How important ICT, transport, and inflation are to inbound tourists, and what South Asia needs to do about them.

Adnan Ramzan[1], Dr. Mahwish Zafar[2], Tuba Rasheed[3], Hamza Akram[4]*, Hina Shahzadi[5]

1- Ph.d Scholar , Department of Economics, The Superior University Lahore, Punjab, Pakistan

2- Faculty of economics and business administration, Superior University Lahore, Punjab, Pakistan

3- Ph.d Scholar , Department of Economics, The Superior University Lahore, Punjab, Pakistan

4-School of Economics and Management, North China Electric Power University, Changping, Beijing China.

5-Govt. Muhammad Nawaz Sharif Associate College Sialkot.

***(Corresponding Author)**

Abstract:

The primary goal of this study is to investigate the possible influence of tool for information and communication (ICT), modes of transportation, and inflation on the requirement for inbound tourists in South Asian states by using panel data.In order to check whether or not the variables are stationary, we use the FADF, FPP, IPS, and LLC unit root tests. For the purpose of determining whether or not there is cointegration over the long term, this study uses the panel cointegration and autoregressive distributed lag (ARDL) estimators. The likely outcomes indicate that equally the Pedroni and Johansen– Fisher panel cointegration approaches provide evidence of the presence of a long-term link between ICT, transport, inflation, and inbound tourism. This is shown by the fact that both approaches reveal the same estimated results.The outcomes of the study show that there is no cointegration between the factors. Also, long-term data show that transport and ICT have a direct and significant link with inbound tourism in South Asia, while inflation has a negative and insignificant link with inbound tourism in South Asia. But ICT and transport have a negative and small effect on tourists from outside the country.This study shows that improving transport and ICT can increase the demand for outbound tourism in South Asia, but the inflation rate needs to be kept in check. For a developing area like South Asia, this could have big effects on the tourism business's aptitude to grow and stay strong.This paper is the first one of its kind to use modern econometric methods to look at the effects of ICT, transport, and inflation in South Asia. Inbound tourism demand research helps the government and policymakers come up with good public policies that will put South Asia in a better situation to benefit from the global tourism industry, which is very competitive.

Keywords: Inbound tourism demand, tool for information and communication (ICT), Transportation, inflation, panel data, South Asia

Introduction

The tourist industry has evolved over the past few decades to become one of the most dynamic and rapidly expanding sectors of the economy (Tasnim et al., 2022). The swift expansion of the travel and tourism industries has refocused the attention of policymakers on the importance of that sector to overall economic expansion, producing employment opportunities, boosting foreign exchange income, promoting other related sectors, and encouraging countries natural glory and culture, among other tasks (Ali & J. Frew, 2014; Gössling, 2020; Shanker, 2008). In recent years, a significant amount of study on theories and facts on tourism requirement has been performed, especially among countries that depend on substantially on the tourism zone of their economy. This is mostly attributable to the rising significance of the worldwide tourism business to the national economy (Khanalizadeh & Yazdi, 2016).

South Asia has a lot of different kinds of land, from deserts, woods, and mountains to swampy areas, coastlines, and meadows. It also has a lot of natural resources and weather that changes all the time. South Asia is home to twenty percent of the world's population, where there are a lot of meager people, not enough jobs in some countries, and a slowing economy. South Asian countries are close to each other and share many of the similar cultural, social, and traditional values that tourists like. The economic and social infrastructures of the countries in this area are similar, which helps them create jobs through tourism by using their human capital and other resources. Because of this, tourism is an important industry for producing jobs and dropping poverty line in this area. The tourism business takes care of important things for its customers, like providing places to stay, places to play, food, and transportation (Nawaz, 2018). Therefore, it is the industry that is expanding at the quickest rate worldwide (Nawaz & Hassan, 2016). It generates Foreign Currency, expansion of the economy, and jobs for all states, especially emerging ones (De Alwis, 2010). People think that tourism is one of the best ways for the world economy to grow. The WTTC (2019) says that the tourism business added 330 billion new jobs and added 10.3% to the worldwide gross domestic product in 2019. Since the turn of the century, the tourist industry has been growing because people have more money to spend, there are more low-cost airlines, it's easier to travel with the help of the Internet, and visa rules have been made easier to follow. WTTC (2019) Reports indicate that the tourist industry in South Asia brought in an extra US$234 billion and added 6.6% to the gross domestic product of the area.

The expansion of the tourism industry has been sped up thanks to the rapid pace of globalization as well as the rise of IT (Li, 2014). The use of tool for information and communication (ICT), makes it possible to share data and establish direct relationships between customers and vendors (Anser et al., 2022). In the modern world, advancements in technology, particularly in IT, have the potential to significantly contribute to the expansion of the tourism industry (Giotis & Papadionysiou, 2022). Information and communications technology has a huge potential to grow the tourism sector because it makes it possible to advertise and sell local tourism services directly in foreign markets (Ali & J. Frew, 2014). Along with ICT, transportation is also a key factor in how many tourists visit a place (Adedoyin et al., 2020). Many scholars are of the opinion that the foundation of a country's tourism sector is directly related to how desirable the country is as a tourist destination (Ivankova et al., 2021; Mandeno, 2012; Usmani et al., 2021; Wong, 1996). Especially, transportation is the base on which many other services can grow (Hirschhorn et al., 2019). As a result, one can observe that transportation is a big influence in South Asia. In addition, transportation is a significant factor in determining the degree to which a site is accessible (Hirschhorn et al., 2019).

High inflation raises travel costs and lowers tourists' spending power, which hurts tourism (Athari et al., 2021). Exchange rates, income levels, and targeted tourists may complicate the relationship. Inflation can raise hotel, transportation, and other travel costs, making a country less competitive for inbound tourists (Ghosh, 2022) Thus, travellers may select cheaper destinations, diminishing the country's tourism. However, the exchange rate may offset inflation's effect on tourists' spending power, making outbound travel less affected by inflation. Inflation may lower a country's currency, making outbound travel cheaper for tourists. Inflation can hurt tourism, but the relationship is complicated (Li et al., 2020).

