



How marine tourism promote financial development in sustainable economy: new evidences from South Asia and implications to future tourism students

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Abstract

The ocean economy and marine tourism policies are global economic concerns being looked at from a deeply holistic viewpoint. For South Asian countries, the ocean economy and marine tourism have successive socio-economic importance. The quantification of the ocean economy and marine tourism also poses some major challenges, and these challenges pose limitations for policymaking by the government and other relevant agencies. The study has used the newly developed hidden panel cointegration test, and the nonlinear panel autoregressive distributed lag (NPARDL) model for a relationship between economic growth and tourism is assessed. This study offers consistent and reliable results of cointegration by incorporating the findings of four approaches to cointegration. The empirical results illustrate the asymmetric relationship between ocean and marine tourism and economic growth. The findings showed that 1% increase in long-term tourism economic growth is adjusted by 2.95% annually. This research paper aims to provide a policy related to South Asia's economic activities and ocean and marine tourism economic significance. Protecting local marine protected areas (MPAs) will improve the economic benefits of the ocean and the marine economy. The policy suggests that there should be a law ensuring that marine tourism is of high quality and environment friendly. This paper provides a guideline for further research with a strong emphasis on ocean- and marine-related economic development and tourism.

Keywords Ocean economy · Financial development · Marine tourism · South Asia's economic activities · Sustainability

Introduction

The economic living of 3 billion people depends on the ocean economy out of which a vast majority lives in developing countries. Marine industries such as fisheries and tourism are an important job and income provider industries (tourism and experience 2016). However, climate change, pollution, and insufficient consideration of environmental and social sustainability may threaten marine resources, hampering the

socio-economic benefits that oceans bring to future generations (Anh Tu et al. 2021; Iqbal et al. 2020; Nawaz et al. 2021b; Sun et al. 2020a, 2020b, 2020c). Enlargement of the marine sector and sustainable investment in the ocean economy such as offshore renewable energy and marine biotechnology will promote job creation, energy supply, food security, and infrastructure (Baloch et al. 2021; Mohsin et al. 2021b; Nawaz et al. 2021a). Understanding how the international community can fill the gap in the development of ocean economy and marine tourism through their expertise, creativity, capacity, and funding to prevent developing countries from lagging in the sustainable marine economy (Chien et al. 2021e; Hu et al. 2020; Wang et al. 2021; Zhao et al. 2020). Coastal and marine tourism is an important part of a sustainable blue economy, creating 6.5 million jobs. The worldwide growth of the ocean economy and marine tourism is expected to reach 3.5 percent.

By 2030, marine and coastal tourism will become the largest value-added component of the marine economy, hitting 26 percent of total production (Khokhar et al. 2020). Regions such as the Caribbean (whose economic growth and

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well-being depend heavily on tourism) and other regions (such as Southeast Asia) are likely to benefit from this development. Nature is the foundation of the tourism industry as travelers around the world are willing to pay a premium for ocean-view quarters like beaches, coral reefs, and panoramic views of the sea (Chien et al. 2021b; Lv and Wu 2021; Sun and Lv 2021; Yuan et al. 2021). The fish and seafood items produced by coastal ecosystems are one of the favorite worldwide economic activity provide foods in restaurants and a source of livelihoods for the poorest coastal communities (He et al. 2021; Li et al. 2021a, 2021b, 2021c; Zhang et al. 2020). Over three billion people depend on marine and coastal businesses for their livelihood. So, 30 percent of the world's fish stock, however, is over-exploited, bringing the stock level below the optimal sustainable yield. Ocean and seawater also consume 30 percent of human-generated CO₂ emissions in everyday life. There is a troubling marine waste situation as about 13,000 bits of plastic litter are found on each square kilometer of the ocean. Policies related to marine, maritime tourism, and ocean economy are being approached with an inclusive outlook in this new era. Particularly, in South Asia (World Travel and Tourism Council 2016), the increasing socio-economic importance of the marine economy and marine tourism is gradually evident.

Ocean economic development in South Asia is becoming increasingly concerned (The World Travel and Tourism Council 2015). Policymaking is the process of engaging various organizations and individuals to work with their self and social benefits for mutual benefit. This paper deals with the policymaking of the ocean economy including marine tourism. The aim of developing an ocean economy and marine tourism policy is to investigate the relationship between the ocean economy and its economic and environmental benefits, along with providing guidance for further development (Nepal Tourism Board 2018; (The World Travel and Tourism Council 2015). Research carries out those economic activities which include employment, salaries, and output. Data analysis reveals that the ocean economy generates 2 percent of employment and 1.7 percent of GDP. The ocean economy is opening up new directions for job and output improvements (Chien et al. 2021c; Iqbal et al. 2019b; Liu and Wu 2019). OECD (2017) describes that one of the biggest sectors of marine and coastal tourism is the marine economy. A source of human economic activity is this marine and coastal tourism industry. Nevertheless, there is a debate about marine and coastal tourism's environmental impact. Naval and coastal tourism not only promises economic growth but also social sustainability. Additionally, the focus of marine and coastal tourism along with the idea of ecotourism is on nature conservation and economic welfare enhancement (Chien et al. 2021g; Chien et al. 2021h; Chien et al. 2020; Iqbal et al. 2019a).

Coastal and marine spaces provide a human being with a wide range of economic activities and services closely related to coastal and marine tourism. The maritime economic sector provides economic advantages but it also threatens the climate. MSP "marine space planning" must be introduced, a strategy for reducing the environmental degradation caused by marine and coastal tourism (Huang et al. 2020; Khokhar et al. 2020; Li et al. 2021b).

Southeast Asia claims ownership of nearly 30% of the world's coral reefs, 35% of mangroves, and at least 18% of seagrass meadows (Mi et al. 2021; Othman et al. 2020; Sadiq et al. 2020) and has a coastline of 173,000 km that borders some of the world's most economically and ecologically rich ocean areas (Anser et al. 2020a; Nguyen et al. 2021). The marine economy is important for several states in the region. Southeast Asia is also home to six of the world's top 25 busiest container ports and two of the world's top ten shipbuilding economies (Baloch et al. 2020; Klain et al. 2018; Li et al. 2021d). MSP ensures to address marine and coastal tourism-related management and development issues to improve environmental conditions for the development of the marine and coastal tourism industries, enhance the efficiency and facilities of the seascapes and ecosystems, climate-compatible steps, to continue spatial control so as not to overwhelm tourism facilities and activities and improving economic and human development to the optimum level (Shair et al. 2021).

Therefore, the purpose of this study is to systematically describe activity within South Asia's maritime economy and fully recognize its contribution to Asia. This approach uses analysis to assess the size and structure of the maritime economy, making extensive use of gray literature to distinguish marine and non-marine activities. The work focuses specifically on contributing to the economic production and employment of exotic air and marine recreation, including activities that rely on the material and local use of the marine environment but also its esthetics

Background and literature review

The income of small coastal fishermen mainly depends on marine resources (Hadjimichael 2018). Consequently, they usually use and occupy areas with high marine biodiversity (Huang et al. 2020; Lenzen et al. 2020). If they use it indiscriminately without protection, then the ecosystem could be endangered, affecting the economic well-being of local communities. Therefore, marine protected area (MPA) has become a universal tool for maintaining high biodiversity area (Ranasinghe et al. 2020; Sadiq et al. 2021; Xueying et al. 2021). The MPAs have different types and size, varying in level of protection and safety focus. Therefore, protecting marine resources from misuse is an important goal. However, the

setting up of MPA may expose the poor to greater risk of unemployment. It is important to develop alternative livelihood programs to help drive coastal communities out of the fishing industry without compromising their livelihoods.

