Journal of Hospitality and Tourism Management 43 (2020) 42–52

Contents lists available at ScienceDirect

Journal of Hospitality and Tourism Management

journal homepage: www.elsevier.com/locate/jhtm

The dynamic effects of globalization process in analysing N-shaped tourism led growth hypothesis

Daniel Balsalobre-Lorente[a,*], Oana M. Driha[b], Avik Sinha[c]

[a] Department of Political Economy and Public Finance, Economic and Business Statistics and Economic Policy, University of Castilla-La Mancha, Spain
[b] Department of Applied Economics, International Economy Institute, Institute of Tourism Research, University of Alicante, Spain
[c] Department of General Management and Economics, Goa Institute of Management, India

ARTICLE INFO

Keywords:
Tourism-led growth hypothesis
Globalization
CO_2 emissions
Energy use

ABSTRACT

This paper validates the tourism-led growth hypothesis for a panel of selected OECD countries, including the effects of per capita CO_2, globalization and energy use during the period 1994–2014.

The long-term relationship between economic growth and the above-mentioned variables is confirmed by applying unit root tests and cointegration approaches. The Generalized Method of Moments (GMM) methodology confirms a N-shaped relationship between international tourism and per capita economic growth. Globalization does not appear to be very effective in the short run for promoting economic growth; its impact on growth is determined through a finite-lag distribution, as the optimal effect can only be achieved in the long term. A direct relationship is detected between economic growth, energy use and globalization. The recommendation is to reshape regulatory frameworks with a clearer focus on promoting international tourism and more efficient energy use as a means of enhancing sustainable economic growth in developed countries. The empirical results reveal that fossil fuels account for a large part of the energy mix, so policy makers should consider reinforcing the promotion of clean energy sources and the use of more efficient processes.

1. Introduction

Tourism plays an important role in the economic development by creating new jobs, creating avenues for income, and consequently adding to tax revenue (Brida, Lanzilotta, Pereyraa, & Pizzolon, 2015; Isik, Dogru, & Turk, 2018). Thus, both employment and income are generated directly in the sectors, in which expenditure or tourism-related investment takes place. The tourism industry also induces further increases throughout the economy as the recipients of rising income spend a part of them (Stabler et al., 2010). Over the past six decades, the continued expansion and diversification of international tourism has significantly contributed to making it one of the most dynamic and fastest-growing industries. In fact, according to the World Travel and Tourism Council (2018), the total contribution of tourism to the world economy in 2017 could be quantified around 10.4% of GDP and 9.9% of total employment. Out of 1.4 billion international tourists in 2018, OECD countries received about 60% of them. Additionally, it is expected that tourism will grow on average about 43 million a year and reach 1.8 billion international arrivals by 2030 (OECD, 2018), which means multiplying by seven the international arrivals compared to 1970. This is not merely due to the emergence of numerous new destinations, but also to the diversification of tourism with more types of travel, and to the importance of an ever more personalized experience (Lee, Wu, & Li, 2018). The rapid growth of tourism via multiplier effects boosts the additional revenues generated by tourism spending, coupled with changes in household spending, and appears to be an induced effect of tourism on the economy (Khan, Seng, & Cheong, 1990; Brida, Pereyra, & Devesa, 2008), causing a positive effect on the increase of the long-run economic growth (Mishra, Sinha, Sharif, & Suki, 2019). Furthermore, tourism promotes investment, incorporates environmental and sustainability criteria into public financing and investment supports (OECD, 2018). Also, the integration of environmental and social standards into tourism policies can generate positive effects on innovation processes, and thus, moving toward more sustainable tourism investments. Environmental tourism policies and economic structures are among the most relevant determinants of international tourism, where globalization process contributes positively to improve these standards in OECD countries (Govdel & Direkci, 2017).

Our study tries to validate the existence of an N-shaped relationship between international tourism expenditures (as a proxy of tourism development) and economic growth. This non-linear connection between

* Corresponding author.
E-mail addresses: Daniel.Balsalobre@uclm.es (D. Balsalobre-Lorente), oana.driha@ua.es (O.M. Driha), f11aviks@iimidr.ac.in (A. Sinha).

https://doi.org/10.1016/j.jhtm.2020.02.005
Received 21 August 2019; Received in revised form 2 February 2020; Accepted 8 February 2020

tourism and economic growth is expected to depend on the level and quality of tourism industry in the destination (Adamou & Clerides, 2009; Zuo & Huang, 2017). In other words, the N-shaped behaviour between tourism and economic growth is related with tourism industry specialization, tourism area cycle life (hereafter TALC), and tourism led growth hypothesis (hereafter TLGH) (Po & Huang, 2008; Chang, Khamkaew, & McAleer, 2009; 2012; Zhao & Mao, 2013). Therefore, the aim of this study is to explore how the level of tourism specialization and its impact on economic growth vary over time. Hence, the N-shaped TLGH assumes a developmental trajectory, related to TALC[1] theory, which supports that grows through different stages over time (Zuo & Huang, 2017). TALC theory considers that variations in tourism specialization will generate different effects over economic growth (Zuo & Huang, 2017). Hence, tourism development not only stimulates the growth of the sector, but it also drives the overall growth of the economy (Sharif, Saha, Campbell, Sinha, & Ibrahiem, 2019). Tourism contributes to reducing poverty while increasing productivity and efficiency in different sectors (Li, Jin, & Shi, 2018), which facilitates economic growth. Hence, the economic contribution of tourism is of special interest for policymakers (Brida et al., 2015).

Despite tourism's capacity to create jobs and reduce poverty, the fluctuations in employment and tax revenues must be underlined as a consequence of tourism business cycles and structural change (Li et al., 2018). In view of the growth of the tourist industry and its increasing importance in OECD countries, the causality between tourism and economic growth has attracted considerable interest from academia (Chen & Chiou-Wei, 2009). Since the first empirical test of the nexus between tourism and economic growth (Ghali, 1976) and the first analysis of the TLGH hypothesis (Balaguer & Cantavella-Jordá, 2002), this subject has received considerable academic attention.

Driven by the growth of the tourism industry in the OECD countries, the shifts in tourists' expectations, and the trend towards a more customized tourism service, declining job prospects in this sector, the need for technological advancements to address climate change issues call for analysing the existing policies for promoting economic growth in these nations. Sustainability and competitiveness also depend on how tourism responds to climate change (Scott, 2006; Weaver, 2011). In fact, tourism depends on a wide range of infrastructure services with numerous environmental and ecological impacts (Gössling, Hall, Lane, & Weaver, 2008, 2002; Gössling, Hansson, Horstmeier, & Saggel, 2002; Gössling, Scott, & Hall, 2015; Lee et al., 2018). Moreover, the financial and international investment issues regarding ascertaining the sustainability of this sector need to be analysed for these countries. Due to these reasons, the OECD countries can be a suitable context for this study.

Extant studies report inconclusive results in regard to the connection between tourism and economic growth. The increasing importance of tourism in many economies, its implications for policymakers, mainly in countries where it has a crucial impact on the economy (Bianchi, 2017, pp. 40–52), coupled with the continued evolution of tourism since the 1950s to the present (Brida et al., 2015; ECLAC, 2009), has led to the accumulation of a vast amount of literature on TLGH. However, other studies reject this hypothesis and point to the existence of an economy-driven tourism hypothesis (Brau, Lanza, & Pigliaru, 2003) or reciprocal hypothesis (Shan & Wilson, 2001). Therefore, there is no clear consensus in the contribution of tourism to economic growth. Some studies have revealed a negative impact related with negative effects on the local population and generate an inefficient tourist sector (Blake, Sinclair, & Soria, 2006, 2003; Dwyer, Forsyth, Spurr, & Van Ho, 2006; Li et al., 2018; Smorfitt, Harrison, & Herbohn, 2005; Zhang & Lee, 2007). Other studies report an adverse effect of tourism over the environmental and economic cost of tourism development (Milne, 1990; Perdue, Long, & Allen, 1990). Therefore, this research considers both perspectives testing a non-linear analysis in the connection between economic growth and international tourism. In this paper, the relationship between international tourism and economic growth is explored throughout a new approach, which considers the long-run effects of globalization, environmental degradation and energy use. Even the analysis of the TLGH traditionally has included additional explanatory variables like energy use or greenhouse gas emission, the processes of globalization and environmental degradation processes have not been significantly explored in this analysis (Balsalobre et al., 2019; Salifou & Haq, 2017).

This study makes several contributions to the literature through (1) a non-linear approach proposing a N-shaped relationship between tourism and economic growth; (2) including and testing the effect of globalization on economic growth by applying a V-finite lag distribution (De Leeuw, 1962; Álvarez, Balsalobre-Lorente, Shahbaz, & Cantos, 2017), as the suggestion is that the optimal effects of globalization on economic growth are not generated immediately; and (3) the application of a contemporary methodology, the pairwise Dumitrescu-Hurlin (2012) panel causality test with the addition of the cointegration and GMM methodology.

2. Literature review

Many studies support that tourism expansion has a positive direct and indirect impacts on economic growth (Balsalobre et al., 2020; Brida, Cortés-Jiménez, & Pulina, 2016; Mérida & Golpe, 2016). This direct nexus between tourism and economic growth is linked to the direct revenues obtained by the different types of tourist agents, e.g., airlines, travel agencies or hotels (Liu & Song, 2018). The indirect contribution is achieved through the positive impact on the balance of payments, the increase of foreign currencies reserves, productivity, competitiveness and employment increase, etc. (Brida et al., 2015; Mérida & Golpe, 2016; Paramati, Alam, & Chen, 2017a, 2017b).

According to the tourist area life cycle (TALC) concept, we assume the tourist destination progresses through five stages: exploration, involvement, development, consolidation, stagnation, and post-stagnation (Fig. 1).

