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Are tourism and energy consumption linked? Evidence from tourism dependent countries

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ABSTRACT

The tourism industry is one of the fastest-growing sectors across the globe. Tourism is not only playing a key role in the development of many small economies but is also considered a major source of income. Tourism-dependent economies are heavily reliant on the tourism sector. This study explored the relationships among energy consumption (EC), economic growth (EG), and tourism (TR) using panel data spanning 2000-2019, for tourism-dependent countries. Panel data methods like feasible generalized least-squares (FGLS) and panel corrected standard errors (PCSE) are employed for empirical analysis. Results reveal that the impact of EC on TR is mixed and sensitive to econometric techniques. While the impact of EG on TR is positive and robust to econometric techniques. We also used other control variables like total population and financial development. The impact of financial development and total population on TR is positive on tourism because they both boosted the tourism industry. Building on these findings, policy recommendations emphasize sustainable energy practices within the tourism industry. This study's insights guide policymakers toward effective strategies that balance economic growth, energy efficiency and sustainable tourism development, ensuring the resilience of the tourism industry within evolving energy landscapes and economic dynamics.

Contribution/Originality: This study fills the existing literature by investigating the impact of energy consumption and economic growth on tourism using panel data from tourism-dependent countries. This study extends the tourism-dependent countries literature on tourism and the energy consumption nexus.

1. INTRODUCTION

According to numerous studies (Adedoyin & Bekun, 2020), tourism serves as a catalyst for economic growth. Another essential element in the relationship between tourism, growth, and emissions is energy utilization. The effect of the "tourism industry" on economic growth (EG) is significant in regions reliant on tourism. For instance, driving more tourists to specific destinations contributes to economic advancement (Adedoyin & Bekun, 2020). TR increases income and employment, as well as improving residents' quality of life in the destinations' economies. It also offers extra tax revenues, an exaggeration of tourism resources, and public physical facilities. In spite of these several types of economic booms, it also gives rise to negative things and costs such as over crowding, noise, crime, and environmental degradation (Caneday & Zeiger, 1991; Johnson, Snepenger, & Akis, 1994; Liu, Sheldon, & Var, 1987; Macintosh & Goeldner, 1986; Wilkinson, 1996). Although the idea of tourism may seem simple, the institutions, processes, and impact of tourism on global society are immense Paul-Andrews (2017) and Bigano,

Hamilton, Maddison, and Tol (2006). International tourist arrivals have been growing at an average rate of 4% per year from 2010 to 2015, with over 1.1 billion international arrivals in 2015 alone and a forecast of 1.8 billion for 2030 Paul-Andrews (2017) and Mérida and Golpe (2016). Domestic tourism has also seen significant growth, with domestic tourism trips being around five times more than international ones (Paul-Andrews, 2017).

Specialization in tourism is intimately connected to the concept of increasing returns, which further amplifies the benefits accruing to markets, enterprises, and sectors (Ridderstaat, 2015). Modeste (1994) lists several reasons why tourism positively contributes to a country's EG: (1) foreign exchange revenues, which are essential for the importation of capital and intermediate goods as well as consumer products, are largely generated by tourism (2) Tourism effectively utilizes a nation's resources in accordance with its factor endowment. (3) Tourism presents opportunities for employment creation in destination areas, benefiting local populations. (4) Tourism acts as a catalyst for infrastructure development within a country, offering advantages not only to tourists but also to residents of those areas. (5) Tourism serves as a conduit for the transfer of new technological and managerial expertise into an economy. (6) Tourism has the potential to establish positive connections with other sectors of the economy, including agriculture, manufacturing, and various service industries (Ridderstaat, 2015).

The global tourism sector is estimated to contribute around 9% to the worldwide GDP, equivalent to approximately 7 trillion USD. This industry has also played a crucial role in decreasing global unemployment by generating job opportunities in tourist destinations (Fahimi, Saint Akadiri, Seraj, & Akadiri, 2018). Over time, tourism has brought about favourable economic outcomes through the utilization of economies of scale within domestic businesses (Fahimi et al., 2018). The arrival of foreign-controlled, high-intensity mass tourism has exceeded the nation's ability to effectively manage and regulate it (Resende-Santos, 2019). Beyond just promoting growth within the industry, tourism also acts as a catalyst for overall economic advancement (Balsalobre-Lorente, Driha, Shahbaz, & Sinha, 2020). Based on statistical data provided by the World Travel and Tourism Council (Onafowora & Owoye, 2020), the Caribbean holds the distinction of having the most tourism-dependent economy among the 12 regions ranked by the World Travel and Tourism Council (WTTC). In 2017, tourism contributed to 14% of the gross domestic product (GDP) in the Caribbean, accounted for 13% of employment (equivalent to 2.2 million jobs), made up 12% of investments, and represented 17% of the region's exports (Onafowora & Owoye, 2020). Tourism helps a country get more money from visitors coming in, which can then be used to bring in new technologies for making things (Cortés-Jiménez, Pulina, Prunera, & Artis, 2009). When tourists come, it encourages investing in new things like better buildings, roads, and skills for people. This competition among businesses gets stronger too (Brida & Pulina, 2010). More tourists can lead to more business for different industries, which can help them grow. This can have a good impact on the whole country (Cernat & Gourdon, 2012). Tourism means more jobs, which means more money for people. This makes the overall earnings of a country go up (Lee & Chang, 2008). Tourism brings extra good things to a country's economy, like more benefits for businesses and communities (Ohlan, 2017).