Countries around the world usually use tourism as a livelihood strategy, and it is also used for biodiversity conservation in protected areas (Mohsin et al. 2021a; Mohsin et al. 2019b; Mohsin et al. 2018; Nawaz and Hassan 2016; OECD 2020). In particular, it aims to increase the well-being of peoples and transform traditional income-generating activities in the region. The ultimate objective is to reduce poverty and eliminating threats to biodiversity. In the past decade, much research has been conducted on the role of tourism in protected areas. The empirical and theoretical literature provides contradictory answers to solve this problem ranging from negative to positive. Many scholars believe that tourism can help improve the income and living standards of residents by creating job opportunities. Although a large amount of literature shows that tourism has a positive impact on development and protected areas, others believe that tourism projects in MPA may be difficult to implement (Gössling et al. 2020). In addition, such projects cannot compete with fishing revenues Prideaux et al. (2020), and they can increase income inequality Dellink et al. (2019), create consumer conflicts Hadjimichael (2018), and result in the elimination of cultural values (Suhel and Bashir 2018). Tourism was soon introduced and identified as an important means of generating alternative livelihoods to compensate for lost opportunities in societies, and hence, the MPA’s focus on marine resources. The similar works has been done on energy, economic, and environment (Li et al. 2021a, 2021b, 2021c, 2021d; Mohsin et al. 2021a; Mohsin et al. 2019b; Mohsin et al. 2020a).

World Travel & Tourism Council (2018) described tourism as a ‘clean industry’ and does not cause any degradation to the environment. The research also accounts for activities related to tourism that collect aquatic and terrestrial ecosystems. Community snuggle resides in non-tourist places as well as tourist sites and beaches with lower organic carbon characteristics, lower densities, and lower diversity (Min et al. 2016; Nawaz et al. 2021a). Small Island is a tourist destination that

attracts tourists because of its natural beauty, foreignness, and diversity. Spots of these tourists have clean, fresh, and appealing water. Tourism becomes a source of boosting the economy because of the boundless characteristics of destination tourism. However, because of the construction of new buildings and tourism-related activities, tourism is one of the major factors of environmental degradation and depletion (Mohsin et al. 2021b). Tourism is a development tool that boosts a country’s economy (Mulok et al. 2012) and plays an important role in the global industry.

The classification of the marine economy according to is as follows.

Marine protected area

Areas that include rivers, estuaries, and oceans are marine protected areas. These marine areas can be hideaways in many forms from marine and wildlife. Commonly marine protected areas are closed to public access and are maintained for purposes of study and conservation. Such MPAs that incorporated flora and fauna are of historical and cultural importance (Ahmad et al. 2020; Wasif Rasheed and Anser 2017; Xu et al. 2020). Min et al. (2016) stated as other industries are growing rapidly in the world so the marine and coastal tourism industries are also one of the fastest growing industries in the world. Nonetheless, people are not fully aware of the economic and environmental value of marine and coastal tourism (Ma et al. 2015). This research paper, as supported by the United Nations Environment and Social Commission for Asia and the Pacific (ESCAP), elaborates key points for encouraging marine and coastal tourism include well-established coastal management practices, healthy and safe coastal ecosystem, resort and beach establishment, and a worthy marine habitat and wildlife protection (Table 1).

Terrestrial and marine protected area

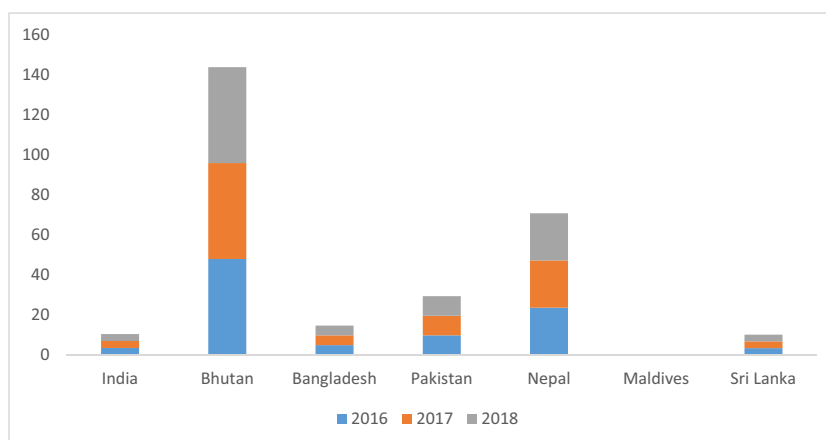
Terrestrial protected areas are an area of about 1,000 hectares which is completely or partially covered which includes national parks, beaches, natural and cultural monuments, hideaways of animals, and habitats protected (see Fig. 1). Such areas are covered under the direct supervision of federal or provincial governments (Kreishan 2010; Songling et al. 2019). Such areas are a source of attraction for tourism, too. These areas include leisure and recreational tourism, cultural tourism, cruise, and marine tourism (Pratt 2015) mentioned the character of the economy’s terrestrial surface water ecosystem. The author clarified that the terrestrial surface water environment has clear importance for industrial and agricultural use, for use in the generation of hydropower and tourism and aquatic goods.

Table 1 Marine protected areas (% of terrestrial water) from 2016 to 2018

Year	India	Bangladesh	Pakistan	Maldives	Sri Lanka
2016	0.170692	5.35694	0.766351	0.048693	0.074707
2017	0.170706	5.35719	0.766529	0.051505	0.074626
2018	0.170706	5.35719	0.766529	0.051505	0.074626

Source: (World Bank 2018)

Fig. 1 Terrestrial and marine protected areas (% of total terrestrial area) (World Bank 2018)



Data and methodology

Analytical framework

The empirical research presented in this paper is based on the standard Cobb–Douglas production function with constant returns in the neoclassical system with Hicks neutral technical methods.

$$Y_t = A_t K_t^a \quad (1)$$

Among them, Y_t is the economic growth (real GDP per capita), A_t represents total factor productivity, and K_t^a represents capital per capita. The literature on economic growth can extend this production function in several ways. Researchers believe that inbound tourism, trade openness, inflation, and capital stock are all factors that affect economic growth.

However, it is possible to assume growth function as follows:

$$A_t = f(T, Z_t) \quad (2)$$

where Z_t is a vector of growth-enhancing variables such as tourism indicators, capital stocks, trade openness, inflation, and other macroeconomic policies, and T is the time dynamics.

Tourism is a significant determinant of economic growth, as we discussed in the previous section. Along with tourism, there are a number of other factors that could influence economic growth. In the theoretical and empirical literature of economics, the relationship between trade openness and economic growth has long been debated. For example, it is claimed that trade openness has a negative impact on individual countries, whereas Harrison (1996) claims that trade openness has a significant and positive impact on economic growth. Lee (1993) and Zhang (2021), for example, show that average tariff rates and economic growth have a negative relationship. Because the results were inconclusive, the implications of trade openness for Pakistan could not be

generalized. As a result, in order to quantify its impact in Pakistan, we include it in our growth regression.