The goals of the study are to find out how ICT, transport, and inflation affect the South Asian inbound tourism industry and to come up with policy models that will help the tourism sector grow. This research investigates at the links among ICT, transport, and inflation in the tourist demand function by adding them to the dynamic autoregressive lag model (ARDL). The main point of this work is to find a link between South Asian countries and inbound tourists, transportation, and information and communication technology. In the past, not much study has been done on how inbound travel affects South Asian countries' transportation, ICT, and inflation. That's what this study will do. Because of the problem with the last study, it's important

to do more research. How do transportation, information, and communication technology (ICT), and prices affect inbound tourism? Do South Asian countries have a long-term link between tourists, transport, ICT, and inflation?

The results of the research are significant for a number of other reasons, including the fact that they enable people to make fact-based decisions regarding ICT, travel, and inflation in South Asian countries. Research on the demand for inbound tourism provides the government and policymakers with the information they need to develop effective public policies that will make it simpler for South Asian countries to profit from the extremely competitive global tourist business.

Literature Review

Although the tourist industry is vast and varied, there are many different sectors that have the potential to contribute to the expansion of the tourism industry. To understand what is meant by these phrases, tourism must be agreed to be the outcome of a number of elements that work together to determine the degree to which a region is appealing. In this part of the article, we will discuss the recent research that has been done on the factors that influence inbound tourism.

ICT and inbound tourism

The tourism sector has been profoundly impacted by technological advancements, notably in the realm of ICT. The magnitude of these transformations is evidenced not only by the fact that they are disruptive, toppling long-standing ways of doing business, but also by the rapidity with which they bring about a tidal wave of tourism and hospitality developments that have an effect on the lifestyles, preferences, and decisions of consumers. These developments have the potential to have a significant impact on the global economy (Gössling, 2020). ICTs help clients identify, personalize, and buy tourism items and assist globalization by giving tools for developing, maintaining, and advertising offers (Qirici et al., 2011). The use of ICT is becoming increasingly vital to the competitiveness of tourist locations (SHARMA et al., 2020).

Kumar et al. (2019) used 1960–2016 ARDL for Israel and discovered mobile subscription significantly affects economic development. The writers also observed ICT-tourism unidirectional causality. Kumar and Kumar (2020) observed that a percent rise in cell phone and internet use increases tourist influxes by .04 and .11% in a well-adjusted sample of nine most

important tourism locations. The report predicts ICT-driven tourist growth. Adeola and Evans (2019) found, through the utilization of the gravity model in a panel research of Africa, that ICT and infrastructure are, among other factors, the significant predictors for worldwide visitor arrivals in Africa. Therefore, the authors argued that enhancing Africa's ICT infrastructure to a sufficient level is necessary for growing the continent's tourism business.

The effect of ICT on the demand for tourism receives a lot of focus in the research. Ramos and Rodrigues (2013) conducted research to determine the effect that ICT has on the demand for tourism in developing nations. Bethapudi (2013) came to the conclusion that information and communications technology has a favorable and considerable effect on the amount of tourists that visit India. Bayram (2020) investigated the significance of ICT for the demand for tourism in India. Liberato et al. (2018) suggested from research that ICT usage improves tourism demand. On the other hand, there is a dearth of research on how information and communications technologies (ICT) like the Internet affect the demand for domestic and international tourism. According to (Garín-Muñoz & Pérez-Amaral, 2011), the use of the internet is significantly more extensive when planning a trip overseas compared to when planning a trip within the same country. The researchers also found that there are good links between using the Internet to plan a trip and the rate of Internet use and trips abroad. In this study, the impact of ICT on inbound tourism demand and the link between Internet use and inbound tourism demand are given a lot of attention.

Transportation and inbound tourism

The studies talk about how important transport by air is to the desire for inbound tourism. Button and Taylor (2000) talk about the laws about moving goods and people by air in the US. The open sky plan and the opening up of the air have been good for the market economy. The market economy has benefited from the liberalization of the air market and the open sky project. There is mounting evidence to suggest that aeroplane traffic services are a vital component of urban economic development (Percoco, 2010; Sheard, 2014; Tveter, 2017). The expansion of regional economic activity is directly correlated to the expansion of air transportation. In order for the economy to flourish in this area, an effective network of air transport is required (Law et al., 2022). In the context of Mauritius, a component that contributes to development is the country's transport infrastructure. Tourists coming from the United States and Asia are concerned about the island's transportation, while European tourists are also concerned about the island's other

types of infrastructure (Khadaroo & Seetanah, 2007). The expansion of the quality of tourist items in terms of infrastructure, services, and communications, as well as other aspects, has a important influence on the growth of the global tourist economy (Cibinskiene & Snieskiene, 2015).

In the framework of the China-Pakistan economic corridor (CPEC), Kanwal et al. (2020) looked into the construction of roads and transport infrastructure as well as public support for tourism. They pointed out that road infrastructure and road transport play a significant role in the expansion of the tourism industry by ensuring that all potential sites are reachable. Hardy (2003) also said that touring paths or autonomy trails are becoming more popular, and that a better road network could make travel more enjoyable. Even though different types of transportation are looked at in tourism literature, past studies have found that better transportation usually makes a tourist destination more accessible and increases the number of tourists who want to go there.

The research conducted by Shen et al. (2023) looked into the effects that China's high-speed rail has on the country. According to the findings of the empirical research, the overall effect of HSR on the economy of China is good. Pagliara et al. (2015) did a "revealed preference" poll in Madrid in 2013. According to the findings, the presence of high-speed rail in Spain has a beneficial effect on tourism destinations; nevertheless, the selection of Madrid as a tourist endpoint is not influenced by the presence of high-speed rail. From the viewpoint of Henan Province in China. The availability of various modes of transportation typically influences the choice of vacation spot made by tourists. The expansion of tourism in Henan Province is significantly aided by improvements to the region's railways, motorways, and other modes of transportation. The expansion of global tourism is considerably aided by improvements made to the standard of goods and services offered to tourists, as well as by advancements in modes of transportation and communication, among other things. The retail sector, hotel chains, and restaurant businesses all benefit from the expansion of the tourism industry as it continues to draw more visitors (Navickas & Malakauskaite, 2009).