Fig. 1 illustrates the transition of tourism over time. When the tourism industry moves into the involvement stage, there is limited interaction between tourists and the local community, resulting in only basic services. Increased advertising induces a pattern of seasonal variation and a definite market area begins to emerge. During the exploration stage, there are a few adventurous tourists visiting sites with few public facilities. The development stage is the last stage where there is continued growth in the local tourism industry. There is a noticeable development of additional tourist facilities and increased promotional efforts. The destination experiences a shift in control of the tourist trade to outsiders, and the number of tourists at peak periods outnumbers the residents. Once the tourism's growth rate begins to decrease, the destination enters a consolidation stage. Tourism has become a major component of the local economy, and a well-delineated business district has begun to take shape. Some of the facilities are outdated and the destination tries to extend the tourist season. This leads to the stagnation stage where peak numbers of tourists and capacity levels are reached. The destination has a well-established image, but it is no longer popular, and the lodging facilities begin to erode and turnover. Finally, the destination reaches the post-stagnation stage facing options ranging from rejuvenation to decline, represented by various levels of change (both positive and negative) in the number of tourist arrivals. The result depends on the destination's ability to position itself and find a viable market. The following section will discuss

[1] The concept of a tourist area life cycle (TALC) was introduced by Butler (1980) to explain the evolution of a tourist area over time. This theory suggests that tourism industry will start slow with negative profits, proceed to a growth stage experiencing a rapid increase, move into a maturity stage where tourism sector begins to decrease, and finally reach a decline stage or a reemerging stage with ascending returns.

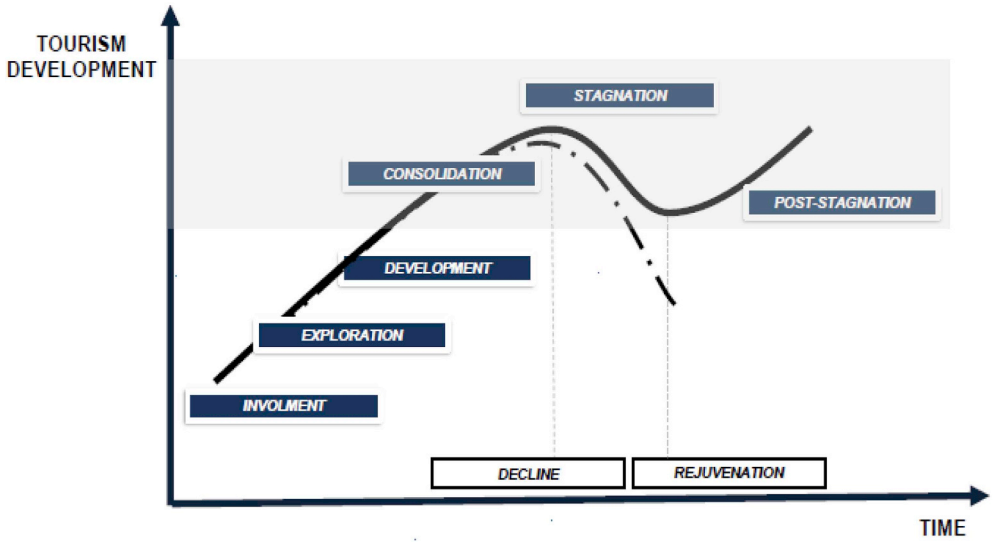


Fig. 1. TALC scheme
Source: Based in Bulter (1980)

previous research using the TALC concept and the various stages of evolution. During the post-stagnation stage, a tourist area presents several possibilities ranging from rejuvenation to decline.

Additionally, the topic of TLGH[2] is not new in research into tourism economics, as enhancing economic growth through tourism has often been used as an important economic development strategy (Chen & Chiou-Wei, 2009; Chang, Khamkaew, & McAleer, 2012; Zhao & Mao, 2013; Nasir, Wu, & Calderón-Guerrero, 2015; Zuo & Huang, 2017). Over 100 papers have already focused on the Granger causality test of the TLGH, highlighting different types of relationships by confirming and/or rejecting it (Brida et al., 2016).[3] TLGH is used to test theoretically the effects of tourism on welfare and the macroeconomic effects of a temporary demand shock (Pao & Tsai, 2011; Dogru and Bulut, 2017), drawing different recommendations for policymakers for specific countries and targets (Brida et al., 2016). Even the TLGH is not new in the empirical literature, our study advances in the analysis of the economic growth-tourism nexus including the globalization, environment and energy use due to their role.

While many studies support TLGH, shocks have reduced economic growth (Blacke et al., 2003; Dunn & Dunn, 2002; Groizard & Santana-Gallego, 2018; Smorfitt et al., 2005; Zhang & Lee, 2007). Other factors such as insufficient tourist regulations (Dwyer, Forsyth, Spurr, & Hoque, 2013), environmental factors (Pham, Simmons, & Spurr, 2010), devaluation policies (Pratt, 2014) or type of tourism services (e.g. rural, business or leisure tourism) have had negative effects on economic growth (Agarwal, 2012; Akama & Kieti, 2007; Gal, Gal, & Hadas, 2010). This negative effect may be caused by inefficient and incorrect administration and policy decisions in the tourism sector. As a driving force for economic growth, tourism should be a strategic sector that is able to foster economic and social development (Gössling & Hall, 2006; OECD, 2018; Scott, 2006; WTTC, 2011).

Our study points out, that even the tourism sector contains beneficial effects over economic growth, there are also many tourism-related economic, social and environmental costs (Palmer & Riera, 2003). The N-shaped reflects a non-linear connection between tourism and economic growth, which denotes a long-run relationship related to the stage of development of tourism industry and its effects over income in receipt countries (Fig. 2).

Fig. 2 reflects the non-linear effects of tourism specialization on economic growth, which project that in early stages of tourism development, this industry exerts a positive effect over local economies confirming the TLGH and showing ascending returns, even this process present high requirements of energy sources, mainly fossil, with low environmental controls.

The N-shaped connection between tourism and economic growth assumes that in early stages of tourism development, there are ascending returns that bring job opportunities, ascending tax revenues or improvements in the balance of payment, which stimulate the local production and income in the destination (Sinclair, 1998). Consequently, in the early stages, the tourism industry would promote economic growth, though the overexploitation of energy sources and low environmental restrictions (Zuo & Huang, 2017). By contrast, the negative connection between tourism expansion and economic growth, with negative returns (Capo, Font, & Nadal, 2007), would be, for example, as consequence of the Dutch disease (e.g. the boom gaming industry), which reduces the area's long-term sustainability (Sheng and Tsui, 2007; Capo et al., 2007). Tourism's industry specialization does not always contribute to economic growth, because of the *law of returns* and limitations of environmental carrying capacity. When the tourism industry starts to experiment diminishing returns, the link with economic growth becomes negative, appearing excessive competition or institutional inertia (path-dependence) (Essletzbichler & Rigby, 2007). During this second stage appears negative externalities, via crowding out effect, economic leakage and pernicious environmental repercussions (Po & Huang, 2008; Zuo & Huang, 2017), being tourism industry mainly controlled by external corporations with weak linkage with the local economy. Some studies also intend this negative connection because of tourism's substitution of the welfare generated in the trade regime dominated by export taxes or import subsidies (Chen & Devereux, 1999). To avoid this situation, there are necessary institutional modifications, which adopt sustainable considerations and innovation strategies, where globalization would contribute positively to reach this situation. In addition, local tourism firms should control the expansion of this industry providing an advanced tourism sector.

Finally, the third stage suggests an optimal situation where high

[2] TLGH is considered to be a reflection of the export-led growth hypothesis (ELGH), which states that economic growth can be boosted by intensifying the amount of labour and capital, but also through the expansion of exports (Brida et al., 2016).

[3] Despite the increasing interest of many researchers in testing the TLGH, there is a notable lack of consensus regarding the relationship between tourism and economic growth (Aslan, 2014; Tugcu, 2014). These discrepancies may be due to the different time frame, country or set of countries analysed or even to the different methodologies used for the empirical test (Brida et al., 2016).

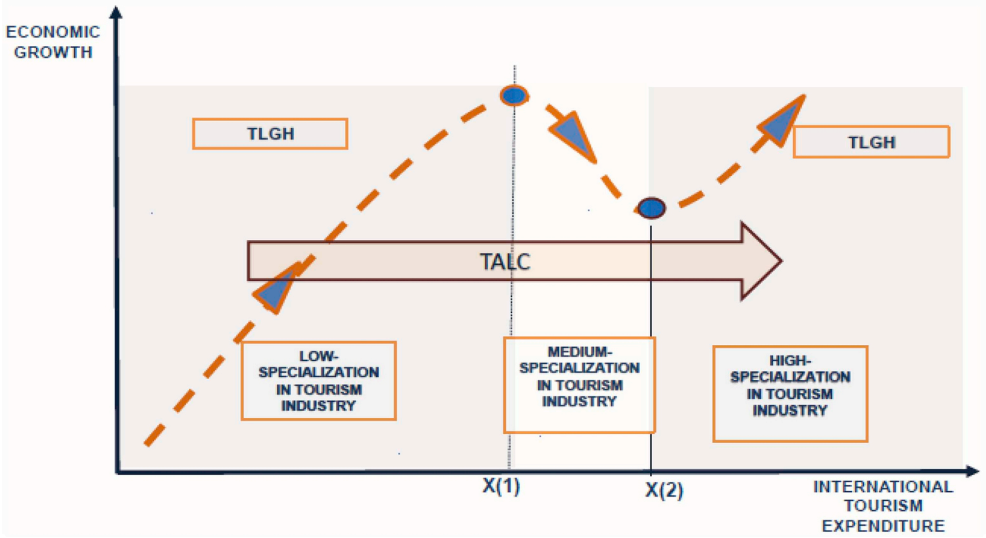


Fig. 2. N-shaped tourism-economic growth Nexus: a TLGH & TALC approach.

developed tourism industry is immersed in a second life cycle, with a diverse set of tourism activities with high return and low environmental impact. During this third stage, will appear cleaner technologies and environmental regulations directly connected with the tourism industry (Zuo & Huang, 2017). This third stage proposes an optimal scenario, where the tourism industry obtains positive returning companionable with positive economic growth. For example, Wu and Xie (2010) concluded that economies with high tourism specialization presented a positive nexus between tourism and economic growth, while the relationship was not obvious when the tourism specialization was low, hece an N-shape relationship between tourism and economic growth beeing underlined.

