Smart destination competitiveness: underscoring its impact on economic growth

Taiwo Temitope Lasisi, Samuel Amponsah Odei and Kayode Kolawole Eluwole

Abstract

Purpose – *The current study is designed to investigate the factors that foster the framing of destination competitiveness and establish the factors that drive the contribution of tourism innovations to economic growth in smart tourism destinations.*

Design/methodology/approach – *A four-year panel data were extracted from the World Economic Forum's travel and tourism competitiveness index and data were analysed using Poisson Pseudo Maximum Likelihood regression model.*

Findings – *The findings demonstrate that both the enabling environment and airport infrastructure significantly affect tourism's impact on the economy of the selected smart European tourism destinations. Conversely, human resources and general infrastructure display a negative correlation with tourism's contribution to the economy. However, no data in the sample support the idea that tourism policies, government prioritization or readiness of tourism information and communication technologies impact tourism's contribution to the economy. Additionally, the marginal effects indicate that improving the enabling environment and airport infrastructure can generate additional benefits for the economy through tourism.*

Originality/value – *The uniqueness of this study is the integration of smart tourism destinations with the measure of destination competitiveness to provide an empirical bridge that links tourism competitiveness to economic growth.*

Keywords *Tourism, Economic growth, Tourism competitiveness, Smart destination*

Paper type *Research paper*

(Information about the authors can be found at the end of this article.)

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Introduction

After several decades of research on tourism destination competitiveness, there is a consensus in academic scholarship that the tourism destination competitiveness index or measure is a necessary tool in stimulating destination growth but more importantly, measuring destination performance. Understandably, the tourism destination competitiveness index objectively balanced both the subjective demands of tourists and the objective industry measures (Enright and Newton, 2004). In other words, destination competitiveness measures both the demand and supply aspects of tourism production and delivery in destination locations.

More recently, the integration of technological advances into the production and consumption of tourism products has seen the introduction of concepts such as Smart tourism destination – a tourism destination that has incorporated information and communication technologies (ICTs) in their tourism services to improve visitor experiences and overall destination performance through co-creation of vales (Errichiello and Micera, 2021). Without a doubt, interest in smart tourism destinations has been increasing among tourists, industry, and academics (Del Chiappa and Baggio, 2015). However, the major focus on smart tourism destination studies has revolved

around conceptualization and definitions (Boes *et al.*, 2015; Buhalis and Amaranggana, 2013); co-creation capabilities (Boes *et al.*, 2016; Buonincontri and Micera, 2016), the ecosystem (Del Chiappa and Baggio, 2015) amongst others.

Despite the understanding by practitioners about the importance of destination competitiveness to the attractiveness and performance of tourism destinations, the smart tourism destination research domain is still lacking in the subject of competitiveness measures. Academic scholarships have acknowledged the role of tourism/destination competitiveness in driving economic growth and performance (Zadeh Bazargani and Kiliç, 2021) in developed, developing, and emerging economies, the focus of scholars has been on uncovering the viable models for competitiveness (Pérez León *et al.*, 2021). Yet, a gulf exists between the understanding of the impacts of tourism competitiveness and the knowledge of the enabling factors for its development.

To the best of our knowledge, Koo *et al.* (2016) conceptualized the competitiveness measure of smart tourism destinations, Cimbaljević *et al.* (2019) reviewed extant literature on smart tourism destinations, and Cavalheiro *et al.* (2020) proposed the developmental model for smart tourism destinations. As such, the current study is designed to investigate the enabling conditions that foster the framing of destination competitiveness in the EU-6 smart tourism destinations. Specifically, the study intends to answer the question of whether or not factors such as government prioritization of tourism, tourism ICT readiness, airport infrastructure, policies, enabling conditions, and visitors' contribution to GDP contribute to destination competitiveness in the case of the EU-6 smart tourism destinations.