Inflation and tourism

High inflation may hurt power firms and raise operational expenses for hotels, entertainment, and tourism. Low inflation lowers interest rates, which hurts investment portfolios. To limit losses, Hang et al. (2020) recommend risk valuation and switch. Inflation is a sustained rise in

prices or money worth. Galı and Gertler (1999) noted some difficulties with this definition. Inflation first affects prices. It is not a proportionate price change. Second, the price increase must last a day, week, or month. Inflation means higher pricing for goods and services we use every day. Prices can change over time. Inflation is a constant rise in pricing, not just one commodity or service.

According to Meo et al. (2018), tourism demand can be stated in terms of the product mix that tourists seek to buy during a specific period. This product mix may be further influenced by some associated criteria that are used to determine tourism demand. When attempting to anticipate future tourism demand, one of the most important factors to take into consideration is inflation, specifically as it relates to tourism prices. The price elasticity of demand consistently reveals an inverse relationship between rising tourism prices and the volume of tourists seeking vacations at those destinations. As a proxy for determining how the price of tourism influences the demand for tourism, researchers usually use the consumer price index (CPI) for travelling the countryside divided by the CPI of the country of origin. Hanafiah and Harun (2010) discovered that higher inflation or the Consumer Price Index decreases tourism. Inflation did directly affect the tourism business, according to earlier experts. However, this results in inflation due to greater rates of consumption that occur as a direct result of tourism, which in turn stimulates demand within the country. In addition to this, tourism also contributes to a rise in the money supply, the primary indicator of inflation (Akinbobola, 2012; Lim & Sek, 2015; Umeora, 2010). The tourism industry is improved, which contributes to economic growth; hence, inflation is unlikely to affect tourism's position in the economy (Yong, 2014). But when inflation goes up, almost everything costs more, which hurts the locals, local tourists, and foreigners directly. This makes tourists less likely to visit, which hurts the tourism business (Barnet, 1975; Huseynli, 2022).

South Asia specific studies

According to Murshed et al. (2020), domestic strife is a big problem for the tourism business in South Asia. Likewise, Li et al. (2022) looked at how trade and tourism demand in South Asia are not related in the same way. According to the findings of another study, the expanding influence of energy policy on tourist arrivals in South Asia is significant (Amin et al., 2020). Also, Sadr (2013) established a significant link between information, and communication technology, levels of poverty, and the development of South Asia's infrastructure in terms of predicting the region's desire for tourism. In along with that, the study highlighted the positive

impact that the availability of air travel and telephone networks had on the demand for tourism. Although another time-series study proposes that inbound tourism fosters human growth by way of the social exchanges that take place, it is important to note that (Sharma, 2021). Consequently, the authors stated that information, and communications technology (ICT), transport infrastructure, and inflation all have the potential to have a significant influence on incoming tourism in the context of South Asia.

We provide an evidence-based view on the relative efficacy of tourist sector factors. Our empirical research on ICT, inflation, and transport infrastructure is the first in South Asia. Empirical studies on technology shocks like ICT, transport quality, and tourism are scarce, the authors write. Some research implies that ICT can boost tourism demand. So, this study adds ICT to the tourism demand function to advance the literature. Apart from ICT, infrastructure development, transit, and inflation can boost tourism demand in South Asia.

Research methodology

Data modeling

In the current study, panel data for South Asian nations were utilized to investigate the relationship between transportation, inflation, information and communication technology (ICT), and inbound tourism. These countries included Bangladesh, Bhutan, India, the Maldives, Nepal, Pakistan, Afghanistan, and Sri Lanka. The analysis covered the period 1997–2021. This area was chosen because of its high inflation rate as well as its diverse physical features, which include glaciers, rainforests, valleys, deserts, and grasslands. These geographical elements can be found in south Asia. For the purpose of our empirical study, we take into account the tourism competitiveness index by making use of the following global tourism indicators: international tourism arrivals and receipts from current US dollars for the inbound tourism index;. In addition, this study included transportation index (air transport, passengers carried), information and ICT index (mobile cellular subscriptions, secure internet servers, fixed telephone subscription), and inflation (consumer prices, annual%), all of which were collected from the World Bank's online database of World Development Indicators (WDI). Table 1 shows the description of variables.

This study used the most famous panel unit root tests, such as the LLC test by Levin et al. (2002), the FADF test, the FPP test by Choi (2001) and Maddala and Wu (1999), and the IPS test by Pesaran (2007), to check how well the variables were integrated. The LLC unit root test assumes that there is a normal unit root process. The LLC test doesn't have a unit root null

hypothesis, but the volition hypothesis does. Each unit root process is used for the ADF, PP, and IPS unit root checks. The null hypothesis of these three unit root tests is that there is a unit root, while the alternative hypothesis does not have a unit root. Due to the fact that the variables were not all in the same place, we used the panel ARDL method to look at the long-term and short-term relationships between the estimated variables. The panel ARDL method has a number of benefits. For example, traditional cointegration methods only look at the equations' long-term association, while the panel ARDL method is more compact (Pesaran and Shin, 1998). (Sulaiman and Abdul-Rahim, 2018) Eq. (1) says that the variables we looked at are stable at I(0), I(1), or level at the first difference. You can write down our default model as:

$$\text{INBT} = f\,(ICT\,,\ T\,, INF\,) \quad \text{---------- (1)}$$

$$(INBT)_{it} = f\left(ICT_{it}^{\propto^1}, T_{it}^{\propto^2}, INF_{it}^{\propto^3}\right) \text{---------- (2)}$$

As fellows know, Equation (2) is logarithmic.

$$In(INBT)_{it} = \propto_0 + (\propto_1 lnICT_{it}) + (\propto_2 lnT_{it}) + (\propto_3 lnINF_{it}) + \varepsilon_t \text{ -- (3)}$$

In the overhead equations, i = 1…, n is the country sign, t = 1…, T is the time sign, and ε is an error term. INBT represents inbound tourism, ICT represents information, and communication technology, INF represents Inflation, and T represents transportation.