In addition, our study also explores how the processes of globalization, economic growth and environmental degradation are increasingly connected (Boukas & Ziakas, 2013; De Vita, 2014; Fereidouni & Al-mulali, 2014; Meng, 2014; Tang, 2013). Globalization is considered a main driving force for economic growth that increases the access to international markets and services in critical sectors such as tourism, thereby enabling environmental correction (Aitken, Hanson, & Harrison, 1997; Balsalobre et al., 2020; Hsiao & Shen, 2003; List & Co, 2000; Shahbaz, Loganathan, Muzaffar, Ahmd, & Jabran, 2016; Tamazian, Chousa, & Vadlamannati, 2009; Turner & Witt, 2001). In fact, globalization also fosters economic efficiency by refining new technologies (technical effect), thus facilitating the control of CO_2 emissions (Tisdell, 2001) as a consequence of the indirect effects on environmental quality (Cavlovic, Baker, Berrens, & Gawande, 2000). In line with the literature, globalization promotes energy efficiency, which considerably contributes to controlling environmental degradation (List & Co, 2000). Globalization increases access to international markets and services in critical sectors such as tourism, enabling more efficient sectorial processes and environmental correction (Govdel & Direkci, 2017; Turner & Witt, 2001). Additionally, globalization processes also enhance technological innovation and increase energy efficiency, enabling low-carbon economic growth (Tamazian et al., 2009). Other effects of globalization include accelerating the development of the tourism industry, producing greater trade openness, and improving access to international markets, services and trade corporations (Keintz, 1968; Turner & Witt, 2001). Tourism appears to be positively affected by trade openness as a proxy of globalization (Dwyer, Forsyth, & Rao, 2000).

Moreover, we also include in our main model the impact of carbon emissions over economic growth, trained by fossil fuels and inefficient energy processes (Lee & Brahmasrene, 2013; Turner & Witt, 2001). Various studies support that environmental damage increases due to industrialization, modernization and urbanization (Azam, Khan, Abdullah, & Qureshi, 2016). Chen, Sheng-Tung, Chia-Sheng, and Chi-Chung (2016) found that a 1% increase in per capita energy consumption reduces real per capita GDP by 3% worldwide, and 4.2% in developing countries, while a 1% increase in per capita CO2 emissions increases world GDP by about 6.7%, and the GDP of a set of 188 countries by 11.9% and 6.1%, respectively, for the period 1993–2010. In addition to reducing carbon emissions, more efficient energy conversion technologies and clean energy technologies such as renewables are traditional ways of mitigating climate change in developed economies (Álvarez et al., 2017). In other words, without proper regulation, carbon emissions will continue damaging economic growth (Uddin, Sayema, & Ozturk, 2016). The extra cost of inefficient energy use and pollution is greater than the resulting benefits from the energy conservation required to enhance efficient energy usage with energy-related equipment and the processes.

Furthermore, a large part of the economic literature has exposed how energy use and climate change contribute to enhancing economic growth, while the globalization process (e.g. trade openness and foreign direct investment) is considered one of the main drivers of economic and social development (Aitken et al., 1997; Hsiao & Shen, 2003; List & Co, 2000; Shahbaz et al., 2016; Tamazian et al., 2009; Turner & Witt, 2001). For instance, Katircioglu (2014) recognizes that there are important interactions between tourism and energy sector, environment or economic growth. In this sense, tourism development leads to a growth in energy capability and increases in pollution levels as a consequence of the expansion of tourism-related activities. Energy use and its impact on economic growth are also widely considered where tourism not only contributes to economic growth but also to an increase in energy consumption (Liu, Feng, & Yang, 2011) and carbon emissions (Gössling & Peeters, 2015; Lee, Wu, & Li, 2018). Previous research underlines the fact that tourism drives economic growth in different ways: (1) the *foreign exchange* brought by tourists and the improvement in the current account balance; (2) *job creation*, which helps reduce poverty, and the subsequent tax revenues; (3) *investment* in infrastructure, human capital and technology; (4) increased *competition and productivity* and, hence, the promotion of *efficiency*; and (5) the use and exploitation of *economies of scale and scope* boosted by tourism (Dogru and Sirakaya-Turk, 2017; Imran, Alam, & Beaumont, 2014; Lee & Brahmasrene, 2013; Li et al., 2018; Shahzad et al., 2017).

Based on the above arguments, our hypotheses are the following:

H1. : An N-shaped relationship is expected between economic growth

Table 1
Dependent and independent variables.
Sources: KOF globalization index (2018); https://www.kof.ethz.ch; World Bank Database (2018)

Variable	Measure	Notation	Relationship
Dependent variable			
Gross domestic product	Log. GDP per capita U$D	GDP	
Independent variables			
International tourism	Log. International tourism expenditures U$D	TOUR	N-shaped
Squared international tourism		$TOUR^2$	
Cubic international tourism		$TOUR^3$	
Globalization	Log. KOF globalization index	ZG	Positive
CO_2 emissions	(Log. metric tons CO_2 emissions, per capita)	CO_2	Positive
Energy use	(Log. kg of oil equivalent per capita)	EU	Positive

and international tourism.

H2. : A long-term relationship is expected between the globalization process and economic growth.

3. Data and methodology

The aim of this study is to analyse the factors affecting CO_2 emissions in selected OECD countries, with a special focus on the role of international tourism and globalization and their relationship with the process of environmental degradation. This section describes the data and outlines the methodology used. The sample is restricted to the period for which annual data are available, from 1994 to 2014 (21 observations for each country) in the World Bank database (World Bank, 2018). The variables are defined in Table 1.

An EKC model based on the carbon emissions function for selected OECD countries is used to estimate the impact of different variables on environmental degradation. The baseline equation (Equation (1)) for this study considers the effect of international tourism, the effects of globalization, CO2 emissions, and energy use on economic growth. Following is the estimation model:

$$GDP_{it} = \alpha_1 T_{it} + \alpha_2 T_{it}^2 + \alpha_3 T_{it}^3 + \alpha_4 ZG_{it} + \alpha_5 CO2_{it} + \alpha_6 EU_{it} + \varepsilon_{it} \quad (1)$$

Equation (1) proposed a cubic relationship between international tourism and economic growth (see Fig. 2). To explore the role of carbon emissions and energy use, as driving forces of the connection between economic growth and tourism, we also propose an additional model (Eq. (2)), where we isolate the effect of these two variables:

$$GDP_{it} = \alpha_1 T_{it} + \alpha_2 T_{it}^2 + \alpha_3 T_{it}^3 + \alpha_4 ZG_{it} + \varepsilon_{it} \quad (2)$$

The non-linearity of the tourism-economic growth connection was suggested previously (Brida et al., 2016, 2015; Po & Huang, 2008). In order to test this non-linearity, this research proposes the hypothesis of an N-shaped nexus between economic growth and tourism to verify the effect of rising international tourism on economic growth in selected OECD countries[4] between 1994 and 2014.

As shown in Fig. 1, in its early stages, tourism development is positively related to economic growth, confirming the TLGH.

GDP_{it} is the real GDP per capita (logarithms current US$ PPP); T_{it} is international tourism expenditure (logarithms current US$). T^2_{it} and T^3_{it} are also included to confirm a non-linear cubic relationship between international tourism expenditure and income for selected OECD countries (see footnote 1) during 1990–2014. We apply a V-finite lag distribution (De Leeuw, 1962; Álvarez et al., 2017) to confirm the positive effect of the globalization process in selected developed countries, confirming that the optimal effects of globalization on economic growth are not generated immediately (Fig. 3).

This finding is one of the novelties in the field of study –mainly in the empirical literature– due to the assumption of a long-term optimal effect in the connection between globalization processes and economic growth (Fig. 3). ZG_{it} represents the globalization processes. As described above, we have transformed globalization into a V-finite lag distribution variable (Fig. 3), based on De Leeuw's (1962) scheme, whose optimal impact appears at t-2:

$$ZG_{it} = * G_{it-j} \quad (3)$$

Equation (3) ($ZG_{it\text{-}j}$) is a dynamic variable of an order 4 finite V-lag distribution structure, which considers that globalization processes accumulate over time. Equation (1) also considers the effects of per capita carbon emissions $CO2_{it}$ (logarithms $MTCO_2$), EU_{it}, energy use per capita (logarithms kg of oil equivalent per capita) on GDP_{it}.

Fig. 3 shows a De Leeuw's finite-lags distribution scheme (Álvarez et al., 2017) in order to analyse the relationship between globalization and economic growth. The main contribution of our study is to confirm that globalization measures require time lags to accomplish their maximum impact on economic growth. These results indicate that globalization as an instrument of technical progress (List & Co, 2000; Tamazian et al., 2009; Tisdell, 2001) can contribute positively to both economic growth and decontamination processes via the energy efficiency process.

The descriptive statistics (Table 2) show that the distribution of variables is skewed and more concentrated than the normal distribution, with longer tails.

To validate our proposed hypotheses, we apply some preliminary tests: the non-stationarity of the series through several panel unit tests; the potential cointegration among variables through different cointegration tests; and the causality relationship among variables.

4. Empirical results

To identify a possible long-run relationship between the variables, they must be integrated in order one, I(1) level. This is determined through the second-generation panel unit root tests. In order to verify the applicability of the unit root tests, we have applied Chudik and Pesaran (2015) weak cross-sectional dependence test, and the results stated in Table 3 demonstrate the presence of cross-sectional dependence, thereby validating the application of the second-generation panel unit root tests. The results of unit root tests documented in Table 4 puts forth the evidence of the variables to be first-order integrated.

