facilitation and implementation of intelligent taxation. The government also needs to place the

appropriate policies in this area to encourage growth in demand of tourism inbound as well outbound.

The economic importance of the travel and tourism industry is now widely recognized by governments globally. This industry sector most often experiences a lack of co-ordination between different agencies involved or ministries/departments in place. This results in conflicts in policy based decisions like providing funds for promotional campaigns while bracing down on visa-free travel, or imposing unfair, non-hypothecated taxes on departing airline passengers. The following table provides generic indicators of the two nations' economies under study.

At a glance (2015)	Thailand	India
GDP (Nominal)	\$ 391.7 Billion	\$ 2.1 Trillion
Population	68 Million	1.3 Billion
Visitors (Overnight)	30.3 Million	7.8 Million

The issues relating to sustainability, corporate responsibility or environmental and social governance (ESG), which have barged upon accountability and responsibility at global forums since 2005, are obtaining scale through a higher level of commitment while integrating them into business strategy, which in turn addresses investment for better infrastructure and innovation to motivate and engage travel & tourism's investment in the global community.

Our research work leads towards the following suggestion for sustainable growth in the tourism and travel sector of both the countries.

Proper usage of Big Data as per our suggested model can lead us towards the sustainability; there are five priority areas of work in this segment to be emphasized as per the World Travel and Tourism Council (WTTC, 2016) as mentioned below:

1. Integrating climate change and related issues into business strategy.
2. Supporting the global transition to a low carbon economy.
3. Strengthening local resilience.
4. Promoting the value of responsible travel.
5. Engaging across the value chain.

These 5 priority areas are needed to impact sustainable tourism through their implementation with Big Data.

GDP is affecting usage and development of ICT and tourism in India, whereas, in the case of Thailand, usage of its ICT infrastructure and economic development reflected as GDP is influencing their growth in the tourism industry. Several creative initiatives are needed to be taken care of while providing relevant information on a global forum, aiming for the sustainable tourism.

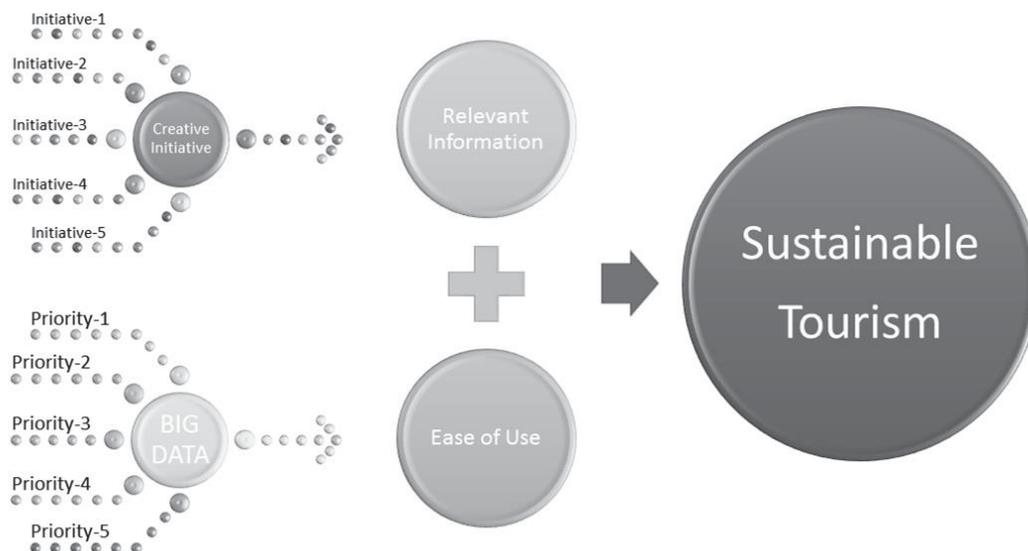


Figure 1: Suggested Model

Sustainable Tourism can be derived from two important variables, i.e., “Relevant Information” needed by the tourist interested and “Ease of Use” while using that information during the visit to that place of interest. There has been a cascading impact where these two variables are further dependent individually, such as provision of relevant information is dependent on creative initiative by that country or place of visit, and ease of use in the current scenario can be derived from Big Data, which can provide information filtered as per priorities of the tourist. As per the requirements of current tourism both relevant information and ease of use are needed side by side by the tourist for making any decision to increase the tourism at their destination.

8. Conclusions

The purpose of the present study was to investigate status, impact, and direction of influence of tourism in India and Thailand. In this paper, data series of India and Thailand (1995-2014) were used to investigate the causal relationship between gross domestic product GDP measured with GDP at market prices (constant 2010 US\$), information and communication technology (ICT) measured as Internet users (per 100 people), and tourism (TRM)

(international tourism) with number of arrivals used as a proxy of tourism development using an econometric model. Outcomes of the model revealed a long-run relationship between these three variables for the selected period of study. Bi-directional causality between economic growth (GDP) and tourism development of Thailand was identified. There was a presence of uni-directional causality running from TRM to ICT. In comparison to India, Thailand is in a better position in terms of inflation control and maintaining the pace of growth, which makes it one of the good performers in the tourism sector. We found uni-directional causality running from GDP to TRM, which is an indicator of growth-led tourism development in India and leads to heavy dependence on tourism for the country’s economic growth. The main driving forces of any economy are promotion of leading industries, market institutions, and political stability, and they should be kept in mind while planning resource allocation and investment activities to encourage overall economic growth. This will provide necessary resources for more development of tourism as well as attract international tourists to tourism destinations of India. To achieve this, we have suggested a model for sustainable tourism, which can contribute to growth of economy by optimizing the use of ICT.