Table 1 Detail of variable and source of data

Variable	Measurement Unit	Source
Inbound Tourism	International tourism, number of arrivals International tourism, receipts (current US$)	WDI
ICT	Fixed telephone subscription Mobile Cellular subscription Secure internet servers	WDI
Transportation	Air transport, passengers carried Railways, passengers carried (million passenger-km)	WDI

Inflation	Consumer prices (annual %)	WDI

Research Findings and discussion

Descriptive statistics

Table 2 shows details about each variable used in the study, like as mean, std dev, kurtosis, min, max, and other statistical measures. The table also shows that the average value of the dependent variable inbound tourism (INBT) is 8.037345, with the min. value being 5.235528 and the max. value being 10.20436. In the same way, the mean value of inflation (INF) is 0.707047, with a std dev of 0.323781, a min. value of -0.874932, and a max. value of 1.421911. The Transportation (T) statistic has a mean value of 5.991422, with the min. being 4.487138 and the max. value being 7.932474. Its std dev is 0.801131. Information and communication technology (ICT) has a mean value of 6.253763, a std dev of 1.232487, a min. of 3.507181, and a max. value of 8.620483. Figure 1 depicts the pattern of the variables that were studied between the years 1997 and 2021.

Table 2 Descriptive Statistics

	INBT	INF	ICT	T
Mean	8.037345	0.707047	6.253763	5.991422
Median	8.249465	0.756221	6.253763	5.981407
Maximum	10.20436	1.421911	8.620483	7.932474
Minimum	5.235528	-0.874932	3.507181	4.487138
Skewness	-0.679792	-1.544388	-0.150845	0.156024
Standard Deviation	1.180732	0.323781	1.232487	0.801131

Kurtosis	3.021741	7.3112551	2.159690	2.585533

Source: Authors' findings with E-Views 10.

Correlation Matrix

The findings for determining whether or not there is a precise direct link between all of the variables are presented in Table 3. It is apparent from the table that as a general rule, none of the numbers are higher than 90%. (Mansfield & Helms, 1982), therefore, none of the variables break one of the basic CLRM presumptions, implying the presence of perfect multicollinearity or a precise linear link. This is because the values in the table are all under 90.

Table 3 Correlation Analysis

	INBT	INF	ICT	T
INBT	1.000000			
INF	0.065976	1.000000		
ICT	0.544194	0.259008	1.000000	
T	0.565068	0.092062	0.848696	1.000000

Source: Authors' findings with E-Views 10.

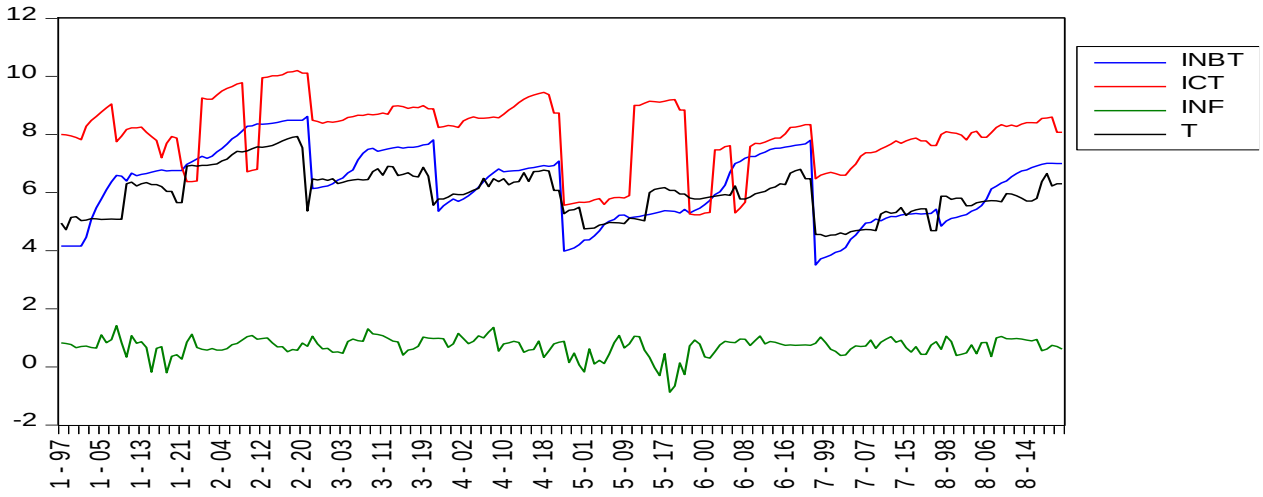

Fig. 1. Pattern of the variables that were studied between the years 1997 and 2021

Variance inflation factor (VIF) matrix

According to O'brien (2007), multicollinearity is not a concern if the values of the variance inflation factor (VIF) are less than 10. Following the application of the calculation for VIF $\left(\frac{1}{1-r^2}\right)$ all of the results were lower than the critical number. Table 4 has all the information.

Table 3 VIF Analysis

Variable	VIF	I/VIF
ICT	4.05	0.246719
T	3.81	0.262219
INF	1.14	0.874564
Mean VIF	3.00	

Source: Authors' findings with E-Views 10.

Panel unit root tests

In this empirical research, the impacts of ICT, transportation, and inflation on inbound tourism were investigated. In this study, panel unit root tests were used to checked for stationarity in the middle of variables and to decide whether or not there was integration of the variables at the second order by limiting our ARDL integration to the second order. Both of these objectives were accomplished by applying this approach. Because it is widely regarded as the testing approach that is most suited for panel data analysis, the ARDL technique was utilized in order to conduct the cointegration study on the variables that were under consideration. As part of its investigation into the stationarity of the variables that are under consideration as well as the integration order, this study utilized the LLC, FADF, FPP, and IPS panel unit root tests. The findings of these panel unit root tests revealed that all of the variables that were investigated exhibited stationarity behavior by the interaction between level and first difference. As a result, the results of the panel unit root tests demonstrated that the ARDL method was capable of being

utilized for the investigation of the long-term link that exists between ICT, transportation, and inflation on incoming tourism (Table 4).