As per the data provided by the WTTC, the tourism sector played a role in establishing 330 million job positions on a global scale in 2019, contributing a substantial US$8.9 trillion to the overall GDP of the world. This contribution accounted for approximately 10.3% of the global GDP. The tourism industry's capacity to generate employment, often attributed to the arrival of tourists, generates income through foreign currency earnings, and ultimately affects a country's economic growth, even during times of economic downturn. As a result, the interplay between tourism and energy consumption (EC) has captured the attention of both academic researchers and economic policymakers. Recent scholarly literature contends that elements such as technological advancements, economic circumstances, urbanization, regional environmental planning, and industrial makeup influence the dynamics of the tourism sector (Khanal, Rahman, Khanam, & Velayutham, 2021). This study extends the tourism-dependent countries literature on tourism and the energy consumption nexus. This study is unique in its nature because it explores the relationship among energy consumption (EC), economic growth (EG), and tourism (TR).

This study aims to address this critical knowledge gap by shining a light on the often-overlooked issue of energy consumption within the tourism sector in such nations. The research by Adedoyin and Bekun (2020) was limited to seven tourism-dependent countries (i.e., Antigua and Barbuda, Aruba, Bahamas, Macao, the Maldives, the Seychelles, Vanuatu)that explored the causal relationship between CO_2 emissions, real GDP per capita (RGDP), and the tourism industry. Our study represents the first attempt to investigate a diverse set of countries with a high reliance on tourism. The rest of the sections are as follows: section 2 presents the "Literature review", section 3 represents "Data and methodology"; section 4 presents "Results and discussions" and the last section, "Conclusion" concludes the study, respectively.

2. LITERATURE REVIEW

Khan, Bibi, Lorenzo, Lyu, and Babar (2020) ventured into exploring the intricate relationship between tourist arrivals, EG, EC, oil consumption, and carbon emissions across 18 countries that played pivotal roles in economic growth through tourism. Ohajionu, Gyamfi, Haseki, and Bekun (2022) engaged in a study aimed at exploring the contribution of the tourism sector to EG and employment opportunities, particularly in Mediterranean economies. Khanal et al. (2021) explored the influence of tourism on environmental degradation in Australia. The outcomes of the study revealed a substantial and long-term relationship between GDP, financial development, tourist arrivals, and EC in the case of Australia. Moreover, the study sought to measure the influence of tourist arrivals on EC while keeping other critical factors constant, such as economic expansion, EC, FDI, capital, FD, and overall population. Bölük and Güven (2022) conducted an investigation on the effects of tourism, EC, urbanization, and EG on the state of environmental quality in Turkey. The study was required to evaluate the validity of the tourism-induced environment Kuznets curve (EKC) hypothesis, utilizing the ecological footprint as an indicator of ecological quality. Their findings revealed the absence of confirmation for either the tourism-induced EKC or the notion of tourism-led growth in Turkey. Rasool, Maqbool, and Tarique (2021) delved into the connection between inbound tourism, financial development, and EG within the five BRICS countries (Brazil, Russia, India, China, and South Africa). Adedoyin and Bekun (2020) conducted a study that analyzed the connections between CO_2 emissions, RGDP, and the tourism industry in seven nations heavily reliant on tourism: Antigua, Barbuda, Aruba, Bahamas, Macao, Maldives, Seychelles, and Vanuatu.

Balsalobre-Lorente et al. (2020) conducted a research undertaking concentrating on the interaction between EG, international tourism, globalization, EC, and CO_2 emissions within OECD nations. Satrovic and Muslija (2020) conducted an investigation into the causal interrelationships among tourism, EC, EG, and CO_2 emissions across the top 10 countries based on tourist arrivals. The results research underscored the reciprocal relationship between tourism and pollutant emission, as well as the interdependence between energy use and pollutant emission. Additionally, a unidirectional causal link was identified, flowing from EG to CO_2 emissions. The impulse response analysis depicted positive reactions of CO_2 emissions to shocks in EG and EC over a decade.