Another key element of economic growth, as per neoclassical growth theory, is capital stock. The majority of studies found that capital stock and economic growth have a positive and significant relationship. Similarly, the discussion of inflation and economic growth is contentious. Inflation has a contrasting impact on economic growth when measured over time. Inflation has a negative effect on output growth rates in the short run, but it has no effect on GDP growth rates in the long run. Importantly, in the case of Pakistan, a moderate inflation rate is required for the economy's health, whereas a moderate and low level of inflation is detrimental to output growth. These contradictory findings lead us to believe that the inflation indicator should be included in growth regression:

$$\begin{aligned} \text{GDP}_{it} = & \alpha + \beta_1 \text{TouE}_{it} + \beta_2 \text{Trade}_{it} + \beta_3 \text{capital}_{it} \\ & + \beta_4 \text{M_Supply}_{it} + \beta_3 \text{Ex_Rate}_{it} \\ & + \beta_4 \text{F_Development}_{it} + \mu_{it} \end{aligned} \quad (3)$$

where GDP_{it} is the economic growth variable of country i at time period T , TouE_{it} is an international tourism receipt of country I at time period t , capital_{it} represents the per capita capital invested of each country, M_Supply_{it} indicates the total supply of each country in a specified time period, Ex_Rate_{it} is the exchange rate of each country against the USA dollar, and $\text{F_Development}_{it}$ indicates the financial development of each country and μ_{it} is the Gaussian error term

Econometric model

As we mentioned in the literature review section, much of the tourism growth literature is based on the cointegration techniques of Engel and Granger (1987), Johnson (1991), and Johnson and Usseus (1990). On the other hand, using the same method with the same variables, there is no chance to

make an original contribution, because over time this will only increase the number of conflicting results, and we have serious questions about tourism management policies. To avoid this problem, we use an autoregressive distributed lag (ARDL) model. To the best of our knowledge, there are no available studies in Pakistan that use ARDL estimates to test the link between tourism and growth (Anser et al. 2020a, 2020c).

Pesaran and Shin (1999) and Pesaran et al. (2001) proposed the ARDL cointegration technique (2001). The ARDL estimator is being used by the researchers because of its many benefits. It does not, for example, require that all data series under consideration have the same integration order, and it works regardless of whether the regressors have an $I(0)$ or $I(1)$ order of cointegration. According to Pesaran and Shin (1999), ARDL estimators produce true parameters in small sample sizes when compared to Johansen and Julius’s cointegration technique, and ARDL estimators’ coefficients are super consistent. As a result, in our case, with 40 annual observations, this is more relevant. In addition, because the ARDL framework is free of residual correlation, endogeneity is less of an issue (Asif et al. 2020; Sarker et al. 2020; Iram et al. 2020a; Sun et al. 2020b; Tehreem et al. 2020). The ARDL method, according to Pesaran and Shin (1999), can differentiate between explanatory and dependent variables. The assessment is possible even when the explanatory variables are endogenous (Pesaran and Pesaran, 1997, Pesaran et al., 2001). This is a critical issue in the tourism and growth nexus, as the literature shows a mixed picture of the causality between tourism and economic growth. As a result, this study uses ARDL modeling. The ARDL is presented as follows in Eq. (4):

$$\begin{aligned} \Delta \ln \text{GDP}_t = & \alpha_0 + \sum_{i=1}^p \alpha_1 \Delta \ln \text{GDP}_{t-i} + \sum_{i=1}^p \alpha_2 \Delta \ln \text{TouE}_{t-i} \\ & + \sum_{i=1}^p \alpha_3 \Delta \ln \text{Trade}_{t-i} + \sum_{i=1}^p \alpha_4 \Delta \ln \text{capital}_{t-i} \\ & + \sum_{i=1}^p \alpha_5 \Delta \ln \text{M.Supply}_{t-i} \\ & + \sum_{i=1}^p \alpha_6 \Delta \ln \text{Ex.Rate}_{t-i} \\ & + \sum_{i=1}^p \alpha_7 \Delta \ln \text{F.Development}_{t-i} + \lambda_1 \text{GDP}_{t-i} \\ & + \lambda_2 \ln \text{TouE}_{t-1} + \lambda_3 \ln \text{trade}_{t-1} \\ & + \lambda_4 \ln \text{capital}_{t-1} + \lambda_5 \text{M.Supply}_{it} \\ & + \lambda_6 \text{Ex.Rate}_{it} + \lambda_7 \text{F.Development}_{it} + \mu_{it} \end{aligned} \quad (4)$$

The expression from λ_1 to λ_7 on the right-hand side depicts the long-run relationship between the variables, whereas the expression from α_1 to α_7 with the summation signs depicts the

short-run dynamics of the variables. In contrast, 0 denotes the drift constant, and t denotes Gaussian white noise. ARDL bounds testing yields complete results for short-run and long-run dynamics after a series of steps and procedures. In the first step, Eq. (4) will be estimated using the ordinary least square (OLS) method, and an F -test will be used to determine whether the variables in Eq. (4) have a long-term relationship (3) (Jun et al. 2020 ; Liu et al. 2020; Liu and Wu 2019).

Pesaran et al. provided upper and lower critical values, which are compared to the calculated F -statistics value (2001). Regardless of whether the variables are $I(0)$ or $I(1)$, if the calculated F -value exceeds the upper critical value, the null hypothesis of no cointegration is rejected (1). The R2 criterion, Hannan Quinn Criterion, Akaike Information Criterion (AIC), and Schwarz Criterion will be used to estimate long-run relationships using the selected ARDL model in the second step (SBC). In the third step, we calculate the following error correction model:

$$\begin{aligned} \Delta \text{GDP}_t = & \beta_0 + \sum_{i=1}^p \delta_1 \Delta \text{GDP}_{t-i} + \sum_{i=1}^p \gamma_2 \Delta \text{TouE}_{t-i} \\ & + \sum_{i=1}^p \theta_3 \Delta \text{Trade}_{t-i} + \sum_{i=1}^p \vartheta_4 \Delta \text{capital}_{t-i} \\ & + \sum_{i=1}^p \rho_5 \Delta \text{M.Supply}_{t-i} + \sum_{i=1}^p \varphi_6 \Delta \text{Ex.Rate}_{t-i} \\ & + \sum_{i=1}^p \omega_6 \Delta \ln \text{F.Development}_{t-i} + \alpha \text{ECM}_{it-1} \\ & + \mu_{it} \end{aligned} \quad (5)$$

Variable selection

Dependent variable

The dependent variable in this study is GDP. Tourism industry should have an impact on the quantitative measure of the economic development, gross domestic product (GDP), and other economic indicators. As a result, a specific literature should need to develop in order to measure the impact of tourism upon GDP to deal with measuring how tourism contributes to economic growth so that the policymakers and government representatives should design the policies to facilitate the tourist from all over the world.