Table 4 Unit roots test outcomes

variables	LLC	IPS	FPP	FADF	Stationary at the 1(0) or 1(1)
INBT	-0.954	-0.1556	12.853	13.812	--
ΔINBT	0.859***	-8.709***	96.928***	95.928***	1(1)
ICT	-3.286	-0.164	18.462	12.732	--
ΔICT	-3.440***	-3.769***	40.120***	40.121***	1(1)
T	0.817	-0.02	8.909	12.059	--
ΔT	-5.063***	-5.831***	95.420***	102.932***	1(1)
INF	-3.538***	-3.469***	41.279***	40.0123***	1(0)
ΔINF	--	--	--	--	--

Source: Authors' findings with E-Views 10.

***, **, and * mean that something has significance at the 1%, 5%, and 10% levels, accordingly.

Panel cointegration tests

In this study, the Pedroni panel cointegration method (Pedroni, 1999) was applied in order to study the lasting cointegration link that exists among the variables that were under investigation; the findings of this investigation are summarized in Table 5. The Pedroni panel cointegration method's estimated results revealed the presence of long-term cointegrating link amoung transportation, inflation and ICT, on inbound tourism. This relationship was found to be causally related to all of these variables. The Johansen–Fisher panel cointegration approach was also used in this investigation, and the expected results are presented in Table 6. The results of this method indicated that the null hypothesis (H0) that underpinned the precise test should be rejected because they demonstrated that there is a long-term cointegration among the variables that were

investigated. Both of the panel cointegration methodologies showed that there is a lasting connection between the variables that were researched. In addition, the Pedroni and Johansen–Fisher panel cointegration tests were subjected to a reliability and accuracy check using the Kao panel cointegration method (Kao et al., 1999) which was implemented in this research. The correctness and dependability of the previous results were validated by the findings of the Kao cointegration test, which are presented in Table 7.

Table 5 Results of the Pedroni

Alternative hypothesis: common AR coefs. (within-dimension)

			Weighted	
	Statistic	Prob.	Statistic	Prob.
Panel v-Statistic	1.88**	0.02	0.93	0.1761
Panel rho-Statistic	-0.77	0.22	-0.26	0.3963
Panel PP-Statistic	-2.16**	0.01	-1.36*	0.0863
Panel ADF-Statistic	-1.42*	0.07	-0.94	0.1736

Alternative hypothesis: individual AR coefs. (between dimension)

	Statistic	Prob.
Group rho-Statistic	0.81	0.7930
Group PP-Statistic	-1.01	0.1548

Group ADF-Statistic	-0.60	0.2722

Source: Authors' findings with E-Views 10.

Note: ***, **, and * represent significance at the 1, 5, and 10% levels, in turn.

Table 6 Reults of Johansen - Fisher

Hypothesized No. of CE(s)	Fisher Stat.* (from trace test)	Prob.	Fisher Stat.* (from max-eigen test)	Prob.
None	72.02***	0.0000	50.26***	0.0000
At most 1	36.30***	0.0026	25.55*	0.0607
At most 2	24.58*	0.0775	12.51	0.7080
At most 3	40.01***	0.0008	40.01***	0.0008

Source: Authors' findings with E-Views 10.

Note: ***, **, and * represent significance at the 1, 5, and 10% levels, in turn.

Table 7 Results of Keo

Null hypothesis	No cointegration
Kao t – statistic	Prob.
-2.27***	0.01

Source: Authors' findings with E-Views 10.

Note: ***, **, and * represent significance at the 1, 5, and 10% levels, in turn.

Long- and short-run valuations

Table 7 shows the long-term and short-term effects of transportation, inflation, information, and communication technology on inbound tourists in South Asian countries. Long-term estimates from the ARDL model showed that transportation had a good effect on inbound tourism in South Asian countries at the 1% level of significance. The economy is projected to grow by 42.454% if

transportation spending goes up by 1%. Our empirical long-term results show that better transportation facilities will help South Asian countries get more tourists more quickly. An investigation was showed in the Taiwan by (Wang, 2009) that set up that transportation had a significant direct effect on inbound tourism. Also, Ghosh (2021) studied the effect of transport facility on inbound Australian tourism from Asia. Their results exposed that transportation infrastructure had a direct and significant influence on inbound tourism in the long-run.

In the same way, this study's results showed that inflation had negative effect on tourists from outside the country. The long-run predicted coefficient of inflation presented that, at a 5% level of significance, a 1% increase in inflation would make 25.4107% fewer people visit south Asian countries. Our outcome endorses the previous results on the acute role of inflation in inbound tourism demand (Ghosh, 2022; Karimi et al., 2019; Meo et al., 2018; Özer & Kırca, 2020). Furthermore, the data presented in Table 7 suggests that ICT had a favorable influence on the growth of inbound tourism. According to the long-run predicted coefficient of 29.5423, an increase of one percentage point in ICT will result in an increase of 29.54% in the number of tourists that visit South Asian countries. Our outcomes are reliable with those of (Anser et al., 2021; Rehman et al., 2020; Sharma et al., 2022; Shehzad et al., 2019).