The results suggest that the variables are I(1). According to the *p*-values reported in the above table, all the series are non-stationary at levels (rejecting the null hypothesis) at their first difference which stands for the integration at I(1). As the null hypothesis is the stationarity of the series (rather than the non-stationarity), the significant results suggest their non-stationarity; these aspects must be properly addressed. Following the confirmation that all the variables were integrated in order one, I(1), the Westerlund and Edgerton (2008) cointegration test was done to determine the existence of long-run relationships among the variables. The results reported in Table 5 show the presence of cointegrating association among the variables and Table 6 shows the structural breaks in the cointegrating series. Due to the regulatory reforms started in 1997 in the OECD nations, the macroeconomic parameters experienced a shock in their trend pattern (OECD, 1997). As an extension of the institutionalization of these reforms, the OECD countries started the "Annual OECD Forum" from June 2000. This meeting was focused on giving a boost to the various

[4] Australia, Austria, Canada, Czech Republic, Denmark, France, Germany, Greece, Hungary, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Spain, Sweden, Switzerland, Turkey, United Kingdom and United States.

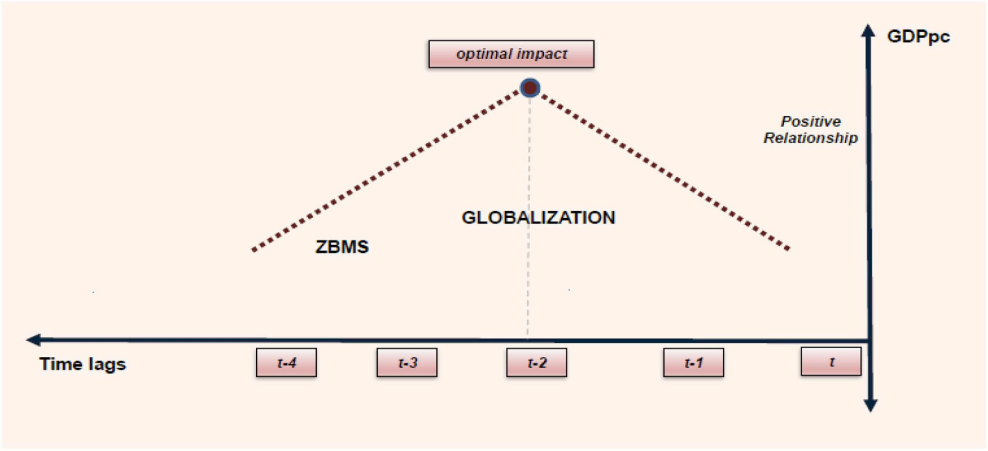


Fig. 3. De Leeuw – V finite lag distribution: economic growth-globalization
Source: prepared by the authors.

Table 2
Descriptive statistics and correlation matrix.

Descriptive statistics					
	GDP	TOUR	ZG	CO_2	E
Mean	32282.740	778.830	744.844	9.411	3988.417
Median	31703.740	516.0140	757.281	8.690	3690.419
Maximum	67056.120	3960.136	828.816	21.269	8441.185
Minimum	8757.200	23.616	534.927	3.297	1094.198
Std. Dev.	11160.490	639.979	61.973	3.972	1588.368
Skewness	0.289	1.728	−1.223	1.271	0.978
Kurtosis	3.128	7.496	4.208	4.144	3.688
Jarque-Bera	5.590	514.466	119.095	124.256	68.718
Probability	0.061	0.000	0.000	0.000	0.000
Correlation matrix					
	GDP	TOUR	ZG	CO_2	EU
GDP	1.000				
T	0.803	1.000			
ZG	0.526	0.529	1.000		
CO_2	0.264	0.019	0.045	1.000	
EU	0.508	0.317	0.266	0.770	1.000

Table 3
Results of Chudik and Pesaran (2015) weak cross-sectional dependence test.

Variables	Test statistic	p-value	Variables	Test statistic	p-value
GDP	74.292	(0.000)	ZGL	74.296	(0.000)
TOUR	74.173	(0.000)	CO_2	74.177	(0.000)
$TOUR^2$	73.839	(0.000)	EU	74.293	(0.000)
$TOUR^3$	73.360	(0.000)			

Table 4
Results of second-generation unit root tests.

Variables	CIPS		Breitung (2000)	
	Level	First Diff.	Level	First Diff.
GDP	−1.583	-3.277^a	12.8239	-10.7374^a
TOUR	−2.096	-3.517^a	3.9211	-9.7230^a
$TOUR^2$	−2.056	-3.485^a	3.9580	-10.2684^a
$TOUR^3$	−2.029	-3.468^a	3.9623	-10.7588^a
ZGL	−1.856	-2.865^a	−0.4141	-13.6193^a
CO_2	-2.337^b	-4.412^a	2.0586	-8.1505^a
EU	-2.229^c	-4.253^a	−1.0402	-7.9182^a

a significant value at 1%; b significant value at 5%; c significant value at 10%.

Table 5
Results of Westerlund and Edgerton (2008) cointegration test.

	Test Statistic (1)	p-value	Test Statistic (2)	p-value	Test Statistic (3)	p-value
$LM\tau$	−7.561	0.000	−8.407	0.000	−5.780	0.000
$LM\phi$	−6.595	0.000	−7.187	0.000	−5.161	0.000

Note: Model (1): model with a maximum number of 4 factors and no shift. Model (2): model with a maximum number of 4 factors and level shift. Model (3): model with a maximum number of 4 factors and regime shift.

industrial sectors for better governance (West, 2007). This was also the year when Slovakia joined the OECD nations. In 2007, open agreement arbitration was started with Russia for reinforcing the group engagement (OECD, 2007). Due to the soaring oil prices, global logistics and transport experienced a severe setback, which was even reflected in global tourism (Márquez, 2011). These years are reflected as possible structural breaks in the test.

The results of the GMM based on Equation (1), are shown in Table 7. To explore the isolating effect of energy use and carbon emissions we also include modifications in our main model (Equation (1)), excluding the variables EU_{it} and CO2it.

The coefficients $\alpha_1 > 0$ and $\alpha_2 < 0$ and $\alpha_3 > 0$ validate the tourism-led growth hypothesis in a first stage and the third stage, while during the second stage the relationship between tourism and economic growth is negative. This evidence confirms that in the first stage of tourism development, tourism boosts economic growth, validating the tourism-led growth hypothesis (Balaguer & Cantavella-Jordá, 2002; Katircioglu, 2014; Dritsakis, 2012; Lee & Brahmasrene, 2013; Tugcu, 2014; Balsalobre et al., 2020). Dritsakis (2012) investigates the long-run relationship between economic growth and tourism in seven Mediterranean regions through cointegration and FMOLS, confirming the TLGH for the regions. Although much of the previous literature has explored the TLGH and revealed the existence of the negative effects of tourism on income levels, our empirical results confirm a non-linear relationship between economic growth and international tourism. The empirical results confirm that increases in international tourism would be detrimental to economic growth (Blake, Sinclair, & Sugiyarto, 2003; Smorfitt et al., 2005; Dwyer et al., 2006; Zhang & Lee, 2007; Sheng & Tsui, 2010; Pratt, 2014; Li et al., 2018). The coefficient $\alpha_4 > 0$ confirms a positive relationship between economic growth and globalization processes. We apply a novel transformation of globalization processes through a V-finite lag distribution (De Leeuw, 1962; Álvarez et al., 2017), confirming that the optimal effects of globalization on economic growth are not generated immediately (Figure-3); according to De

Table 6
Structural breaks in the countries.

Country	No Shift	Level Shift	Regime Shift	Country	No Shift	Level Shift	Regime Shift
Australia	1997	2012	2012	Netherlands	1997	2012	2011
Austria	1997	2012	2012	New Zealand	1997	2011	2011
Canada	1997	2012	2012	Norway	1997	2011	2011
Czech Republic	1997	2012	2012	Poland	1997	2011	2011
Denmark	1997	2008	2008	Portugal	1997	2000	2011
France	1997	2007	2008	Slovak Republic	1997	2000	2009
Germany	1997	2002	2006	Spain	1997	2000	2011
Greece	1997	2002	2006	Sweden	1997	2000	2011
Hungary	1997	2007	2007	Switzerland	1997	2011	2011
Ireland	1997	2007	2007	Turkey	1997	2011	2011
Italy	1997	2007	2007	United Kingdom	1997	2011	2001
Japan	1997	2007	2007	United States	1997	2001	2001

Table 7
Results of GMM analysis.

Variables	Model 1	Model 2	Model 3	Model 4
TOUR	17.2707[a]	0.2414[a]	46.6671[b]	24.5441[b]
$TOUR^2$	−3.0592[a]	–	−8.6961[c]	−4.4592[b]
$TOUR^3$	0.1756[b]	–	0.5172[b]	0.2624[b]
ZGL	0.5598[b]	0.3126[c]	7.8071[c]	2.9209[b]
CO_2	−2.0758[a]	−0.0147[b]	–	−0.3797[c]
EU	1.9811[b]	0.2760[b]	–	–
Constant	−36.6399[c]	4.4404[c]	−120.1687[c]	−51.7715[c]
Hansen's J statistics	0.3757	0.9278	0.8251	0.2556
DWH Test statistics	6.3484[b]	4.3608[b]	6.4139[b]	6.1220[b]
Turnaround point 1	126.25	–	85.56	111.18
Turnaround point 2	876.55	–	862.59	748.52
Inflection point	332.67	–	271.67	288.48

a significant value at 1%; b significant value at 5%; c significant value at 10%.

Leeuw (1962), the optimal impact occurs in t-2.[5] According to the econometric results, we find a negative connection between economic growth and carbon emissions ($\alpha_5 < 0$). These results confirm that economic growth in OECD countries is supported by carbon emissions. In other words, this result establishes that the reduction in carbon emissions would have a positive impact on economic growth. That is to say, the presence of inefficient environmental measures would reduce economic growth (Chen et al., 2016).

Finally, the empirical results also validate a positive relationship between energy use and economic growth ($\alpha_6 > 0$). Societies with rising growth levels generate increased energy use (Sharif et al., 2020; Sinha, Shahbaz, & Balsalobre, 2017; Zafar, Shahbaz, Hou, & Sinha, 2018), which has a positive impact on economic structures.