Zhang and Zhang (2021) explored the transient and enduring causal relationships within the realm of tourism, EG, EC, and CO_2 emissions for 30 Chinese provinces. Ridderstaat, Croes, and Nijkamp (2013) delved into the economic role of tourism in Aruba. This study disclosed a long-time equilibrium link between TD and EG in Aruba. Bano, Alam, Khan, and Liu (2021) conducted an investigation into the dynamic interrelationships among tourism, REC, income, FDI, and CO_2 emissions in Pakistan. Bhola-Paul (2015) underscores that in the context of island tourism, Grenada, Barbados, and Tobago maintain a competitive advantage over other revenue-generating industries. Augustine (2017) conducted a co relational study in the British Virgin Islands (BVI) to explore the connections between destination images, travel motivations, and tourist satisfaction.

Xia et al. (2022) embarked on an exploration of the tourism-led growth hypothesis across 34 European countries spanning 1995 to 2015. Their study encompassed eight tourism indicators and crucial growth determinants like capital, labor, and renewable and non-renewable energy consumption. The researchers confirmed

a positive correlation between tourism, labor, capital, and GDP, thereby substantiating the presence of the TLGH in European nations. Balsalobre-Lorente et al. (2020) conducted a research undertaking concentrating on the interaction between EG, international tourism, globalization, EC, and CO_2 emissions within OECD nations from 1994 to 2014. Notably, the study suggested that globalization initially reduced the role of international tourism in climate change in development stages. Globalization seems to mitigate carbon emissions from international tourism. In light of these findings, the study advocated for regulatory frameworks that promote energy efficiency and renewable sources to alter the existing energy mix in OECD countries.

Ben Jebli, Ben Youssef, and Apergis (2019) addressed the scarcity of econometric research exploring the nexus between tourism and renewable energy. Their study sought to uncover the causal links among REC, tourist arrivals, trade openness ratio, economic growth, FDI, and CO_2 emissions across a panel of 22 Central and South American countries from 1995 to 2010. Ridderstaat et al. (2013) delved into the economic role of tourism in Aruba from 1972 to 2011. This study disclosed a long-time equilibrium link between TD and EG in Aruba. The outcomes emphasized the importance of strategic resource allocation, financial resources, leadership, innovation, creativity, and entrepreneurship to sustain beneficial tourism development for both local and regional economies.

Wilkinson (1996) analyzed the striking tourism growth in the Caribbean microstate of Anguilla, which had progressed through the initial stages of Butler's tourist cycle model to reach the "development" stage. The study highlighted that continued rapid tourism growth could pose environmental and social challenges, including strains on essential resources like water, sewage, and electricity, as well as increased reliance on expatriate labor and multinational corporations. Setiawati and Pamungkas (2022) concentrated on evaluating the influence of the tourism sector on both GDP per capita and the environment, as reflected by CO_2 and total EC, within Indonesia's context. The findings of the study indicated that an improvement in total foreign tourist arrivals had a positive near-term influence on real GDP per capita (RGDP-PC) and total EC, while a decline yielded positive effects on diminishing RGDP, CO_2 emissions, and total EC. To sum up the literature review, there is no study that investigated the liaison between EC, EG, and TR using a tourism-dependent economy sample. Our study is the first attempt in this regard. This study extends the tourism-dependent countries literature on tourism and the energy consumption nexus. This study is unique in its nature because it explores the relationship among energy consumption (EC), economic growth (EG), and tourism (TR).

3. DATA AND METHODOLOGY

3.1. Data

This paper explores the liaison between EC, EG, and TR in tourism-dependent countries. For empirical examination, panel data from 2000 to 2019 has been used. The details of the said variables are presented in Table 1. Following the study of Khanal et al. (2021), variables are chosen for empirical analysis.

Table 1. Description of the variables.

Variables	Codes	Description	Literature
Dependent variable			
Tourism	TR	International tourist arrivals	Ul-Haq, Imran, Oad, and Visas (2023)
Independent variable			
Energy consumption	EC	We use different proxies for energy consumption (i.e., energy use per capita and energy intensity (Level of primary energy)	Visas et al. (2023)
Economic growth	GDP	GDP per capita (Constant 2010 US$)	Dou, Ul-Haq, Visas, Aslam, and Khanum (2023), and Ul-Haq, Imran, et al. (2023)
Controls			
Financial development	FD	Domestic credit to private sector (% of GDP)	Ul-Haq, et al. (2023)
Population	TP	Total population	Sánchez-Galiano, Martí-Ciriquián, and Fernández-Aracil (2017)