On the opposite hand, it was discovered that inflation had a favorable impact on international tourism in the short run. In the short run, a connection between ICT and inbound tourism was established; nevertheless, this connection was unfavorable and minor. In the countries of South Asia, the indication from the short-run study showed that the implementation of ICT led to a reduction in the number of tourists who visited those countries. In addition, the estimated short-run results suggested a negative and statistically insignificant association between transportation and inbound tourism in the South Asian countries. This was demonstrated by the fact that the relationship was negative. These results are consistent with what was seen Choudhary et al. (2020), Tang and Tan (2016), Fleissig (2021), and Narayan (2004).-

Table 7 Results of the ARDL

Variable	Coefficient	Std. Error	t-statistic	Prob.
Long Run Analysis				
ICT	0.295423***	0.05	5.71	0.00
T	0.424504**	0.18	2.25	0.02
INF	-0.254107***	0.10	-2.49	0.01
Short Run Analysis				
COINTEQ01	-0.235963***	0.06	-3.91	0.00
ICT	-0.644942	0.57	-1.13	0.25
T	-0.018476	0.08	-0.21	0.83
INF	0.050974	0.08	0.62	0.54
C	0.981170***	0.26	3.79	0.00

Mean dependent var	0.06	S.D dependent var	0.54
S.E. of regression	0.52	Akaike info criterion	0.31
Sum Squared resid	42.63	Schwarz criterion	1.02
Log likelihood	11.78	Hannan – Quinn criter	0.59

Source: Authors' findings with E-Views 10.

Note: ***, **, and * represent significance at the 1, 5, and 10% levels, in turn.

Summary and Implications for Policy

Transportation, ICT, inflation, and inbound tourism in South Asian countries were examined using annual data from 1997 through 2021. Bangladesh, Bhutan, India, the Maldives, Nepal, Pakistan, Afghanistan, and Sri Lanka This study used LLC, FPP, FADF, and IPS unit root tests

to determine if the series is stationary. Long-term factor relationships were examined using Pedroni and Johansen–Fisher (JF) panel cointegration tests. Inflation, ICT, and transportation's long-term and short-term effects on inbound tourists were examined using ARDL. Both panel cointegration methodologies showed a long-term relationship between inflation, ICT, and transportation for South Asian incoming visitors. This study found that long-term inflation negatively affected South Asian economic development, but short-term inflation had no significant effect. Transportation and ICT boosted South Asian inbound tourism. Inflation negatively affected South Asian countries' long-term inbound tourism, although it had no substantial short-term effect. Transportation and ICT also boosted South Asian inbound tourism.

The results show that transit options improved incoming tourism, resulting in the following policy recommendations: Based on these findings, regulations should offer acceptable placement options to facilitate easier access to and acquisition of locations, cut freight charges, and make it easier to convey items to holiday destinations. Travel and transportation policies require educated employees, resource management, foreign language ability, and effective information to tourists on potential hazards and possibilities in target destinations. The study also shows how important ICT is to the tourism industry. ICT in the region should be pushed through the government and policy advocacy groups. So, by making the technology infrastructure better and more widespread, it will be possible for the nation to engage in tourism promotion on a more extensive scale. Making use of ICT to expand internet-based tourism will boost inbound visitor numbers in the future. Screening, identifying, following, and predicting behavior can all be done with the use of intelligent technology, as can working with the abilities required to hunt down contacts. Also, ICT makes it possible to do financial deals without cash and without talking to anyone. ICT should be added to the tourist demand model as a focus of future research. Also, our results show that just improving ICT won't be enough. Important, too, is inflation. The research as well demonstrates that inflation, which represents the stability of the country, has a negative relationship regarding the tourist business. This is due to the fact that inflation reflects the degree of certainty or uncertainty that exists in the country. A high inflation rate makes things more expensive, which discourages investors and visitors, leading to a drop in tourism, which in turn has a negative influence on the inbound tourism. As a result, the government should regulate the inflation through better use of monetary and fiscal policy in order to prevent these bad effects from occurring.

Future direction

The following are some of the restrictions that were placed on the study, all of which point to possible new lines of inquiry that could be pursued. In following studies, the quality of the environs in the surrounding zone ought to be given more attention as an additional key component in determining the amount of demand for tourism. In addition to this, a linear estimating approach is used in this work, and the researchers did not take into account any nonlinear effects in their analysis of the data. It's possible that the relationships between the variables don't follow a linear pattern at all. In later studies, perhaps this aspect will become more understandable. The conclusions of this article can't be generalized to the conditions in other parts of the world because the research was only conducted in South Asia. It is likely that academics will look into how the effect of ICT and other elements affects the need for travel and tourism in a collection of countries that have like socioeconomic characteristics.

References

Adedoyin, F. F., Bekun, F. V., Driha, O. M., & Balsalobre-Lorente, D. (2020). The effects of air transportation, energy, ICT and FDI on economic growth in the industry 4.0 era: Evidence from the United States. Technological forecasting and social change, 160, 120297.

Adeola, O., & Evans, O. (2019). Digital tourism: mobile phones, internet and tourism in Africa. Tourism Recreation Research, 44(2), 190-202.

Akinbobola, T. (2012). The dynamics of money supply, exchange rate and inflation in Nigeria. Journal of Applied Finance and Banking, 2(4), 117.

Ali, A., & J. Frew, A. (2014). ICT and sustainable tourism development: an innovative perspective. Journal of Hospitality and Tourism Technology, 5(1), 2-16.

Amin, S. B., Kabir, F. A., & Khan, F. (2020). Tourism and energy nexus in selected South Asian countries: a panel study. Current Issues in Tourism, 23(16), 1963-1967.

Anser, M. K., Adeleye, B. N., Tabash, M. I., & Tiwari, A. K. (2022). Services trade–ICT–tourism nexus in selected Asian countries: new evidence from panel data techniques. Current Issues in Tourism, 25(15), 2388-2403.

Anser, M. K., Khan, M. A., Nassani, A. A., Askar, S. E., Abro, M. M. Q., Zaman, K., & Kabbani, A. (2021). The mediating role of ICTs in the relationship between international tourism and environmental degradation: fit as a fiddle. Environmental Science and Pollution Research, 28, 63769-63783.

Athari, S. A., Alola, U. V., Ghasemi, M., & Alola, A. A. (2021). The (Un) sticky role of exchange and inflation rate in tourism development: insight from the low and high political risk destinations. Current Issues in Tourism, 24(12), 1670-1685.

Barnet, E. M. (1975). The impact of inflation on the travel market. The Tourist Review, 30(1), 2-5.