We usually consider correlation when we explore the relationship between variables, although this does not imply causation in econometrics. Many correlations can be empty or spurious. Granger (1969) included an approach to find the chronological ordering of movements of variables. Our study also applies the pairwise Dumitrescu-Hurlin (2012) panel causality test to explore the movements among variables. We apply a 2-lag order selection as the appropriate lag length. These lags imply the relevance of past information and must refer to a reasonable time span in which one variable can be used to predict another. By applying lag 2, according to Schwarz information criteria (SIC), we obtain the Wbar and Zbar statistics, allowing common factors in the cross-equation covariance to be detached:

Figure-4 (based on the results shown in Table 8) reflects a bilateral causality between tourism and economic growth (Chen and Chiou, 2009; Lean & Tang, 2010; Lorde, Francis, & Drakes, 2011; Ridderstaat, Croes, & Nijkamp, 2014; Samimi, Sadeghi, & Sadeghi, 2011).

Economy-driven tourism growth suggests that economic development positively affects economic growth by improving tourism infrastructures, education or safety processes (Cárdenas, Rivero, & Pulido, 2013). We obtain unidirectional causality from international tourism to carbon emissions and energy use. Ghosh (2010) showed a two-way short-term causality between carbon emissions and economic growth in India during 1971–2006, concluding that in the short run, any effort to diminish carbon emissions could ultimately slow economic growth in India. Our results, in line with Uddin et al. (2016), establish a unidirectional causality running from economic growth to the carbon emission and energy consumption. These results suggest that carbon emission reduction strategies will reduce economic growth if no supplementary policies are taken to alter this causal relationship. Our study also confirms unidirectional causality running from economic growth to energy use (Altunbas & Kapusuzoglu, 2011; Marathe & Mozumder, 2007; Narayan & Smyth, 2005; Ozturk & Acaravci, 2013; Çetintaş, 2016), confirming the conservation hypothesis (Çetintaş, 2016) regarding the impact of economic growth on energy use. This hypothesis suggests that a modification in the energy mix would not negatively affect economic growth. Finally, we also find a bidirectional causality running from globalization to carbon emissions, energy use, economic growth and international tourism. A bidirectional time-varying causality between energy consumption and CO2 emissions were shown in Ajmi, Hammoudeh, Nguyen, and Satod (2015) and Pao and Tsai (2011). Some interdisciplinary studies have been conducted to evaluate the dynamic behaviours of energy consumption and CO2 emissions (Fang, Wang, & Li, 2015; Krey et al., 2012).

5. Discussion of the empirical results

The econometric results reveal the existence of an N-shaped relationship between economic growth and international tourism. The first and third stages of the association confirm the tourism led-growth hypothesis (TLGH). Between the first and third stage, tourism reflects a negative impact on economic growth. Existence of the turning points might turn out to be useful for analyzing the tourism-growth nexus, when we isolate the effects of environmental damage and energy use. When we consider the energy use and environmental damage in our main model (Equation (1)), we are assuming that these variables moderate the relationship between economic growth and tourism. To understand the behaviour of these variables, we propose another model by isolating these driving forces in the connection between economic growth and tourism (see Equation (2)).

Fig. 5 illustrates the turning point (X(1)), calculated from

[5] When we use globalization G (without any transformation) the adjustment of the model presents R-squared = 0.702916 and adjusted R-squared = 0.700281. In contrast, when we use the variable ZG, R-squared = 0.734557 and adjusted R-squared = 0.731566, as the model proposed in Equation (1) has a better fit with globalization transformed into a finite lag distribution variable.

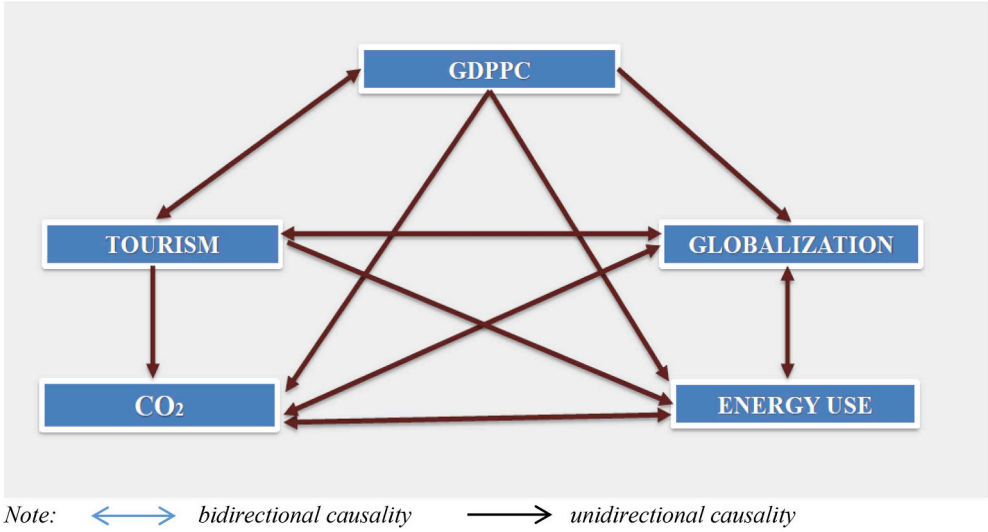


Fig. 4. Diagram of pairwise Dumitrescu-Hurlin panel causality tests.

Table 8
Pairwise Dumitrescu-Hurlin Panel Causality test.

Null Hypothesis	W-Stat.	Zbar-Stat.	Prob.
GDP does not homogenously cause TOUR	3.3623	8.1833[a]	0.0000
TOUR does not homogenously cause GDP	1.6825	2.3644[b]	0.0181
GDP does not homogenously cause ZGL	2.8205	6.3064[a]	0.0000
ZGL does not homogenously cause GDP	1.2576	0.8924	0.3722
GDP does not homogenously cause CO_2	7.5748	22.7756[a]	0.0000
CO_2 does not homogenously cause GDP	0.9993	−0.0024	0.9981
GDP does not homogenously cause EU	7.5553	22.7083[a]	0.0000
EU does not homogenously cause GDP	0.9192	−0.2801	0.7794
TOUR does not homogenously cause ZGL	2.7220	5.9651[a]	0.0000
ZGL does not homogenously cause TOUR	4.9216	13.5849[a]	0.0000
TOUR does not homogenously cause CO_2	7.4615	22.3832[a]	0.0000
CO_2 does not homogenously cause TOUR	1.1471	0.5096	0.6104
TOUR does not homogenously cause EU	6.4505	18.8812[a]	0.0000
EU does not homogenously cause TOUR	0.9513	−0.1687	0.8660
ZGL does not homogenously cause CO_2	3.6560	9.2008[a]	0.0000
CO_2 does not homogenously cause ZGL	2.0686	3.7016[a]	0.0002
ZGL does not homogenously cause EU	4.6317	12.5806[a]	0.0000
EU does not homogenously cause ZGL	1.8603	2.9803[a]	0.0029
CO_2 does not homogenously cause EU	6.0166	17.3781[a]	0.0000
EU does not homogenously cause CO_2	3.2779	7.8907[a]	0.0000

a significant value at 1%; b significant value at 5%.

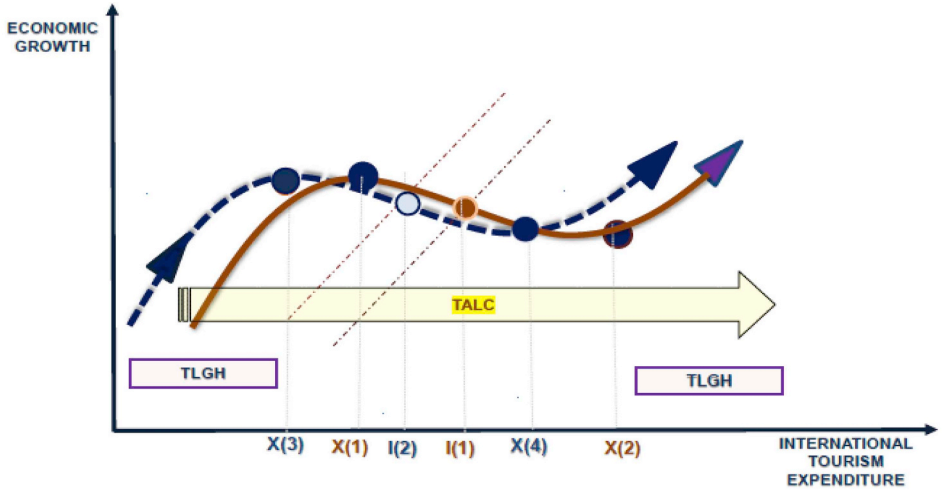
econometric results (Table 7). When we omit the effects of energy use and carbon emission in Equation (1), we find a new turning point (X (1)*), which reflects how the variables $CO2_{it}$ and EU_{it} delays the transition to the second stage, where there is a negative relationship between economic growth and international tourism. In line with existing studies, we find that the negative effects of tourism on economic growth relate to policy-level inefficiencies having negative impact on tourism industry (Dwyer et al., 2013; Li et al., 2018; Pham et al., 2010). Other studies reveal that policies related to currency devaluation (Pratt, 2014) or foreign investment in tourism (Sheng & Tsui, 2009; 2010) exert a negative effect on economic growth. The types of tourism also condition the economic impact (Agarwal, 2012; Akama & Kieti, 2007; Gal et al., 2010; Sheng & Tsui, 2010). Li et al. (2018) consider that diminishing marginal income effects might also explain the negative economic impacts affecting the tourism industry.

The isolation of energy use and environmental damage (see Equation (2)) modifies the turning points. When we consider the role of the energy use and environmental damage in Equation (1), we find that these variables help to maintain a positive association between tourism and economic growth in early stages of tourism development (i.e., X (3) > X(1)), and thereby, reaching the optima in the third stage. The empirical results also support the dirty activities and the traditional energy use of fossil sources delay reaching at the third stage (X(2) > X (4)). Therefore, there are necessary energy and environmental regulations linked with the tourism industry for diminishing the pernicious influence of energy use (mainly dominated by fossil sources) and carbon emissions. Therefore, the empirical results confirm that societies need to assume strict energy and environmental measures in order to enhance the effects of international tourism over economic growth.