Independent variable

(a) GDP: (a) Tourism earning: during the past few years, the traveling business has practiced continuous growth and excavating variation, becoming one of the deprived rising financial sectors at international level. Contemporary traveling is thoroughly associated with the growth and contains

progressively new destinations of travelers. These forces have made tourism the main driver of economic and social advancement. The data for tourism earning is collected from World Bank (Tehreem et al. 2020; Wasif Rasheed and Anser 2017; Yousaf et al. 2020; Xu et al. 2020). Trade: the data for total volume of trade is collected from World Bank and statistical year book of each country. (c) Exchange rate: the exchange rate is determined autonomously of the economic growth rate. The exchange rate will affect financial growth and similarly the economic growth rate will affect the exchange rate. (d) Financial development and money supply: in short, tourism and financial development are positively correlated and statistically important in relative to economic growth. In other words, the increase in tourism and financial development will ensure the rise in financial growth in the long run. (e) Money supply: money supply brings up the amount of money accessible in the host country, which may have a complex association with financial development, customer spending, and finally traveling demand. Further, the data for each variable is collected from the World Bank data source and statistical year book of each south Asian courtier from 2000 to 2017.

Results and discussion

Table 2 provides the descriptive statistics of the selected variables. Marine tourism connected with ocean and coastal conservation is one of the major issues that need to be addressed immediately. Tourism is inherently contentious about its cost and benefits. Eco-marine tourism is a new trend that is suitable for sustainability. This paper provides an argument that adds fuel to the idea that marine tourism needs careful policy analysis, preparation, and public education (Danielle and Masilela 2020; Kikulwe and Asindu 2020; Siegel 2011). Figure 2 provides the correlation among the selected variables. The comparative analysis and review of their effectiveness in stimulating and promoting technological innovation in the marine sector across the industry is required (Chien et al. 2021e, 2021g). The role of central and regional governments in

cluster innovation activities can be studied particularly from the following perspectives.

An international network began to be established to exchange views and experiences in the fields of cross-industry maritime technology, setting up centers of excellence, innovation incubators, etc., with a particular focus on key general purpose and enabling technologies. In general, these tasks are carried out by the same “coastal flood protection” organizations (such as universities and research institutions): development and maintenance activities designed to protect coastlines from coastal erosion and floods caused by increases in the sea level. Strictly speaking, this is not an ocean-based operation that benefits or supports the marine industry and is therefore not commonly included in the marine economy concept. The rising influx of tourists is struggling to cope with numerous tourist hotspots. Residents in cities like Amsterdam, Venice, and Barcelona have expressed fear and increasing anti-tourist sentiment. Tourism-driven upsizing can put pressure on local communities’ lives and livelihoods, drive up property prices, overcrowd tourist destinations, and exacerbate coastal erosion from coastal tourism activities.

Threats to our oceans require cross-border and regional cooperation but the most important thing is multi-stakeholder global involvement. It is essential to empower the public and private sectors to reduce plastic waste, create a circular economy, and build strategic partnerships for sustainable and resilient communities. Alliances between the world’s largest packaging manufacturers, such as the Global Commitment to the New Plastics Economy, are critical to developing creative collective action and strategies to reduce pollution in order to save the planet support economic growth and stimulate sustainable opportunities to protect our oceans is crucial. The ocean appears to be endless, but we are all in the same boat and need to find common solutions to tackle the waves. Transatlantic seas required cruise ships by the mid-20th century, but air travel had made crossing seas cheap and fast. A plane can cross the Atlantic in a couple of hours instead of the week most cruise ships need. Cruise lines can no longer provide their means of traveling to and from holidays, thus failing to improve their level of service. Because the demand for cross-sea cruise ships is small, cruise ship operators have to adopt different operating methods. During holidays, they started changing the concept of the cruise itself. Ships began sailing abroad and provided additional facilities and operations. Marine tourism has significantly boosted the economic development of countries that are popular cruise travel destinations. Every year, almost 8 million people travel by boat in the United States. Cruise ships contribute roughly \$18 billion annually to the US economy. More than 25,000 Americans are employed directly by the cruise line. The cruise industry in the United States offers an estimated 250 000 jobs. In many parts of the world, like the Cortez Sea off Mexico’s coast, the number of large prey species has been dwindling,

Table 2 Descriptive statistics

Variable	Mean	S. Dev	Min	Max
GDP	11.76	0.09	10.62	19.92
TouE	2.44	0.23	2.01	2.74
Trade	1.01	0.2	0.62	1.28
Capi	4.34	0.07	4.25	4.45
MSupply	11.83	0.39	9.29	12.44
FDev	1.43	0.95	0.46	3.33
ExR	1.91	0.07	1.81	2.03

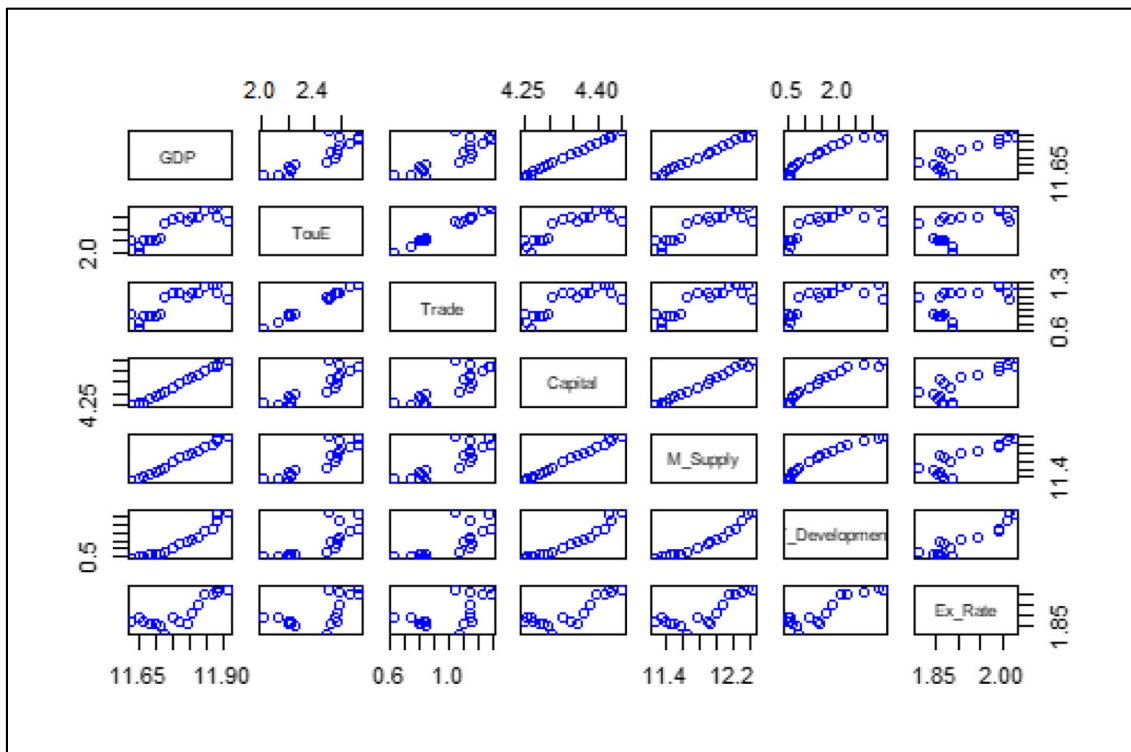


Fig. 2 Correlation matrix of the selected variables

probably due to overfishing. Several nations, including the US, have laws regulating the number, form, and size of game fish that may be captured and retained to reduce harm to fish stocks. More than 350 million people go to the coast of coral reefs worldwide each year (Asha and Makalela 2020; Balogh and Jámbor 2017; Koloba 2020). The coral reef tourism industry’s annual production value is valued at US\$ 36 billion.