3.2. Methodology

To examines the relationship between the EC, EG, and TR in tourism-dependent countries. Tourism is the dependent variable, while EC and EG are the main explanatory variables. For empirical analysis, we employed the Feasible Generalized Least Squares (FGLS), and Panel Corrected Standard Errors (PCSE). These techniques provided valuable insights into the underlying long-term linkage among the variables in the panel dataset. The econometric model specified in the study follows the model used by Subhan et al. (2019) and Amin, Kabir, and Khan (2020). This model aims to explore the relationship between energy consumption, EG, and various control factors and international tourist arrivals in tourism-dependent countries. The coefficients (β0, β1, β2, β3) will be estimated to assess the impact of EC and EG on tourism. The study uses the following model:

$$TR_{it} = \beta_0 + \beta_1 EC_{it} + \beta_2 EG_{it} + \beta_3 X_{it} + \varepsilon_{it}$$

Where TR_{it} is international tourist arrivals, EC_{it} is different proxies for energy consumption (i.e., energy use per capita and energy intensity (level of primary energy), EG_{it} is GDP per capita (constant 2010 US$), β_0 is constant, and the vector X indicates the control variable for robustness checks in our model. The total variables in this study consist of FD, representing Domestic Credit to the private sector as a percentage of GDP, TP, representing the total population. Following Al-Malki, Hassan, and Ul-Haq (2023); Farooq, Ul-Haq, and Cheema (2023), and Shi, Visas, Ul-Haq, Abbas, and Khanum (2022), we employed a suitable FGLS technique in the presence of heteroscedasticity, cross-sectional dependence, and serial correlation (Beck & Katz, 1995; Maddala & Lahiri, 2009; Ul-Haq, Khanum, & Raza Cheema, 2020). FGLS is a more suitable method where T>N (as in our present case, our N is 5 and T is 20).

4. RESULTS AND DSICUSSIONS

4.1. Diagnostics Tests

The results of the diagnostic tests are shown in the Table 2. This test is used to check the validity of the coefficients in the panel regression model. The Wooldridge test is used to check for serial correlation or autocorrelation in the errors of the panel regression model. Autocorrelation occurs when the error terms in the model are correlated across time periods. The BPLM test is used to check for cross-sectional dependence (CSD) in panel data. Cross-sectional dependence occurs when the error terms in the model are correlated across different cross-sectional units (e.g., individuals or countries). The diagnostic tests suggested the use of FGLS in the present situation. FGLS is a more suitable method where T>N (as in our present case, our N is 5 and T is 20), as suggested by the Parks-Kmenta method for the empirical analysis (Ul-Haq, Ashraf, Cheema, Hye, & Visas, 2023).

Table 2. Panel diagnostic tests.

Test	Issues	Statistics
Modified-Wald	Hetero.	1055.55***
Wooldridge test	Serial corr.	156.091***
BPLM test	CSD	357.932***

Note: Significance-level is shown by number of asterisks. *** for 1%.

The descriptive statistics are presented in the Table 3, where numbers show the general characteristics of the variables used for empirical analysis.

Table 3. Descriptive statistics.

Variables	Obs.	Mean	Std. dev.	Min.	Max.
TR	228	13.45	1.05	11.11	15.79
EC	228	3.75	2.66	1.66	16.21
EG	228	9.19	0.92	7.59	10.82
FD	195	3.89	0.38	2.65	4.53
TP	228	12.47	1.52	10.71	17.27

4.2. Energy Consumption, Economic Growth and Tourism Nexus: Empirical Analysis

We studied the relationship between EC, EG and TR in the tourism dependent-countries using the FGLS and PCSE techniques. The estimates are presented in Table 4.

Table 4. Energy consumption, economic growth and tourism nexus.

Variables	FE	RE	FGLS	PCSE
EC	-0.020**	-0.019*	-0.026***	0.009
	(0.009)	(0.010)	(0.007)	(0.012)
EG	2.573***	2.023***	0.852***	0.823***
	(0.160)	(0.143)	(0.026)	(0.049)
Constant	-10.12***	-5.069***	5.755***	5.850***
	(1.467)	(1.331)	(0.258)	(0.425)
Observations	228	228	228	228

Note: TR is dependent variable in all columns. Significance-level is shown by number of asterisks. * for 10%, ** for 5%, and *** for 1%.

The different models provide slightly varying estimates for the liaison between EC and TR. The fixed-effects and random-effects models show a negative association, where higher energy consumption is linked to reduced tourism levels. The FGLS model strengthens this finding while also accounting for heteroscedasticity. However, robust evidence of a significant relationship has not been found the PCSE model. When interpreting the results, it is important to consider the strengths and limitations of each model. All models consistently demonstrate a robust positive correlation between economic growth and the tourism in industry. Regardless of the model specification (fixed-effects, random-effects, FGLS, or PCSE), higher economic growth is linked to increased levels of tourism. It is vital to consider the model's strengths and limitations when interpreting the results, and the importance of economic growth for tourism activity has highlights the robustness of the relationship.