The empirical results also reveal that globalization has a positive effect on economic growth, and the results validate the impact of the finite-lags of this variable. This model thus allows dynamic analysis of the effect of globalization on economic growth through the De Leeuw (1962) approach. Finally, we also find a direct connection between energy use, carbon emissions and economic growth. The transformation into a V-finite distribution variable explains how measures associated with the globalization process (e.g. foreign direct investment, trade openness, etc.) include a lag to obtain a maximum impact on economic growth. In other words, these results reveal the positive impact of globalization on economic growth. Empirical evidence has quantified the fact that globalization serves as an instrument of technical progress (List & Co, 2000; Tamazian et al., 2009; Tisdell, 2001). Thus, globalization measures require time lags to accomplish their maximum impact on economic growth, and the maximum effects cannot be seen in the short term. According to the results of the OLS, FMOLS and DOLS regressions, and in line with previous evidence, globalization accelerates the technical effect in both the traditional economic sectors and in tourism. The coefficient $\alpha_3 > 0$ confirms that globalization processes help the international tourism industry to correct emissions (Dwyer et al., 2000).

The negative connection between economic growth and carbon emissions implies the use of dirty sources reducing economic growth in selected OECD countries. Results suggest the need for a change in environmental regulations through innovation and stricter measures (Balsalobre & Álvarez, 2016; Álvarez el al., 2017; Sinha, Shahbaz, & Sengupta, 2018; 2020).

Finally, we have found evidence of the positive effect of energy use (EU_{it}) on per capita gross domestic product, confirming the growth hypothesis. Rising growth levels might be attributed to energy use. On this note, the positive relationship between economic growth and carbon emissions suggests that developed countries rely on non-renewable sources to achieve economic growth. OECD countries could reinforce their promotion of high-quality tourism in order to increase its long-run (positive) impact on economic growth. As a result of this economic pattern, it can be stated that when the economy requires (additional) energy sources, fossil fuels have a higher impact on the



Notes: X(1) reflect the turning point of international tourism expenditure pc (X(1)= 126.25 U$D) proposed in Equation 1 .X(1) reflect the turning point when we omit energy use and carbon emissions in Equation-1 (X(3)= 85.56 U$D).X(2)= 876.55; X(4)=862.59.; I(1)=332.67; I(2)=271.67*

Fig. 5. The analysis of the turning points in the main model.

economic cycle and environmental degradation.

The correct application of tourism and global measures (e.g., foreign direct investment or trade openness) might enhance social welfare, reduce poverty, and accumulate capital (Li et al., 2018). Blake (2008) considers three channels for influencing tourism poverty: government revenues, earnings and prices. When prices rise with higher output prices and wages in tourism, it reduces real income levels for the local population. In addition, people not employed in tourism are not benefitted from the earnings from tourism channels. Unless the government reallocates revenues in tourism-related taxes, this can directly impact the local population and increasing poverty levels. In line with Blake (2008) and Li et al. (2018), the role of tourism in reducing poverty is still under question, and governments need to attract foreign investment and tourism-related infrastructures to improve the quality of the tourism sector and local incomes. According to the empirical results, unless governments consider the most efficient and cleaner policies for planning and managing tourism, economic systems will be considerably reduced by the pernicious effects of international tourism (see Fig. 5).

The results underline the need to design a legal framework for a cleaner tourism sector linked to better infrastructures and the promotion of renewable sources and energy efficiency. The integration of technologies would create competitive value through the use of information and communication technologies (Dwyer, Edwards, Mistilis, Roman, & Scott, 2009; WEF, 2017).

6. Conclusions and main policy implications

This paper aims to underline the relevance of tourism and its impact on economic growth in developed countries by confirming an N-shaped association between tourism and economic growth, following the TLGH hypothesis. The contributions of our study to the existing literature are (a) validation of an N-shaped TLGH for selected developed countries, and (b) analyzing the dynamic impact of globalization, carbon emissions, and energy use on economic growth, for designing relevant policy recommendations. This association analyzes the structural effect of the tourism industry and how specialization process is closely related to the environment and the use of energy. Accordingly, we can establish policy recommendation in line with the promotion of structural changes and innovations in the tourism industry (e.g., implementation of technology connected with the reduction of operational cost) to transform this industry under a more sustainable patter.

The results confirm that specialized tourism industry will demand improvements in energy use and the environmental quality to achieve sustainable economic growth. Consequently, our study confirms that increase in tourism output might be integrated with structural transformations, connected with the capability to attract visitors, reflecting both social and environmental effects (McElroy, 2003). Our empirical results reveal that the use of fossil sources and polluting activities delay the optimal connection between the tourism industry and economic growth. Thereby, our study validates a non-linear relationship between economic growth and international tourism in OECD countries, suggesting that the negative effects of tourism on economic growth would be solved with the adoption of environmental and energy regulations to reduce the pernicious effects that tourism industry exerts on economic growth, once tourism growth reaches a certain threshold level. The government can play a key role by implementing suitable measures by promoting effective tourism infrastructures. This policy-level consideration is supported by the positive effects of globalization on economic growth and these effects must be planned for the long term, as achieving the optimum level requires time.

The results also validate the conservation hypothesis, and this is characterized by the degradation process, in which economic growth is accomplished by increasing carbon emissions. Higher economic growth results in greater energy requirements, which increase the use of fossil fuels and consequential CO2 emissions. Therefore, the government needs to assume changes in the energy mix by promoting renewable energy and enforcing energy efficiency through foreign direct investments. Globalization can be said to be implicated in the promotion of clean technologies (technical effect), and also contributes to the adoption of the regulatory measures necessary to improve competitiveness and efficiency in the international tourism industry (Roy, Schoenherr, & Charan, 2018; Roy & Singh, 2017).

However, this study has some limitations in terms of the choice of globalization indicator and some of its more specific effects. Despite these limitations, one of the contributions of this paper is pointing out the need to curb the negative effects of international tourism on economic growth, while highlighting the close connection between developed societies and fossil fuels as a mean of increasing their income levels. We also propose policy recommendations to reduce the negative effect of international tourism before these economies reach a certain point in their tourism industry. Policymakers should put efforts to promote the tourism sector along with promoting renewable energy

sources, in order to reduce environmental degradation, energy dependence and poverty levels. Governments must first undertake changes in the energy mix by promoting renewable energy and more efficient and innovative energy uses, to reduce the share of fossil sources.

Appendix A. Supplementary data

Supplementary data related to this article can be found at https://doi.org/10.1016/j.jhtm.2020.02.005.

References

Adamou, A., & Clerides, S. (2009). Prospects and limits of tourism-led growth: The international evidence. *Review of Economic Analysis, 3*, 287–303.

Agarwal, S. (2012). Resort economy and direct economic linkages. *Annals of Tourism Research, 39*(3), 1470–1494.

Aitken, B., Hanson, G. H., & Harrison, A. E. (1997). Spill overs, foreign investment, and export behaviour. *Journal of International Economics, 43*, 103–132.

Ajmi, A. N., Hammoudeh, S., Nguyen, D. K., & Satod, J. R. (2015). On the relationships between CO2 emissions, energy consumption and income: The importance of time variation. *Energy Economics, 49*, 629–638.

Akama, J. S., & Kieti, D. (2007). Tourism and socio-economic development in developing countries: A case study of Mombasa Resort in Kenya. *Journal of Sustainable Tourism, 15*(6), 735–748.

Altunbas, Y., & Kapusuzoglu, A. (2011). The causality between energy consumption and economic growth in United Kingdom. *Economic Research-Ekonomska Istraživanja, 24*(2), 60–67.

Álvarez, A., Balsalobre-Lorente, D., Shahbaz, M., & Cantos, J. M. (2017). Energy innovation and renewable energy consumption in the correction of air pollution levels. *Energy Policy, 105*, 386–397.

Aslan, A. (2014). Tourism development and economic growth in the Mediterranean countries: Evidence from panel Granger causality tests. *Current Issues in Tourism, 17*(4), 363–372.

Azam, M., Khan, A. Q., Abdullah, H. B., & Qureshi, M. E. (2016). The impact of CO2 emissions on economic growth: Evidence from selected higher CO2 emissions economies. *Environmental Science and Pollution Research, 23*(7), 6376–6389.

Balaguer, J., & Cantavella-Jordá, M. (2002). Tourism as a long-run economic growth factor: The Spanish case. *Applied Economics, 34*(7), 877–884.

Balsalobre-Lorente, D., Driha, O. M., Bekun, F. V., & Adedoyin, F. F. (2020). The asymmetric impact of air transport on economic growth in Spain: Fresh evidence from the tourism-led growth hypothesis. *Current Issues in Tourism,* 1–17.

Balsalobre-Lorente, D., Driha, O. M., Shahbaz, M., & Sinha, A. (2019). The effects of tourism and globalization over environmental degradation in developed countries. *Environmental Science and Pollution Research,* 1–15.

Balsalobre, D., & Álvarez, A. (2016). Economic growth and energy regulation in the environmental Kuznets curve. *Environmental Science and Pollution Research, 23*(16), 16478–16494.

Bianchi, R. (2017). *The political economy of mass tourism and its contradictions. Mass tourism in a Small World.* Wallingford: CAB International.

Blake, A. (2008). Tourism and income distribution in East Africa. *International Journal of Tourism Research, 10*(6), 511–524.

Blake, A., Sinclair, M. T., & Soria, J. A. C. (2006). Tourism productivity: Evidence from the United Kingdom. *Annals of Tourism Research, 33*(4), 1099–1120.

Blake, A., Sinclair, M. T., & Sugiyarto, G. (2003). Quantifying the impact of foot and mouth disease on tourism and the UK economy. *Tourism Economics, 9*(4), 449–465.

Boukas, N., & Ziakas, V. (2013). Impacts of the global economic crisis on Cyprus tourism and policy responses. *International Journal of Tourism Research, 15*(4), 329–345.

Brau, R., Lanza, A., & Pigliaru, F. (2003). How fast are the small tourism countries growing? Evidence from data 1980-2003. *Tourism Economics, 12*(4), 603–613.

Brida, J. G., Cortés-Jiménez, I., & Pulina, M. (2016). Has the tourism-led growth hypothesis been validated? A literature review. *Current Issues in Tourism, 19*(5), 394–430.