Unit root test

The main advantage of the ARDL estimator is that it can be used without considering friction cointegration or $I(0)$, $I(1)$ data sequences. However, Ouattara (2004) proved that, due to the views of Pesaran et al. (2001), ARDL estimates may not be applicable to any data sequence generated by $I(2)$ processing or higher. explicitly mentioned the hypothesis, assuming that the order of the hypothesis variable for the ARDL boundary test is (0) or (1) integer. Therefore, it is still necessary to test the smoothness. To this end, the enhanced augmented Dickey-Fuller (ADF) estimator is applied to check the stationary process of the data series. The findings of the ADF test are shown in Table 3. It is obvious from the augmented Dickey-Fuller findings that some datasets are integrated through $I(0)$ or $I(1)$. The important thing is that all data sequences are not $I(2)$ or higher. Therefore, we have reason to use ARDL estimator.

To establish the long-run relationship between economic growth and tourism, we can use ARDL bound testing

procedures because the unit root test confirms that none of the series are integrated of $I(2)$. For this, we use the OLS estimation procedure to estimate Eq. (4) and compute joint F -statistics. Table 3 displays the computed F -statistics as well as the critical values proposed by Pesaran et al. (2001) for various levels of significance. The F -statistics is well above the critical value at a 5% level of significance. As a result, there is evidence that the variables have a strong long-term relationship. When the ADF test is performed using the first difference, the insignificant supposition is generally rejected at a significance level of 1% or 5%, implying that the data converts into a stationary shape with the first difference. In general, non-stationary series exist at the conventional time

Table 3 Unit root tests

	ADF test	k		ADF test	K
GDP	-1.173	0	Δ GDP	-4.143	0
TouE	-1.273	1	Δ TouE	-5.253	1
Trade	-2.997	1	Δ Trade	-3.967	2
Capi	-0.937	1	Capi	-2.927	2
MSup	-1.37	2	Δ MSup	-5.317	1
FDev	-1.273	1	Δ FDev	-2.927	2
ExR	-2.997	1	Δ ExR	-3.097	1

Source: authors’ calculation

level, despite the fact that all series are stationary at the first difference.

Econometric estimation

Long-run test

The long-run estimates of Eq. (4) are then estimated using the ARDL cointegration technique. In order to find the coefficient of the level of variables, we estimated the model using various criteria such as the criterion, Hannan Quinn Criterion, AIC Criterion, and SBC Criterion. All models produced nearly identical long- and short-run results. As a result, we only show the results of models that were chosen based on the AIC criterion, as (Akadiri et al. 2019; Flores and Chang 2020) demonstrated that AIC outperforms other criteria when the time span is less than 60 observations in a Monte Carlo experiment.

Table 4 shows the results of the long-run estimates. The findings indicate that all the variables are statistically positive at 1% significant level. The tourism earning is statistically positive at 1% significant level. It means in the long run, a 1% increase in international tourism earning leads to a 0.22-percent increase in economic growth (GDP). The finding supports the tourism-led growth hypothesis, which states that improvements in inbound tourism can lead to increased economic growth. Our findings are consistent with those of recent empirical studies (Sokhanvar 2018; Kumar 2019; Ranasinghe et al. 2020). This finding confirms the early cointegration between tourism and economic growth and shows the pace of adjustment from a short- to long-term equilibrium path. The results show that tourism has a statistically significant positive impact on economic growth. According to the model, for the principle of the minimum SBC value, we choose the ARDL (1, 0, 1) model and the long-term impact estimation is shown

in Table 4. Obviously, our model fits very well with the statistically significant independent arguments of the data.

Further, the study used important control variables such as international trade, capital invested, money supply, financial development, and exchange rate. Table 5 shows the results of control variables; the coefficient of trade is positive and statistically significant at 1% significant level. It shows that 1% increase in international trade leads to 0.31% increase in economic growth. Our results are in line with (Akadiri et al. 2019); they find that the improvement in the international trade will lead to higher level of economic growth. Next the coefficient of capital implies that 1% increase in helps to 0.24% rise in economic growth. Further, money supply, financial development, and exchange rates have a positive impact at 1% significant level. The 1% increase in the money supply, financial development, and exchange rates leads to 0.02%, 0.45%, and 0.34% rise in economic growth.

Short-run test estimation

Table 5 shows the short-run analysis results as well as the coefficient of error correction terms. When compared to the long run, the short-run results are nearly identical in terms of signs and are consistent with a priori expectations. Short-run estimates, on the other hand, have smaller magnitudes than long-run estimates. This result suggests that the variables we chose have a greater long-term impact on economic growth.

The calculated values of the F -statistics given in the last row of Table 6 are statistically significant at the 1% significance level. This means that the overall adaptability of the model used is good. For this model, the results of the Durbin-Watson's statistic value are less than 2, which indicates that there is no autocorrelation problem. In addition, the R square value is 0.908, which indicates that these

Table 4 Long-run estimates from ARDL model

Variable	Coefficient	Standard error	T -ratio
TouE	0.2134*	0.0548	43.544 [0.000]
Trade	0.3100*	0.0218	4.5432 [0.000]
Capi	0.2343*	0.3423	4.543[0.000]
MSuply	0.0295	0.0453	4.484 [0.000]
F_Dvlp	0.0425*	0.2644	3.4321[0.000]
ExR	0.3332*	0.0332	2.3254 [0.000]
Constant	3.6688*	0.0778	5.3375 [0.000]
χ^2 (serial correlation)			0.7386
χ^2 (functional form)			0.1644
χ^2 (normality)			0.4282
χ^2 (heteroscedasticity)			0.5848

Source: author's own calculation by using E-Views 5

Note.: * significant at the 1 percent level.

Table 5 Short-run estimates from ARDL model

Variable	Coefficient	Standard error	T -Ratio
Δ TouE	0.4332***	0.0398	3.3382 [0.002]
Δ TouEPC	0.3110***	0.0421	-1.34206 [0.150]
Δ Capi	0.2134***	0.2144	-4.6796 [0.000]
Δ MSuply	0.2893***	0.0444	1.2335[0.010]
Δ F_Dvlp	0.0324***	0.2354	4.4525 [0.100]
Δ ExR	0.4131***	0.0339	1.7386 [0.000]
<i>Diagnostic test</i>			
R -squared			0.908
F -statistics			8.0323
Durbin-Watson's			1.9070
CUSUM			Stable
CUSUMSQ			Stable

Source: author's own calculation by using E-Views 5.

Table 6 Liner shipping connectivity index

Year	India	Bangladesh	Pakistan	Maldives	Sri Lanka
2004	34.14	5.20	20.18	4.15	34.68
2005	36.88	5.07	21.49	4.08	33.36
2006	42.90	5.29	21.82	3.90	37.31
2007	40.47	6.36	24.77	4.75	42.43
2008	42.18	6.40	24.61	5.45	46.08
2009	40.97	7.91	26.58	5.43	34.74
2010	41.40	7.55	29.48	1.65	40.23
2011	41.52	8.15	30.54	1.62	41.13
2012	41.29	8.02	28.12	1.60	43.43
2013	44.35	7.96	27.71	8.12	43.01
2014	45.61	8.40	27.50	7.79	53.04
2015	45.85	9.31	32.33	7.59	54.43
2016	58.21	10.95	34.82	7.97	61.21
2017	56.90	11.87	34.86	3.45	70.62
2018	59.90	12.07	38.20	7.76	72.46
Mean	44.84	8.03	28.20	5.02	47.21

independent individuals can expand economic growth change information in a short period, and other factors can be interpreted as 66%. In addition, due to structural changes in the country, Nepal’s macroeconomic series may have witnessed structural breakthroughs. This result corroborates a similar finding of (Ohlan 2017; Zhuang et al. 2021).