In model 1 (results are presented in Table 5), tourism is negatively influenced by energy consumption but positively influenced by economic growth, according to the FGLS. As energy consumption rises, tourism tends to decrease, while as the economy grows, tourism tends to increase. In model 2, the following relationships are indicated by FGLS: negative influence of tourism and energy consumption. As energy consumption rises, tourism tends to decrease. There is a positive link between tourism and economic growth. As the economy grows, tourism tends to increase. Financial development positively influenced tourism. An increase in financial development will lead to increased tourism. The FGLS results in Model 3 reveal a refined picture of tourism dynamics. There is a negative connection between tourism and energy consumption, indicating that as energy consumption increases, tourism tends to decrease. Conversely, tourism proves positive relations with economic growth, the financial development, and the total population. As the economy grows, financial service area improves, and the population rises, tourism rises as well.

Table 5. Energy consumption, economic growth and tourism nexus (FGLS model).

Variables	(1)	(2)	(3)
EC	-0.026***	-0.016**	-0.011*
	(0.007)	(0.007)	(0.006)
EG	0.852***	0.754***	1.172***
	(0.026)	(0.038)	(0.028)
FD		0.719***	1.107***
		(0.102)	(0.059)
TP			0.799***
			(0.038)
Constant	5.755***	3.748***	-11.36***
	(0.258)	(0.491)	(0.640)
Observations	228	195	195

Note: TR is dependent variable in all columns. Significance-level is shown by number of asterisks. * for 10%, ** for 5%, and *** for 1%.

Table 6. Energy consumption, economic growth and tourism Nexus (PCSE Model).

Variables	(1)	(2)	(3)
EC	0.009	-0.0003	0.003
	(0.012)	(0.012)	(0.008)
EG	0.823***	0.763***	1.048***
	(0.049)	(0.063)	(0.038)
FD		0.841***	1.224***
		(0.135)	(0.090)
TP			0.540***
			(0.067)
Constant	5.850***	3.176***	-7.545***
	(0.425)	(0.755)	(0.944)
Observations	228	195	195

Note: TR is dependent variable in all columns. Significance-level is shown by number of asterisks. *** for 1%.

Model 1, as the dependent variable in the PCSE analysis with tourism, (are presented in the Table 6 above) shows that economic growth has a strong positive influence on tourism, while energy consumption shows a weak positive association with tourism. Model 2, the PCSE analysis discloses that energy consumption does not significantly impact tourism while tourism is positively associated with both economic growth and financial development, which have significant effects, while Model 3, the PCSE analysis, shows that the tourism is significantly positively influenced by economic growth, financial development, and the total population. On the other hand, although EC seems to have a positive impact on tourism, the relationship is not statistically significant.

Economic growth and energy consumption have a strong relationship with tourism, as the correlation analysis suggests that economic growth, financial development, and population have a positive correlation with tourism, but EC has a negative relationship with tourism. The examined data underwent panel diagnostic testing, which revealed that they had statistically significant serial correlation, CSD and a satisfactory model fit. After the panel, diagnostic tests were executed for FE, RE, FGLS, PCSE, and GMM. The findings of FE, RE, and FGLS revealed that energy consumption has the significant negative relation with tourism; these results are similar to those of Nepal, Al Irsyad, and Nepal (2019) and contradict those of Ben Jebli et al. (2019); Katircioğlu (2014) and Tang, Tiwari, and Shahbaz (2016), while economic growth has a positive impact on tourism (Akan, Arslan, & Isik, 2007; Antonakakis, Dragouni, & Filis, 2015; Eugenio-Martin, Martín-Morales, & Sinclair, 2008; Lin, Yang, & Li, 2019; Oh, 2005; Payne & Mervar, 2010; Tang & Jang, 2009). PCSE and GMM models show the negative impact of energy consumption on tourism only when financial development is added to the model. Energy consumption has a negative impact in all other cases, and these results are in contrast with Khan, Hou, and Le (2021); Tang et al. (2016); Nepal et al. (2019); Dogan and Aslan (2017), and Khanal et al. (2021). Financial development has the positive impact on tourism (Rasool et al., 2021).

5. CONCLUSION

This paper explored the impact of EC and EG on TR in tourism-dependent economies for the period from 2000 to 2019. The main goal of this study is to study the connection between EC, EG, and TR in tourism-dependent countries. The study used econometric techniques like FGLS and PCSE to find patterns. These methods gave the study reliable results that study could trust. However, the PCSE method showed something different, suggesting a positive connection between energy use and tourism. The impact of energy consumption (EC) on tourism is mixed and sensitive to econometric techniques. And the impact of economic growth (EG) on tourism is positive and robust to the econometric technique. This needs more study to understand why it happened in this way. On the other hand, economic growth consistently had a positive effect on tourism in the study model. We also add some control variable-financial development and total population to our study. Financial development and the total population

also had a positive impact on tourism. This is something the study already knows when the economy gets better, people usually have more money to spend, which makes them more likely to travel.