Bayram, G. E. (2020). Impact of information technology on tourism. In The emerald handbook of ICT in tourism and hospitality (pp. 243-257). Emerald Publishing Limited.

Bethapudi, A. (2013). The role of ICT in tourism industry. Journal of applied economics and business, 1(4), 67-79.

Button, K., & Taylor, S. (2000). International air transportation and economic development. Journal of Air Transport Management, 6(4), 209-222.

Choudhary, S. A., Khan, M. A., Sheikh, A. Z., Jabor, M. K., bin Nordin, M. S., Nassani, A. A., Alotaibi, S. M., Abro, M. M. Q., Vo, X. V., & Zaman, K. (2020). Role of information and communication technologies on the war against terrorism and on the development of tourism: Evidence from a panel of 28 countries. Technology in Society, 62, 101296.

Cibinskiene, A., & Snieskiene, G. (2015). Evaluation of city tourism competitiveness. Procedia-Social and Behavioral Sciences, 213, 105-110.

De Alwis, R. (2010). Promoting Tourism in South Asia. Promoting Economic Cooperation in South Asia, 259.

Fleissig, A. R. (2021). Habit persistence in tourist sub-industries. Journal of Applied Economics, 24(1), 103-113.

Galı, J., & Gertler, M. (1999). Inflation dynamics: A structural econometric analysis. Journal of monetary Economics, 44(2), 195-222.

Garín-Muñoz, T., & Pérez-Amaral, T. (2011). Internet usage for travel and tourism: The case of Spain. Tourism Economics, 17(5), 1071-1085.

Ghosh, S. (2021). Inbound Australian tourism demand from Asia: a panel gravity model. Journal of Economic Studies, 48(7), 1388-1400.

Ghosh, S. (2022). Geopolitical risk, economic growth, economic uncertainty and international inbound tourism: an Indian illustration. Review of Economics and Political Science, 7(1), 2-21.

Giotis, G., & Papadionysiou, E. (2022). The Role of managerial and technological innovations in the tourism industry: A review of the empirical literature. Sustainability, 14(9), 5182.

Gössling, S. (2020). Technology, ICT and tourism: from big data to the big picture. Journal of Sustainable Tourism, 29(5), 849-858.

Hanafiah, M. H. M., & Harun, M. F. M. (2010). Tourism demand in Malaysia: A cross-sectional pool time-series analysis. International Journal of trade, economics and finance, 1(2), 200.

Hang, T. T. B., Nhung, D. T. H., Huy, D. T. N., Hung, N. M., & Pham, M. D. (2020). Where Beta is going–case of Viet Nam hotel, airlines and tourism company groups after the low inflation period. Entrepreneurship and Sustainability Issues, 7(3), 2282.

Hardy, A. (2003). An investigation into the key factors necessary for the development of iconic touring routes. Journal of Vacation Marketing, 9(4), 314-330.

Hirschhorn, F., Paulsson, A., Sørensen, C. H., & Veeneman, W. (2019). Public transport regimes and mobility as a service: Governance approaches in Amsterdam, Birmingham, and Helsinki. Transportation Research Part A: Policy and Practice, 130, 178-191.

Huseynli, N. (2022). Econometric analysis of the relationship between tourism revenues, inflation and economic growth: The case of morocco and South Africa. African Journal of Hospitality, Tourism and Leisure, 11(1), 135-146.

Ivankova, V., Gavurova, B., Bačík, R., & Rigelský, M. (2021). Relationships between road transport infrastructure and tourism spending: A development approach in European OECD countries. Entrepreneurship and Sustainability Issues, 9(2), 535.

Kanwal, S., Rasheed, M. I., Pitafi, A. H., Pitafi, A., & Ren, M. (2020). Road and transport infrastructure development and community support for tourism: The role of perceived benefits, and community satisfaction. Tourism Management, 77, 104014.

Kao, C., Chiang, M. H., & Chen, B. (1999). International R&D spillovers: an application of estimation and inference in panel cointegration. Oxford Bulletin of Economics and statistics, 61(S1), 691-709.

Karimi, M. S., Khan, A. A., & Karamelikli, H. (2019). Asymmetric effects of real exchange rate on inbound tourist arrivals in Malaysia: An analysis of price rigidity. International Journal of Tourism Research, 21(2), 156-164.

Khadaroo, J., & Seetanah, B. (2007). Transport infrastructure and tourism development. Annals of tourism research, 34(4), 1021-1032.

Khanalizadeh, B., & Yazdi, S. (2016). Tourism Demand: A Pane Data Approach. Current Issues in Tourism, 1-14.

Kumar, N., & Kumar, R. R. (2020). Relationship between ICT and international tourism demand: A study of major tourist destinations. Tourism Economics, 26(6), 908-925.

Kumar, R. R., Stauvermann, P. J., Kumar, N., & Shahzad, S. J. H. (2019). Exploring the effect of ICT and tourism on economic growth: a study of Israel. Economic Change and Restructuring, 52, 221-254.

Law, C. C., Zhang, Y., Gow, J., & Vu, X.-B. (2022). Dynamic relationship between air transport, economic growth and inbound tourism in Cambodia, Laos, Myanmar and Vietnam. Journal of Air Transport Management, 98, 102161.

Li, X. (2014). An analysis of labour productivity growth in the Canadian tourism/hospitality industry. Anatolia, 25(3), 374-386.

Li, Y., Alharthi, M., Ahmad, I., Hanif, I., & Hassan, M. U. (2022). Nexus between renewable energy, natural resources and carbon emissions under the shadow of transboundary trade relationship from South East Asian economies. Energy Strategy Reviews, 41, 100855.

Li, Z., Shu, H., Tan, T., Huang, S., & Zha, J. (2020). Does the demographic structure affect outbound tourism demand? A panel smooth transition regression approach. Journal of Travel Research, 59(5), 893-908.