The ARDL analysis indicates that the short-term difference in the long-term equilibrium of economic growth is adjusted by 2.95% annually. It can be seen that tourism is also the engine of economic growth in the short term. Further, 1% increase in per capita international tourism income has increased by GDP (per capita) has increased by 4.25%, and other conditions have remained unchanged. In the short run, the financial development coefficient can be ignored (Alemzero et al. 2020a, 2020b; Gautam 2008; Ikram, Sroufe et al., 2019; Sun, Tariq et al., 2020).

In this manner, the national travel industry needs a stable political, legitimate, and monetary framework inside which it can work, which will give the travel industry exercises authenticity (Korstanje and Tarlow 2012; Hsu et al. 2021). Universal vacationers become progressively on edge about the well-being and security while their occasion as opposed to residential travelers since they do not have a place with the nation they visit. A cataclysmic event causes the declination of vacationer landings in the affected zone and made the negative picture to the guest and pushing them away from the goal (Massé 2016). Political insecurity is significant in the travel industry. There are not many investigations that have exhibited the negative effect of fear mongering on the travel industry. Hitchcock and Wesner (2008) found that political unsteadiness significantly affects the travel industry request in both

created and creating nations. The outcomes showed that the travel industry in nations with less hazard inconstancy is not hurt by the hazard. Then again, chance impacts entries in poor and rich nations; its effect on returns in rich nations is more than poor on.

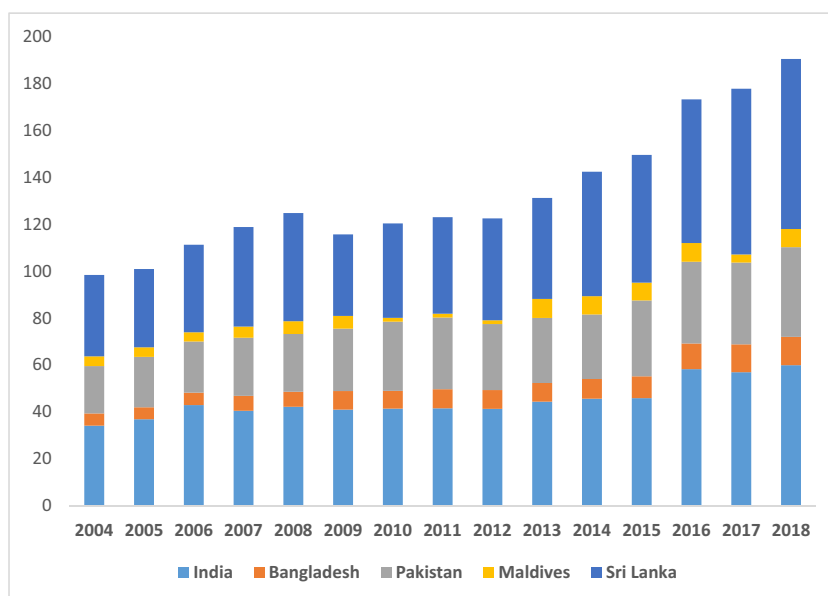
Linear shipping connectivity index

Linear shipping connectivity index (LSCI) is a global shipping network connectivity index (Bartholdi et al., 2016). This index has five components: (I) the number of ships, (ii) the container carrying capacity, (iii) the size of the vessel, (iv) the number of services provided by ships, and (v) the number of companies with containers available for execution (Balogh and Jámbor 2017). The connectivity index is calculated by the value of each component separated by the base year 2004 for the maximum value of each component. Likewise, the average value of each variable is obtained and divided by the base year 2004 overall average value and multiplied by a value of 100. Table 6 presents the results of LSCI, among south Asian countries, the LSCI value of Sri Lanka is 47.21 while India is at second position and Pakistan at third. The U. N. Conference on Trade and Development (UNCTAD) reports this shipping link index. Mihalic (2016) analyzes the effect of the LSCI and port facilities on inland Caribbean freight levels. The study found close links between the facilities of liner shipping, port infrastructure, and freight rates.

This paper explores the reduction in freight rate due to developed port infrastructure that includes the length of the berth, storage capacity, and port areas (Fig. 3). The study also found that numbers of ports are taking more advantage of their geographic location. Few other measures, such as reducing transport costs and improving shipping services, could improve transport connectivity and competitiveness in trade. Ajaz et al. (2021), Chien et al. (2021), Ehsanullah et al. (2021), and Gao et al. (2019) analyzed the effect of liner shipping connectivity on short-term and long-term bases of trade flows in the South African economy. With 142 trading partners, this work takes into account factors such as trade sailing distances, GDP, and direct air distance. This study concludes that the positive effect of the common direct connection number and the level of competition on the trade flows is significant. However, the number of transshipment and sailing distance has a negative impact on both short- and long-term trade flows (Khan et al. 2019; Jansen and Jonker 2018).

One of the noteworthy findings that emerge from this research study is that countries do not need to plan ever larger ships or vessels for their competition in foreign trade. This index comprises different dimensions including regional integration, trade and investment, infrastructure and connectivity, value chain of the region, and free movement of people, while other dimensions include money and finance and institutional

Fig. 3 Liner shipping connectivity index of each country



and social integration (Nawaz et al. 2021b). This study concludes that Asia is found to be well integrated into communication, commerce, and free movement of people while Asia lags in institutional and social dimensions and (Jernsittiparsert and Chankoson 2019; Susanto 2019).

According to (Gössling et al. 2018), biological sciences can be used to study the evolution of ocean star clusters. Changes in the performance and composition of maritime clusters reflect their various roles in different regions and periods, so four types of maritime clusters can be identified: (i) in the first category, maritime activities within the cluster are concentrated in the port (cargo handling) function) and transportation function. In global regional supply chains, maritime clusters have a special role because they can process and distribute information. Offshore clusters are considered hubs of the supply chain in the global or regional economic and commercial markets. The best examples of such maritime clusters are in Rotterdam, Hong Kong, and Singapore (Horng and Tsai 2012; Wong et al. 2008). The fourth-generation cluster appeared in the 1990s and is physically separate but interconnected via a common operator or department for management. This is due mainly to the vertical and horizontal integration which transport operators have adopted. These are service centers (ship financing, maritime law, marine insurance, ship registration, ship leasing, and shipbrokers) and can support very remote customers; a good example is London (Khan et al. 1990; Yeung et al. 2004) “A Commitment to Sustainable Growth in the Caribbean,” and in the process helped shape new policies and investments in the region.

We are beginning to see many good examples of these companies investing directly in the health of coral reefs that they know can support their businesses. The number and size of the fish within this reserve has increased significantly,

supporting coral reefs around the surrounding island (Sun et al. 2020c). Its economic value as well as the value of fish processing, carbon stockpiling, and coastal protection. By revealing where and how revenue is generated, MOW’s graphs and tools can help companies fully understand the natural systems that support their business and make new investments (Mohsin et al. 2019b).