Brida, J. G., Lanzilotta, B., Pereyraa, J. S., & Pizzolon, F. (2015). A nonlinear approach to the tourism-led growth hypothesis: The case of the MERCOSUR. *Current Issues in Tourism, 18*(7), 647–666.

Brida, J. G., Pereyra, J. S., & Devesa, M. J. S. (2008). Evaluating the contribution of tourism to economic growth. *Anatolia, 19*(2), 351–357.

Capo, J., Font, A. R., & Nadal, J. R. (2007). Dutch disease in tourism economies: Evidence from the Balearics and the canary islands. *Journal of Sustainable Tourism, 15*(6), 615–627.

Cárdenas, P., Rivero, M., & Pulido, J. (2013). Does tourism growth influence economic development? *Journal of Travel Research, 54*, 206–221.

Cavlovic, T., Baker, K. H., Berrens, R. P., & Gawande, K. (2000). A meta-analysis of environmental Kuznets studies. *Agriculture and Resource Economics Review, 29*(1), 32–42.

Çetintaş, H. (2016). Energy consumption and economic growth: The case of transition economies. *Energy Sources, Part B: Economics, Planning and Policy, 11*(3), 267–273.

Chang, C. L., Khamkaew, T., & McAleer, M. J. (2009). *A panel threshold model of tourism specialization and economic development.* Available at: SSRN 1496324.

Chang, C. L., Khamkaew, T., & McAleer, M. J. (2012). Estimation of a panel threshold model of tourism specialization and economic development. *Tourism Economics, 18*(1), 5–41.

Chen, C. F., & Chiou-Wei, S. Z. (2009). Tourism expansion, tourism uncertainty and economic growth: New evidence from Taiwan and Korea. *Tourism Management, 30*, 812–818.

Chen, L. L., & Devereux, J. (1999). Tourism and welfare in Sub-Saharan Africa: A theoretical analysis. *Journal of African Economies, 8*(2), 209–227.

Chen, P. Y., Sheng-Tung, C., Chia-Sheng, H., & Chi-Chung, C. (2016). Modeling the global relationships among economic growth, energy consumption and CO2 emissions. *Renewable and Sustainable Energy Reviews, 65*, 420–431.

Chudik, A., & Pesaran, M. H. (2015). Common correlated effects estimation of heterogeneous dynamic panel data models with weakly exogenous regressors. *Journal of Econometrics, 188*(2), 393–420.

De Leeuw, F. (1962). The demand for capital goods by manufacturers: A study of quarterly time series. *Econometrica, 30*(3), 9–12.

De Vita, G. (2014). The long-run impact of exchange rate regimes on international tourism flows. *Tourism Management, 45*, 226–233.

Dogru, T., Sirakaya-Turk, E., & Crouch, G. I. (2017). Remodeling international tourism demand: Old theory and new evidence. *Tourism Management, 60*, 47–55.

Dritsakis, N. (2012). Tourism development and economic growth in seven Mediterranean countries: A panel data approach. *Tourism Economics, 18*(4), 801–816.

Dumitrescu, E., & Hurlin, C. (2012). Testing for granger non-causality in heterogeneous panels. *Economic Modelling, 29*(4), 1450–1460.

Dunn, H. S., & Dunn, L. (2002). *People and tourism: Issues and attitudes in the Jamaican hospitality.* Arawak Publications 2002.

Dwyer, L., Edwards, D., Mistilis, N., Roman, C., & Scott, N. (2009). Destination and enterprise management for a tourism future. *Tourism Management, 30*(1), 63–74.

Dwyer, L., Forsyth, P., & Rao, P. (2000). The price competitiveness of travel and tourism: A comparison of 19 destinations. *Tourism Management, 21*(1), 9–22.

Dwyer, L., Forsyth, P., Spurr, R., & Hoque, S. (2013). Economic impacts of a carbon tax on the Australian tourism industry. *Journal of Travel Research, 52*(2), 143–155.

Dwyer, L., Forsyth, P., Spurr, R., & Van Ho, T. (2006). Economic effects of the world tourism crisis on Australia. *Tourism Economics, 12*(2), 171–186.

ECLAC (United Nations Economic Commission for Latin America and the Caribbean) (2009). *Economic survey of the Caribbean, 2008 – 2009.* Port of Spain: ECLAC Subregional Office for the Caribbean (LC/CAR/L.216).

Essletzbichler, J., & Rigby, D. L. (2007). Exploring evolutionary economic geographies. *Journal of Economic Geography, 7*(5), 549–571.

Fang, C., Wang, S., & Li, G. (2015). Changing urban forms and carbon dioxide emissions in China: A case study of 30 provincial capital cities. *Applied Energy, 158*, 519–531.

Fereidouni, H. G., & Al-mulali, U. (2014). The interaction between tourism and FDI in real estate in OECD countries. *Current Issues in Tourism, 17*(2), 105–113.

Gal, Y., Gal, A., & Hadas, E. (2010). Coupling tourism development and agricultural processes in a dynamic environment. *Current Issues in Tourism, 13*(3), 279–295.

Ghali, M. A. (1976). Tourism and economic growth: An empirical study. *Economic Development and Cultural Change, 24*(3), 527–538.

Ghosh, S. (2010). Examining carbon emissions economic growth nexus for India: A multivariate cointegration approach. *Energy Policy, 38*(6), 3008–3014.

Gössling, S. (2002). Global environmental consequences of tourism. *Global Environmental Change, 12*(4), 283–302.

Gössling, S., & Hall, C. M. (2006). An introduction to tourism and global environmental change. In S. Gössling, & C. M. Hall (Eds.). *Tourism and global environmental change* (pp. 1–34). London: Routledge.

Gössling, S., Hall, M., Lane, B., & Weaver, D. (2008). The Helsingborg statement on sustainable tourism. *Journal of Sustainable Tourism, 16*(1), 122–124.

Gössling, S., Hansson, C. B., Horstmeier, O., & Saggel, S. (2002). Ecological footprint analysis as a tool to assess tourism sustainability. *Ecological Economics, 43*, 199–211.

Gössling, S., & Peeters, P. (2015). Assessing tourism's global environmental impact 1900–2050. *Journal of Sustainable Tourism, 23*(5), 639–659.

Gössling, S., Scott, D., & Hall, C. M. (2015). Inter-market variability in CO_2 emission-intensities in tourism: Implications for destination marketing and carbon management. *Tourism Management, 46*, 203–212.

Govdel, T., & Direkci, D. (2017). The relationship between tourism and economic growth: OECD countries. *International Journal of Academic Research in Economics and Management Sciences, 6*, 104–113.

Groizard, J. L., & Santana-Gallego, M. (2018). The destruction of cultural heritage and international tourism: The case of the Arab countries. *Journal of Cultural Heritage, 33*, 285–292.

Hsiao, C., & Shen, Y. (2003). Foreign direct investment and economic growth: The importance of institutions and urbanization. *Economic Development and Cultural Change, 51*, 883–896.

Imran, S., Alam, K., & Beaumont, N. (2014). Environmental orientations and environmental behaviour: Perceptions of protected area tourism stakeholders. *Tourism Management, 40*, 290–299.

Isik, C., Dogru, T., & Turk, E. S. (2018). A nexus of linear and non-linear relationships between tourism demand, renewable energy consumption, and economic growth: Theory and evidence. *International Journal of Tourism Research, 20*(1), 38–49.

Katircioglu, S. (2014). Testing the tourism-induced EKC hypothesis: The case of Singapore. *Economic Modelling, 41*, 383–391.

Keintz, R. M. (1968). A study of the demand for international travel to and from the United States. *Journal of Travel Research, 7*(1), 6–10.

Khan, H., Seng, C. F., & Cheong, W. K. (1990). Tourism multiplier effects on Singapore. *Annals of Tourism Research, 17*(3), 408–418.

Krey, V., O'Neill, B., van Ruijven, B., Chaturvedi, V., Daioglou, V., Eom, J., et al. (2012). Urban and rural energy use and carbon dioxide emissions in Asia. *Energy Economics, 34*, 272–283.

Lean, H. H., & Tang, C. F. (2010). Is the tourism-led growth hypothesis stable for Malaysia? A note. *International Journal of Tourism Research, 12*(4), 375–378.