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REFERENCES

Adedoyin, F. F., & Bekun, F. V. (2020). Modelling the interaction between tourism, energy consumption, pollutant emissions and urbanization: Renewed evidence from panel VAR. *Environmental Science and Pollution Research*, *27*, 38881-38900. https://doi.org/10.1007/s11356-020-09869-9

Akan, Y., Arslan, İ., & Isik, C. (2007). The impact of tourism on economic growth: The case of Turkey. *Journal of Tourism*, *9*(1), 1-24.

Al-Malki, A. M., Hassan, M.-U., & Ul-Haq, J. (2023). Nexus between remittance outflows and economic growth in GCC countries: The mediating role of financial development. *Applied Economics*, *55*(46), 5451-5463. https://doi.org/10.1080/00036846.2022.2139812

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. https://doi.org/10.1080/13683500.2019.1638354

Antonakakis, N., Dragouni, M., & Filis, G. (2015). Tourism and growth: The times they are a-changing. *Annals of Tourism Research*, *50*, 165-169. https://doi.org/10.1016/j.annals.2014.11.008

Augustine, S. N. (2017). *British virgin Island's tourists' motives to travel, destination image, and satisfaction*. Doctoral Dissertation, Walden University.

Balsalobre-Lorente, D., Driha, O. M., Shahbaz, M., & Sinha, A. (2020). The effects of tourism and globalization over environmental degradation in developed countries. *Environmental Science and Pollution Research*, *27*, 7130-7144. https://doi.org/10.1007/s11356-019-07372-4

Bano, S., Alam, M., Khan, A., & Liu, L. (2021). The nexus of tourism, renewable energy, income, and environmental quality: An empirical analysis of Pakistan. *Environment, Development and Sustainability*, 1-24. https://doi.org/10.1007/s10668-021-01275-6

Beck, N., & Katz, J. N. (1995). What to do (and not to do) with time-series cross-section data. *American Political Science Review*, *89*(3), 634-647. https://doi.org/10.2307/2082979

Ben Jebli, M., Ben Youssef, S., & Apergis, N. (2019). The dynamic linkage between renewable energy, tourism, CO2 emissions, economic growth, foreign direct investment, and trade. *Latin American Economic Review*, *28*(1), 1-19. https://doi.org/10.1186/s40503-019-0063-7

Bhola-Paul, H. M. (2015). Tourism challenges and the opportunities for sustainability: A case study of Grenada, Barbados, and Tobago. *Journal of Tourism and Hospitality Management*, *3*(9-10), 204-213. https://doi.org/10.17265/2328-2169/2015.10.004

Bigano, A., Hamilton, J. M., Maddison, D. J., & Tol, R. S. (2006). Predicting tourism flows under climate change: An editorial comment on Gössling and Hall (2006). In (Vol. 79, pp. 175-180): Kluwer Academic Publishers.

Bölük, G., & Güven, M. (2022). The role of tourism, energy consumption, urbanization, and economic growth on ecological footprint: The Turkish case. *European Journal of Science and Technology*(38), 440-449. https://doi.org/10.31590/ejosat.1030941

Brida, J. G., & Pulina, M. (2010). *A literature review on the tourism-led-growth hypothesis*. Working Paper CRENoS, No. 201017.

Caneday, L., & Zeiger, J. (1991). The social, economic, and environmental costs of tourism to a gaming community as perceived by its residents. *Journal of Travel Research*, *30*(2), 45-49. https://doi.org/10.1177/004728759103000210

Cernat, L., & Gourdon, J. (2012). Paths to success: Benchmarking cross-country sustainable tourism. *Tourism Management*, *33*(5), 1044-1056. https://doi.org/10.1016/j.tourman.2011.12.007

Cortés-Jiménez, I., Pulina, M., Prunera, C. R., & Artis, M. (2009). Tourism and exports as a means of growth. *Research Institute of Applied Economics*, *10*, 1-28.

Dogan, E., & Aslan, A. (2017). Exploring the relationship among CO2 emissions, real GDP, energy consumption and tourism in the EU and candidate countries: Evidence from panel models robust to heterogeneity and cross-sectional dependence. *Renewable and Sustainable Energy Reviews*, *77*, 239-245. https://doi.org/10.1016/j.rser.2017.03.111

Dou, S., Ul-Haq, J., Visas, H., Aslam, B., & Khanum, S. (2023). Does export product diversification reduce sulfur dioxide emissions in China? A regional analysis. *International Journal of Environmental Science and Technology*, *20*(6), 6247-6258. https://doi.org/10.1007/s13762-022-04353-y

Eugenio-Martin, J. L., Martín-Morales, N., & Sinclair, M. T. (2008). The role of economic development in tourism demand. *Tourism Economics*, *14*(4), 673-690. https://doi.org/10.5367/000000008786440111