The idea of focusing on nature is not a new concept, but MOW’s comprehensive and focused experience provides the travel and tourism industry with an opportunity to lead the private sector and institutionalize natural values into business practices and corporate sustainability. Once we know when we need it, we will take advantage of the business opportunities that exist and begin a wider campaign for innovation and sustainable development. The ocean occupies more than two-thirds of the earth’s surface, provides food, and resources, produces oxygen, absorbs greenhouse gases, tracks climate change, establishes weather patterns and temperatures, and serves as a highway for international maritime trade. In fostering sustainable development, economic growth, and livelihoods, the ocean will play an important role (Mohsin et al. 2019a). It is aimed at expanding coastal States’ economic borders beyond their territories. The marine economy includes a sustainable economy that targets the marine environment, associated biodiversity, ecosystems, species, and genetic resources, including marine organisms (from fish, algae to microorganisms) and offshore natural resources while ensuring their sustainable use. The value of the global marine economy is estimated to be between 3 and 6 trillion US dollars per year and more than 3 billion people depend on the oceans for their livelihood.

UNCTAD supports developing countries in identifying opportunities and challenges that the marine economy may

present. It also supports national trade and other competent authorities in the design and creation of an enabling policy and regulatory environment to promote the development and development of the sustainable marine economic sector through the definition and implementation of national and regional marine economic and trade strategies. The strategy’s goal is to achieve convergence and reinforcement of various linkages and phases of selected value chains at the national level to enter domestic, regional, and international markets. The content of the draft strategy and action plan was based on feedback obtained in 2018 during the first national workshop for stakeholders. The draft action plan will include a set of strategic steps aimed at executing the strategy, a list of key participants and stakeholders, an implementation timeline, and an estimation of the required resources. Following debate, review, and approval of the OETS report and action plan, UNCTAD and DOALOS will collaborate with the Commonwealth Secretariat to obtain Belize’s support for the implementation of 1–2 identified priority measures within their mandates. Everything lessons learned in Belize and other recipient countries (Costa Rica and Barbados) will be discussed at the fifteenth UNCTAD regional event in 2020, likely in Barbados.

International inbound tourists

The overall number of visitors who fly to a destination country other than their regular residence are foreign inbound tourists (see Table 7). The visitors’ visit to the place of destination

does not exceed 12 months. And the object of the visit is a non-earning and remuneration operation. A measure of the same-day tourists, cruise and air passengers, and cruise participants is used as a number of tourist arrivals when there is a lack of data availability. Large data are gathered from tourism accommodation facilities. In different countries, however, the number of arrivals and their calculation is different (Hamilton et al. 2015). The number of arrivals is generally not considered to be the number of people who fly. Every time a person who is supposed to make multiple trips to a particular country within a given period is counted as a new arrival. There is no hard distinction between current industries and new ones. In some countries, coastal aquaculture is already mature, but on an industrial scale, it has become a high-tech and technology-intensive operation and hopes to expand more off-shore activities and huge advances in satellite

The cruise industry is focusing on new destinations like the Arctic and Antarctica. The division into mature and emerging industries nonetheless provides a pragmatic and manageable approach to the project. The structure of the global shipping sector will experience major changes in the coming decades. This is partly because of global economic growth and increasing demand. For example, container shipments tend to continue to grow rapidly in the shipping sector and container shipments could triple by 2035. While aquaculture will be the main driver of total production, global fisheries output is expected to increase by around one-fifth over the next decade. Although it has improved in recent years, due to the lack of strict management strategies to restore fisheries to biologically

Table 7 Number of tourist arrivals

Year	India	Bhutan	Bangladesh	Pakistan	Nepal	Maldives	Sri Lanka
2000	2649000	7600	199000	557000	464000	467000	400000
2001	2537000	6400	207000	500000	361000	461000	337000
2002	2384000	5600	207000	498000	275000	485000	393000
2003	2726000	6300	245000	501000	338000	564000	501000
2004	3457000	9200	271000	648000	385000	617000	566000
2005	3919000	13600	208000	798000	375000	395000	549000
2006	4447000	17300	200000	898000	384000	602000	560000
2007	5082000	21000	289000	840000	527000	676000	494000
2008	5283000	28000	467000	823000	500000	683000	438000
2009	5168000	23000	267000	855000	510000	656000	448000
2010	5776000	41000	303000	907000	603000	792000	654000
2011	6309000	66000	155000	1161000	736000	931000	856000
2012	6578000	105000	125000	966000	803000	958000	1006000
2013	6968000	116000	148000	-----	798000	1125000	1275000
2014	13107000	133000	125000	-----	790000	1205000	1527000
2015	13284000	155000	-----	-----	539000	1234000	1798000
2016	14570000	210000	-----	-----	753000	1286000	2051000
2017	15543000	255000	-----	-----	940000	1390000	2116400

sustainable productivity levels, there is little or no space for further expansion of the wild fish captured (see Fig. 4). The aging population, rising incomes, and relatively low transport costs would render coastal and marine areas more attractive in tourism. At the same time, as temperature, changes in ocean acidity and rising sea levels affect the movement of fish stocks, new trade routes, port structures, and the creation of new tourist attractions and attractions, climate change will also affect the development of traditional marine industries while destroying other people (Chen et al. 2018).

Ahmad et al. 2020 drew up tourism as a double-edged sword that contributes to economic growth. But this significant portion of tourism has the opportunity cost of destroying the climate. The study results indicate that tourism has adverse environmental consequences for two countries, Indonesia and the Philippines (Hendijani, 2018). A healthy ocean is important not only to our environmental health but also to promote economic growth, job creation, and poverty eradication (Li et al. 2021a, 2021b, 2021c, 2021d; UN Environment, 2016). Recognizing the great potential of the blue economy, world leaders and scientists conducted a strategic discussion on the future of our oceans at the first Sustainable Blue Economy Conference held in November 2018 in Nairobi, Kenya Mayer et al., 2016; Potgieter, 2018). The planet should improve the health of the seas, and the oceans, lakes, rivers, and habitats they sustain are rapidly under pressure and global decline (Focardi et al. 2006). Marine economic activity management must be put in the physical environment in which it operates a flowing, buoyant three-dimensional environment that covers two-thirds of the earth's surface (He et al. 2020; Mohsin et al. 2020b; Yang et al. 2021).

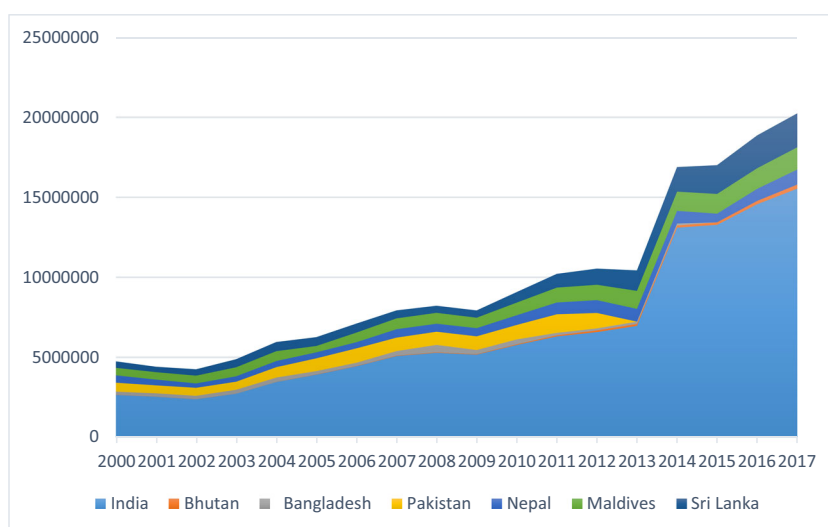
The obvious (in some cases less apparent) variations between land and sea are significant in how to handle human activities in two distinct environments. Nonetheless, although these differences affect the environment and marine operational outcomes, many of the concepts and technologies used

in marine planning and management are often borrowed from land practices. Marine industry the sectorial scope of the marine economy in marine economic research varies greatly from country to country (Ikram et al. 2019a, 2019b; Sun et al. 2019). Those sectors may be removed from the marine economy in one country but not in another. The definitions of the classifications and divisions used, however, vary greatly from country to country. There are no definitions and statistical terms agreed internationally for marine activities. In 2010, the maritime industry directly contributed about 31 million full-time jobs, accounting for about 1 percent of the global workforce (about 1.5 percent of global active employment).