Lee, J. W., & Brahmasrene, T. (2013). Investigating the influence of tourism on economic growth and carbon emissions: Evidence from panel analysis of the European union. *Tourism Management, 38*, 69–76.
Lee, S. H., Wu, S. C., & Li, A. (2018). Low-carbon tourism of small islands responding to climate change. *World Leisure Journal, 60*(3), 235–245.
Li, K. X., Jin, M., & Shi, W. (2018). Tourism as an important impetus to promoting economic growth: A critical review. *Tourism Management Perspectives, 26*, 135–142.
List, J. A., & Co, C. Y. (2000). The effect of environmental regulation on foreign direct investment. *Journal of Environmental Economics and Management, 40*, 1–20.
Liu, J., Feng, T., & Yang, X. (2011). The energy requirements and carbon dioxide emissions of tourism industry of Western China: A case of Chengdu city. *Renewable and Sustainable Energy Reviews, 15*, 2887–28944.
Liu, H., & Song, H. (2018). New evidence of dynamic links between tourism and economic growth based on mixed-frequency granger causality tests. *Journal of Travel Research, 57*(7), 899–907.
Lorde, T. B., Francis, & Drakes, L. (2011). Tourism services exports and economic growth in Barbados. *International Trade Journal, 25*(2), 205–232.
Marathe, A., & Mozumder, P. (2007). Causality relationship between electricity consumption and GDP in Bangladesh. *Energy Policy, 35*, 395–402.
Márquez, H. (2011). The oil that comes in from the cold. Global issues. Available at: http://www.globalissues.org/news/2011/12/30/12335 .
McElroy, J. L. (2003). Tourism development in small islands across the world. *Geografiska Annaler: Series B, Human Geography, 85*(4), 231–242.
Meng, X. (2014). Is a tourism subsidy the best response to the global financial crisis? A short-run CGE simulation for Singapore. *Asia Pacific Journal of Tourism Research, 19*(3) 325-234.
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.
Milne, S. (1990). The impact of tourism development in small Pacific Island states: An overview. *New Zealand Journal of Geography, 89*(1), 16–21.
Mishra, S., Sinha, A., Sharif, A., & Suki, N. M. (2019). Dynamic linkages between tourism, transportation, growth and carbon emission in the USA: Evidence from partial and multiple wavelet coherence. *Current Issues in Tourism,* 1–23.
Narayan, P. K., & Smyth, R. (2005). Electricity consumption, employment and real income in Australia evidence from multivariate granger causality tests. *Energy Policy, 33*, 1109–1116.
Nasir, M. A., Wu, J., & Calderón-Guerrero, J. (2015). Economic growth, exchange rate and constrained competiveness of the tourism sector in Andalucía. *International Journal of Management and Economics, 48*, 84–100.
OECD (1997). *The OECD report on regulatory reform synthesis*Paris: Organization for Economic Co-operation and Development.
OECD (2007). Chair's summary of the OECD Council at Ministerial level, Paris, 15-16 may 2007 - innovation: Advancing the OECD agenda for growth and equity. Available at: http://www.oecd.org/newsroom/chairssummaryoftheoecdcouncilatministeriallevelparis15-16may2007-innovationadvancingtheoecdagendaforgrowthandequity.htm.
OECD (2018). *Tourism trends and policies 2018.* https://doi.org/10.1787/tour-2018-en Publishing, Paris.
Ozturk, I., & Acaravci, A. (2013). The long-run and causal analysis of energy, growth, openness and financial development on carbon emissions in Turkey. *Energy Economics, 36*, 262–267.
Palmer, Y., & Riera, A. (2003). Tourism and environmental taxes: With special reference to the Balearic ecotax. *Tourism Management, 24*, 665–674.
Pao, H. T., & Tsai, C. M. (2011). Multivariate Granger causality between CO2 emissions, energy consumption, FDI (foreign direct investment) and GDP (gross domestic product): Evidence from a panel of BRIC (Brazil, Russian Federation, India, and China) countries. *Energy, 36*, 685–693.
Paramati, S. R., Alam, M. S., & Chen, C. F. (2017a). The effects of tourism on economic growth and CO2 emissions: A comparison between developed and developing economies. *Journal of Travel Research, 56*(6), 712–724.
Paramati, S. R., Shahbaz, M., & Alam, M. S. (2017b). Does tourism degrade environmental quality? A comparative study of Eastern and Western European union. *Transportation Research Part D: Transport and Environment, 50*, 1–13.
Perdue, R. R., Long, P. T., & Allen, L. (1990). Resident support for tourism development. *Annals of Tourism Research, 17*(4), 586–599.
Pham, T. D., Simmons, D. G., & Spurr, R. (2010). Climate change-induced economic impacts on tourism destinations: The case of Australia. *Journal of Sustainable Tourism, 18*(3), 449–473.
Po, W. C., & Huang, B. N. (2008). Tourism development and economic growth - a nonlinear approach. *Physica A, 387*, 5535–5542.
Pratt, S. (2014). A general equilibrium analysis of the economic impact of a devaluation on tourism: The case of Fiji. *Tourism Economics, 20*(2), 389–405.
Ridderstaat, J., Croes, R., & Nijkamp, P. (2014). Tourism and long-run economic growth in Aruba. *International Journal of Tourism Research, 16*(5), 472–487.
Roy, V., Schoenherr, T., & Charan, P. (2018). The thematic landscape of literature in sustainable supply chain management (SSCM) A review of the principal facets in SSCM development. *International Journal of Operations & Production Management, 38*(4), 1091–1124.
Roy, V., & Singh, S. (2017). Mapping the business focus in sustainable production and consumption literature: Review and research framework. *Journal of Cleaner Production, 150*, 224–236.
Salifou, C. K., & Haq, I. U. (2017). Tourism, globalization and economic growth: A panel cointegration analysis for selected west African states. *Current Issues in Tourism, 20*(6), 664–667.
Samimi, A. J., Sadeghi, S., & Sadeghi, S. (2011). Tourism and economic growth in developing countries: P-VAR approach. *Middle-East Journal of Scientific Research, 10*(1), 28–32.
Scott, D. (2006). Climate change and sustainable tourism in the 21st century. In J. Cukier (Ed.). *Tourism research: Policy, planning, and prospects* (pp. 175–248). Waterloo: Department of Geography Publication Series, University of Waterloo.
Shahbaz, M., Loganathan, K., Muzaffar, A. T., Ahmd, K., & Jabran, M. A. (2016). How urbanization affects CO2 emissions in Malaysia? The application of STIRPAT model. *Renewable and Sustainable Energy Reviews, 57*, 83–93.
Shan, J., & Wilson, K. (2001). Causality between trade and tourism: Empirical evidence from China. *Applied Economics Letters, 8*, 279–283.
Sharif, A., Mishra, S., Sinha, A., Jiao, Z., Shahbaz, M., & Afshan, S. (2020). The renewable energy consumption-environmental degradation nexus in Top-10 polluted countries: Fresh insights from quantile-on-quantile regression approach. *Renewable Energy, 150*, 670–690.
Sharif, A., Saha, S., Campbell, N., Sinha, A., & Ibrahiem, D. M. (2019). Tourism, environment and energy: An analysis for China. *Current Issues in Tourism,* 1–20.
Sheng, L., & Tsui, Y. (2009). A general equilibrium approach to tourism and welfare: The case of Macao. *Habitat International, 33*(4), 419–424.
Sheng, L., & Tsui, Y. (2010). Foreign investment in tourism: The case of Macao as a small tourism economy. *Tourism Geographies, 12*(2), 173–191.
Sinclair, M. T. (1998). Tourism and economic development: A survey. *Journal of Development Studies, 34*(5), 1–51.
Sinha, A., Sengupta, T., & Alvarado, R. (2020). Interplay between technological innovation and environmental quality: Formulating the SDG policies for next 11 economies. *Journal of Cleaner Production, 242*, 118549.
Sinha, A., Shahbaz, M., & Balsalobre, D. (2017). Exploring the relationship between energy usage segregation and environmental degradation in N-11 countries. *Journal of Cleaner Production, 168*, 1217–1229.
Sinha, A., Shahbaz, M., & Sengupta, T. (2018). Renewable energy policies and contradictions in causality: A case of next 11 countries. *Journal of Cleaner Production, 197*, 73–84.
Smorfitt, D. B., Harrison, S. R., & Herbohn, J. L. (2005). Potential economic implications for regional tourism of a foot and mouth disease outbreak in North Queensland. *Tourism Economics, 11*(3), 411–430.
Stabler, M. J., Papatheodorou, A., & Sinclair, M. T. (Eds.). (2010). *The economics of tourism* (2nd ed.). Oxon: Routledge.
Tamazian, A., Chousa, J. P., & Vadlamannati, C. (2009). Does higher economic and financial development lead to environmental degradation: Evidence from the BRIC countries. *Energy Policy, 37*, 246–253.
Tang, C. F. (2013). Temporal Granger causality and the dynamics relationship between real tourism receipts, real income and real exchange rates in Malaysia. *International Journal of Tourism Research, 15*(3), 272–284.
Tisdell, C. (2001). Globalization and sustainability: Environmental Kuznets curve and the WTO. *Ecological Economics, 39*, 185–196.
Tugcu, C. T. (2014). Tourism and economic growth nexus revisited: A panel causality analysis for the case of the Mediterranean region. *Tourism Management, 42*, 207–212.
Turner, L. W., & Witt, S. F. (2001). Factors influencing demand for international tourism: Tourism demand analysis using structural equation modelling, revisited. *Tourism Economics, 7*(1), 21–38.
Uddin, G. S., Sayema, B. S. H., & Ozturk, I. (2016). Carbon emissions, energy consumption, and economic growth relationship in Sri Lanka. *Energy Sources, Part B: Economics, Planning and Policy, 11*(3), 282–287.
Weaver, D. (2011). Can sustainable tourism survive climate change? *Journal of sustainable Tourism, 19*(1), 5–15.
West, J. (2007). OECD forum 2007 innovation: Not all peaches and cream: As the 8th annual OECD Forum in may showed, everyone agrees that innovation is important, but not everyone agrees on the reasons why. *OECD Observer,* (262), 25–27.
Westerlund, J., & Edgerton, D. L. (2008). A simple test for cointegration in dependent panels with structural breaks. *Oxford Bulletin of Economics & Statistics, 70*(5), 665–704.
World Bank (2018). *World Development Indicators.* https://data.worldbank.org/indicator/ Available at:.
World Economic Forum (WEF) (2017). The global competitiveness report 2017-2018. Geneva, ISBN-13: 978-1-944835-11-8, Retrieved at https://www.weforum.org/reports/the-global-competitiveness-report-2017-2018.
World Travel, & Tourism Council (2018). *Travel & tourism: Economic impact 2018 Albania.* World Travel & Tourism Council (WTTC).
WTTC (2011). *World travel and tourism Council. Travel and tourism economic impact 2011: European union.* London, UK: World Travel and Tourism Council.
Wu, C. Y., & Xie, F. Y. (2010). Non-linear relationship between international tourism development and economic growth: A threshold panel data approach [J]. *Journal of Business Economics, 2*.
Zafar, M. W., Shahbaz, M., Hou, F., & Sinha, A. (2018). From non-renewable to renewable energy and its impact on economic growth: The role of research and development expenditures in Asia-Pacific economic cooperation countries. *Journal of Cleaner Production, 212*, 1166–1178.
Zhang, J., & Lee, D. J. (2007). The effect of wildlife recreational activity on Florida's economy. *Tourism Economics, 13*(1), 87–110.
Zhao, L., & Mao, R. (2013). Tourism development, threshold effects and economic growth-evidence from China. *Chinese Journal of Shanxi University of Finance and Economics, 12*, 60–67.
Zuo, B., & Huang, S. (2017). Revisiting the tourism-led economic growth hypothesis: The case of China. *Journal of Travel Research, 57*(2), 151–163.