Fahimi, A., Saint Akadiri, S., Seraj, M., & Akadiri, A. C. (2018). Testing the role of tourism and human capital development in economic growth. A panel causality study of micro states. *Tourism Management Perspectives*, *28*, 62-70. https://doi.org/10.1016/j.tmp.2018.08.004

Farooq, U., Ul-Haq, J., & Cheema, A. R. (2023). Is there an EKC between economic growth and air pollutant emissions in SAARC countries? Evidence from disaggregated analysis. *Environmental Science and Pollution Research*, 1-13. https://doi.org/10.1007/s11356-023-29363-2

Johnson, J. D., Snepenger, D. J., & Akis, S. (1994). Residents' perceptions of tourism development. *Annals of Tourism Research*, *21*(3), 629-642.

Katircioğlu, S. T. (2014). Testing the tourism-induced EKC hypothesis: The case of Singapore. *Economic Modelling*, *41*, 383-391. https://doi.org/10.1016/j.econmod.2014.05.028

Khan, A., Bibi, S., Lorenzo, A., Lyu, J., & Babar, Z. U. (2020). Tourism and development in developing economies: A policy implication perspective. *Sustainability*, *12*(4), 1618. https://doi.org/10.3390/su12041618

Khan, I., Hou, F., & Le, H. P. (2021). The impact of natural resources, energy consumption, and population growth on environmental quality: Fresh evidence from the United States of America. *Science of the Total Environment*, *754*, 142222. https://doi.org/10.1016/j.scitotenv.2020.142222

Khanal, A., Rahman, M. M., Khanam, R., & Velayutham, E. (2021). Are tourism and energy consumption linked? Evidence from Australia. *Sustainability*, *13*(19), 10800. https://doi.org/10.3390/su131910800

Lee, C.-C., & Chang, C.-P. (2008). Tourism development and economic growth: A closer look at panels. *Tourism Management*, *29*(1), 180-192. https://doi.org/10.1016/j.tourman.2007.02.013

Lin, V. S., Yang, Y., & Li, G. (2019). Where can tourism-led growth and economy-driven tourism growth occur? *Journal of Travel Research*, *58*(5), 760-773. https://doi.org/10.1177/0047287518773919

Liu, J. C., Sheldon, P. J., & Var, T. (1987). Resident perception of the environmental impacts of tourism. *Annals of Tourism Research*, *14*(1), 17-37. https://doi.org/10.1016/0160-7383(87)90045-4

Macintosh, R., & Goeldner, C. (1986). *The tourism industry*. New York: Harper Press.

Maddala, G., & Lahiri, K. (2009). *Introduction to econometrics* (4th ed.). New York: John Wiley & Sons Ltd.

Mérida, A., & Golpe, A. A. (2016). Tourism-led growth revisited for Spain: Causality, business cycles and structural breaks. *International Journal of Tourism Research*, *18*(1), 39-51. https://doi.org/10.1002/jtr.2031

Modeste, N. (1994). *The impact of growth in the tourism sector on economic development, the experience of selected Caribbean countries*. Paper presented at the XXVI Annual Conference of the Regional Programme of Monetary Studies, November 23–26, 1994.

Nepal, R., Al Irsyad, M. I., & Nepal, S. K. (2019). Tourist arrivals, energy consumption and pollutant emissions in a developing economy–implications for sustainable tourism. *Tourism Management, 72*, 145-154. https://doi.org/10.1016/j.tourman.2018.08.025

Oh, C.-O. (2005). The contribution of tourism development to economic growth in the Korean economy. *Tourism Management, 26*(1), 39-44. https://doi.org/10.1016/j.tourman.2003.09.014

Ohajionu, U. C., Gyamfi, B. A., Haseki, M. I., & Bekun, F. V. (2022). Assessing the linkage between energy consumption, financial development, tourism and environment: Evidence from method of moments quantile regression. *Environmental Science and Pollution Research*, 1-15. https://doi.org/10.1007/s11356-021-17920-6

Ohlan, R. (2017). The relationship between tourism, financial development and economic growth in India. *Future Business Journal, 3*(1), 9-22. https://doi.org/10.1016/j.fbj.2017.01.003

Onafowora, O. A., & Owoye, O. (2020). Tourism development and air pollution in caribbean SIDs: A bootstrap panel granger causality analysis. *Journal of Tourismology, 6*(2), 221-239. https://doi.org/10.26650/jot.2020.6.2.0012

Paul-Andrews, L. (2017). *Tourism's impact on the environment: A systematic review of energy and water interventions*. Doctoral Dissertation, University of Canterbury.