Conclusion and policy implication

The objective of this paper is policy-based analysis of ocean and marine economy and tourism of South Asia through ARDL regression analysis over the period of 2000 to 2017. The findings of the study reveal that tourism earning is statistically positive at 1% significant level, which indicate in the long run, a 1% increase in international tourism earning leads to a 0.22-percent increase in economic growth (GDP). The finding supports the tourism-led growth hypothesis, which states that improvements in inbound tourism can lead to increased economic growth. Further, the findings showed that the short-run results are nearly identical in terms of signs and are consistent with a priori expectations. Short-run estimates, on the other hand, have smaller magnitudes than long-run estimates. This result suggests that the variables we chose have a greater long-term impact on economic growth. A recent study published in the Journal of Ocean Policy by the Ministry of Oceans and Oceans shows that coral reefs around the world support 70 million trips a year and make these reefs a strong tourism driver. Overall, coral reefs are bringing \$36 billion annually in an economic value to the world. Of this \$36

Fig. 4 Total number of tourist's arrival and environment



billion, \$19 billion is real “on-reef” tourism, such as diving, snorkeling, glass bottom boating, and watching wildlife on the reef. The remaining \$16 billion comes from tourism in the “close coral reefs,” which involves other activities from admiring beautiful views and beaches to local seafood, boarding paddles, and sheltering the surrounding reefs.

Through protecting the local ocean and marine resources, economic benefits of coastal and marine economy and marine tourism can be achieved. Sustainable marine tourism will help protect the environment and contribute significantly to sustainable economic growth. Ocean economy and tourism policy implications also include ensuring that every person abides by the same law in protecting marine resources and ensure rules that hotels, businesses, and residents are not contributing to littering and polluting the marine environment. MPAs are the tourist destinations of greatest attraction. Tourists enjoyed visiting endangered species and beautiful beaches inside well-managed MPAs. Tourists would charge a visit fee that would support local communities in their protection and wellbeing. Another way of increasing the economic benefits of the ocean and marine economy and tourism is by pursuing “self-governance in the environment.”

Policy implication

It is clear that when tourists leave the fishing or aquaculture industries, they cannot accommodate the locals in terms of economic well-being. Therefore, it is imperative that when the tourism industry is offered and prioritized by the community; the people dependent on this resource will be made habitable and eligible. Security measures were not taken before the risky aspects of the society, and full tourism was arranged and a step had to be taken before designing measures for the development of tourism. The ecosystem is more valuable if the two industries work together. But, in most communities, self-depreciation measures must be limited. It is experienced that, with low literacy levels, poor organization, communication is impaired, and problems need to be understood and communicated. Thus, assistance from the government is needed in the early stages. For fishermen and aquaculture people, there was no difference between training programs (wildlife care or hospitality training) in which they were part of the tourism manpower. Such a curriculum not only makes it difficult for locals to take advantage of the difficulty of fasting but also enables them to preserve awareness of natural information.

It is not just a demonstration of tourism but also a regional economy that seeks to diversify the economic well-being and employment protests of local villagers. This requires proper planning, monitoring, and implementation. For example, the MPA’s decision on land-bound fishermen may not be of any use to the fishermen’s consensus. In other words, if there is a history of tourism promotion, the traditional activity stores do not know anything about the

priority of this, but it is important to mention that other resource-based consumers are also involved in promoting it.

This work regularly describes the economic activities that take place in the marine environment and separates these activities from South Asia’s national accounts and estimates that the activities in the maritime economy affect the Asia economy. Therefore, this article demonstrates the feasibility of the maritime economy and has many important implications for maritime policy.

First, the estimate could provide a “blue” region for growth measures and maritime industrial strategy. Adopting this systematic approach for the next edition of tourism will provide a global comparison of economic activity in these sectors while using this approach to include emerging maritime sectors in future estimates.

Second, this finding is important considering South Asia’s strategic initiative to produce low-carbon energy. However, many offshore wind farms are still being built and it is expected that technologies will be rapidly acquired in these areas, so the ongoing impact of offshore winds on the economy should be constantly monitored.

Third, this estimate can form the basis of the view of marine natural capital because the economic sector is not separate; therefore, economic activities must be linked to aspects of marine natural capital. The natural capital approach links the state of environmental assets to the socio-economic benefits they can provide to society and are essential for policymaking in Asia. Emerging research linking the economy to natural capital can reflect the effects of policy on the environment and the economy and is expected to improve understanding of trade relations between the economy and the environment. The implementation of the natural capital approach is still in its early stages, although there are plans to issue natural capital accounts for the maritime area, which would enable a link between the natural capital accounts and the maritime economy sectors.

Fourth, this assessment may add to the evidence used in maritime planning and environmental impact studies. Baseline assessments are currently used in marine projects for employment and maritime planning. However, certain departments have low levels of confidence, and basic research recognizes that detailed studies of marine economic activities will explain the involvement and connections between maritime planning departments. Therefore, our systematic approach can be used to improve the basic estimate of maritime projects by providing the latest estimate of multiplication. The marine table developed here can also be scaled up to specific areas of Asia. Therefore, the production in coastal project areas can be estimated, so that it can be used as an economic basis. The economic sectors described in this study have been mapped for those used for maritime planning and are included in the additional material.

Finally, our method of purposefully assessing the impact of economic activities on the maritime sector can help strengthen maritime policy and evidence. Despite its limitations, this estimate can help policymakers and planners better understand the economic impact of maritime activities. At the same time, continued use of this method may help assess the impact of changing structures on the marine economy and determine its impact on employment. Future research may improve or update this estimate, apply it at the regional level, or incorporate the result into a natural capital model to investigate the trade relationship between the economy and natural capital production. There are also extensive contributions to other locations found in this study that are based specifically on the need to reach activity store trips. Future local offerings must mobilize local people to participate in support programs and tourism activity stores should be the style of their events.

Author contribution Conceptualization and methodology: Liu Li
Review and visualization: Baijun Wu
Data curation, supervision, visualization, and editing: Ataul Karim Patwary
Writing of draft, software, and editing: all authors

Data availability The data that support the findings of this study are openly available on request.

Declarations

Ethics approval and consent to participate We declare that we have no human participants, human data, or human issues.

Consent for publication We do not have any individual person's data in any form.

Competing interests The authors declare that they have no competing interests.

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