Liberato, P., Liberato, D., Abreu, A., Alén-González, E., & Rocha, Á. (2018). The information technologies in the competitiveness of the tourism sector. Proceedings of the International Conference on Information Technology & Systems (ICITS 2018),

Lim, Y. C., & Sek, S. K. (2015). An examination on the determinants of inflation. Journal of Economics, Business and Management, 3(7), 678-682.

Mandeno, T. G. (2012). Is tourism a driver for public transport investment? University of Otago].

Mansfield, E. R., & Helms, B. P. (1982). Detecting multicollinearity. The American Statistician, 36(3a), 158-160.

Meo, M. S., Chowdhury, M. A. F., Shaikh, G. M., Ali, M., & Masood Sheikh, S. (2018). Asymmetric impact of oil prices, exchange rate, and inflation on tourism demand in Pakistan: new evidence from nonlinear ARDL. Asia Pacific Journal of Tourism Research, 23(4), 408-422.

Murshed, M., Mahmood, H., Alkhateeb, T. T. Y., & Banerjee, S. (2020). Calibrating the impacts of regional trade integration and renewable energy transition on the sustainability of international inbound tourism demand in South Asia. Sustainability, 12(20), 8341.

Narayan, P. K. (2004). Fiji's tourism demand: the ARDL approach to cointegration. Tourism Economics, 10(2), 193-206.

Navickas, V., & Malakauskaite, A. (2009). The possibilities for the identification and evaluation of tourism sector competitiveness factors. Engineering economics, 61(1).

Nawaz, M. A. (2018). Public investment, private investment, governance and tourism growth in five south Asian Association for Regional Cooperation Countries PhD Thesis. Universiti Utara Malaysia].

Nawaz, M. A., & Hassan, S. (2016). Tourism in South Asia. Journal of Economic & Management Perspectives, 10(4), 591-601.

O'brien, R. M. (2007). A caution regarding rules of thumb for variance inflation factors. Quality & quantity, 41, 673-690.

Özer, M., & Kırca, M. (2020). THE IMPACT OF TOURISM DEMAND ON REGIONAL INFLATION IN TURKEY. Journal of the Geographical Institute "Jovan Cvijić" SASA, 70(3), 241–254-241–254.

Pagliara, F., La Pietra, A., Gomez, J., & Vassallo, J. M. (2015). High Speed Rail and the tourism market: Evidence from the Madrid case study. Transport Policy, 37, 187-194.

Pedroni, P. (1999). Critical values for cointegration tests in heterogeneous panels with multiple regressors. Oxford Bulletin of Economics and statistics, 61(S1), 653-670.

Percoco, M. (2010). Airport activity and local development: Evidence from Italy. Urban studies, 47(11), 2427-2443.

Qirici, E., THEODHORI, O., & ELMAZI, L. (2011). E-Marketing and ICT-Supported tourist destination management. Implications for tourism industry in global recession. International Journal of Management Cases, 13(3), 152-158.

Ramos, C. M., & Rodrigues, P. M. (2013). The importance of ICT for tourism demand: A dynamic panel data analysis. Quantitative methods in tourism economics, 97-111.

Rehman, O. U., Liu, X., Rauf, A., Slama, M. B., & Amin, W. (2020). Internet tradition and tourism development: A causality analysis on BRI listed economies. Tourism Economics, 26(6), 926-957.

Sadr, S. M. H. (2013). The role of ICT in tourism industry on economic growth: Case study of Iran. European Journal of Business and Management, 5(17), 159-165.

Shanker, D. (2008). ICT and Tourism: challenges and opportunities.

Sharma, C. (2021). Testing the asymmetric effects of the economic policy uncertainty on the tourism demand in India. Tourism Economics, 27(4), 867-873.

SHARMA, M., Mohapatra, G., & GIRI, A. K. (2020). Beyond growth: does tourism promote human development in India? Evidence from time series analysis. The Journal of Asian Finance, Economics and Business, 7(12), 693-702.

Sharma, M., Mohapatra, G., & Giri, A. K. (2022). Assessing the role of ICT, governance, and infrastructure on inbound tourism demand in India. Journal of Economic and Administrative Sciences(ahead-of-print).

Sheard, N. (2014). Airports and urban sectoral employment. Journal of Urban Economics, 80, 133-152.

Shehzad, K., Liu, X., Rauf, A., Arif, M., Mazhar, S., Sohail, N., & Amin, W. (2019). Revolutionising tourism development in China: An effective role of ICT and Western Silk Road project. Asia Pacific Journal of Tourism Research, 24(9), 965-977.

Shen, P., Yin, P., & Zhang, T. (2023). The combined effects of high-speed rail and aviation on tourist arrivals in China. Research in Transportation Business & Management, 100970.

Tang, C. F., & Tan, E. C. (2016). The determinants of inbound tourism demand in Malaysia: another visit with non-stationary panel data approach. Anatolia, 27(2), 189-200.

Tasnim, Z., Shareef, M. A., Dwivedi, Y. K., Kumar, U., Kumar, V., Malik, F. T., & Raman, R. (2022). Tourism sustainability during COVID-19: developing value chain resilience. Operations Management Research, 1-17.

Tveter, E. (2017). The effect of airports on regional development: Evidence from the construction of regional airports in Norway. Research in Transportation Economics, 63, 50-58.

Umeora, C. E. (2010). Effects of money supply and exchange rates on inflation in Nigeria. Journal of Management and Corporate Governance, 2.

Usmani, G., Akram, V., & Praveen, B. (2021). Tourist arrivals, international tourist expenditure, and economic growth in BRIC countries. Journal of Public Affairs, 21(2), e2202.

Wang, Y.-S. (2009). The impact of crisis events and macroeconomic activity on Taiwan's international inbound tourism demand. Tourism Management, 30(1), 75-82.

Wong, J. D. (1996). The impact of tourism on local government expenditures. Growth and change, 27(3), 313-326.

WTTC, W. (2019). World travel and tourism council. The Economic Impact of Travel and Tourism.

Yong, E.-L. (2014). Innovation, tourism demand and inflation: Evidence from 14 European countries. Journal of Economics, Business and Management, 2(3), 191-195.