Payne, J. E., & Mervar, A. (2010). Research note: The tourism–growth nexus in Croatia. *Tourism Economics, 16*(4), 1089-1094. https://doi.org/10.5367/te.2010.0014

Rasool, H., Maqbool, S., & Tarique, M. (2021). The relationship between tourism and economic growth among BRICS countries: A panel cointegration analysis. *Future Business Journal, 7*(1), 1-11. https://doi.org/10.1186/s43093-020-00048-3

Resende-Santos, J. (2019). Cape Verde and the risks of tourism specialisation: The tourism option for Africa's small states. *Journal of Contemporary African Studies, 37*(1), 148-168. https://doi.org/10.1080/02589001.2019.1619916

Ridderstaat, J., Croes, R., & Nijkamp, P. (2013). Tourism and long-run economic growth in Aruba. *International Journal of Tourism Research, 16*, 472-487.

Ridderstaat, J. R. (2015). *Studies on determinants of tourism demand dynamics in a small island destination. The case of Aruba*. Ph. D. Thesis, Economics and Business Administration, Vrije Universiteit Amsterdam.

Sánchez-Galiano, J.-C., Martí-Ciriquián, P., & Fernández-Aracil, P. (2017). Temporary population estimates of mass tourism destinations: The case of Benidorm. *Tourism Management, 62*, 234-240. https://doi.org/10.1016/j.tourman.2017.04.012

Satrovic, E., & Muslija, A. (2020). Modeling causal relationships among tourism, energy, CO2 emissions and economic growth. *Bingöl University Social Sciences Institute Journal, 20*, 81-102. https://doi.org/10.29029/busbed.734869

Setiawati, N., & Pamungkas, E. (2022). How important is environmentally sustainable tourism? Evidence in Indonesia from 1974-2018 Using NARDL cointegration. *Journal of Economics & Development Studies, 23*(2), 201-219. https://doi.org/10.18196/jesp.v23i2.15238

Shi, J., Visas, H., Ul-Haq, J., Abbas, S., & Khanum, S. (2022). Investigating the impact of export product diversification on environmental degradation: Evidence from Chinese Provinces. *Environment, Development and Sustainability*, 1-32. https://doi.org/10.1007/s10668-022-02536-8

Subhan, F., Azam, S., Khan, G., Irfan, M., Muhammad, S., Al-Sehemi, A. G., . . . Kityk, I. V. (2019). Elastic and optoelectronic properties of CaTa2O6 compounds: Cubic and orthorhombic phases. *Journal of Alloys and Compounds, 785*, 232-239. https://doi.org/10.1016/j.jallcom.2019.01.140

Tang, C.-H. H., & Jang, S. S. (2009). The tourism–economy causality in the United States: A sub-industry level examination. *Tourism Management, 30*(4), 553-558. https://doi.org/10.1016/j.tourman.2008.09.009

Tang, C. F., Tiwari, A. K., & Shahbaz, M. (2016). Dynamic inter-relationships among tourism, economic growth and energy consumption in India. *Geosystem Engineering, 19*(4), 158-169. https://doi.org/10.1080/12269328.2016.1162113

Ul-Haq, J., Ashraf, I., Cheema, A. R., Hye, Q. M. A., & Visas, H. (2023). The relationship between trade liberalization and gender disparity in education: Evidence from Pakistan. *Nurture*, *17*(3), 180-193.

Ul-Haq, J., Imran, K., Oad, S., & Visas, H. (2023). Nexus between air travel and environmental degradation in BRICS countries: A tourism perspective. *Chinese Journal of Population, Resources and Environment*, *21*(3), 189-196. https://doi.org/10.1016/j.cjpre.2023.09.008

Ul-Haq, J., Khanum, S., & Raza Cheema, A. (2020). The impact of trade liberalization on child labor in Pakistan. *International Review of Applied Economics*, *34*(6), 769-784. https://doi.org/10.1080/02692171.2020.1782853

Visas, H., Rehan, R., Ul-Haq, J., Cheema, A. R., Khanum, S., & Hye, Q. M. A. (2023). Does tourism increase energy consumption in BRICS countries? *Journal of Tourism Management Research*, *10*(1), 94-106. https://doi.org/10.18488/31.v10i1.3402

Wilkinson, P. F. (1996). Anguilla: a tourism success story? *Visions in Leisure and Business*, *14*(4), 37-62.

Xia, W., Doğan, B., Shahzad, U., Adedoyin, F. F., Popoola, A., & Bashir, M. A. (2022). An empirical investigation of tourism-led growth hypothesis in the european countries: Evidence from augmented mean group estimator. *Portuguese Economic Journal*, 1-28. https://doi.org/10.1007/s10258-021-00193-9

Zhang, J., & Zhang, Y. (2021). Tourism, economic growth, energy consumption, and CO2 emissions in China. *Tourism Economics*, *27*(5), 1060-1080. https://doi.org/10.1177/1354816620918458