Given the above background, concerns, and motivations, the current study holds several contributions. First, the uniqueness of integrating smart tourism destinations with the measure of destination competitiveness provides an empirical bridge that links tourism competitiveness to tourism innovation for the selected European destinations. This presents some advantages to examining competitiveness at a subregional and or country level. In other words, the geographically dispersed nature of the selected European countries supports the extension of the findings across both homogenous and heterogeneous regional settings.

Further, the regional perspective of this study enables the understanding of critical stakeholders in the important factors for region-specific policy generations that are not only effective but appropriate for the contextual composition of the region. Specifically, while other studies have established some important indicator of tourism competitiveness and its linkages to economic performance, to the best of our knowledge, no such study exist with smart tourism destinations in Europe. Hence, the findings of this study can be instrumental in designing policies that are context-specific and useable for the intended stakeholders. Also, the result of this study will be of importance to countries, especially developing nations looking to use tourism development to diversify their economy.

Literature review

Smart tourism destinations

Some earlier conceptualizations, such as "eDestinations," have served as inspiration for smart tourism destinations. However, while eDestinations focused on the use of ICTs to deliver information and to play a crucial role in all operations (Novianti *et al.*, 2022), smart tourism destinations technology is prominently entrenched in all aspects due to new advances like the Internet of Things (Elkhwesky and Elkhwesky, 2022). The topic of smart tourism destinations emerged to explain how the idea of smart cities is applied to tourism destinations (Coca-Stefaniak, 2020). In addition to outlining the components of a smart tourism system, the concept of smart tourism destinations has since been clarified (Shafiee *et al.*, 2019). Although there is no consensus on a definition for smart tourist destinations yet (Gelter *et al.*, 2021). de Avila (2015) in Gretzel *et al.* (2015) defines smart tourism as the utilization of advanced technology infrastructure within an innovative tourist destination to ensure the sustainable development of tourist regions that are accessible to all. This technology also fosters

interaction and integration between visitors and their surroundings, enhancing their overall experience while also improving the quality of life for residents. Also, the Spanish innovation-fostering organization SEGITTUR and AENOR, a standardization agency has established one of the most widely used definitions. According to (SEGITTUR, 2022), a smart tourism destination is defined as an innovative tourist destination that relies on advanced technology to facilitate sustainable development and improve the quality of life for both visitors and residents while encouraging interaction with the environment. However, scholars such as Errichiello and Micera (2021), Gomez-Oliva *et al*. (2019), and Özen (2020), have come up with other definitions.

Smart tourism destinations seek to enhance visitor experiences and doing so requires combining ICTs with the real world. This is in accordance with Errichiello and Micera (2021), who define smart tourism destinations as locations that use ICTs to improve visitor experiences and organizational performance through increased co-creation of value. The fundamental goal of smart tourism destinations is to enhance visitor experiences by utilizing cutting-edge smart devices and ICTs. Theoretically, this may be accomplished by creating a central technological interface that connects all the stakeholders, incorporates required data from many sources, and facilitates real-time and dynamic information exchange. This would increase productivity, facilitate decision-making, and improve visitor experiences (Jeong and Shin, 2019; Zhang *et al*., 2022) in a context in which destinations must foster deeper relationships and smarter knowledge sharing among stakeholders to stay innovative and competitive (Valeri and Baggio, 2021). However, in places that promote smart tourism, general technical improvements must be tailored to specific smart technologies, which are specialized tools made for predetermined goals that offer value to the tourism industry by encouraging greater participation, experience personalization, and co-creation (Zhang *et al*., 2022). The robust interactions and personalized experiences in smart cities have the potential to benefit all and increase the destination's competitiveness for smart tourism (Boes *et al*., 2016).

Travel and tourism competitiveness index

The travel and tourism competitiveness index (TTCI) is a measure of the relative performance of a country's travel and tourism industry (Rodríguez-Díaz and Pulido-Fernández, 2020a). It is used to assess the performance of a country's travel and tourism industry in comparison to other countries. The TTCI is based on a range of factors, including the quality of infrastructure, the cost of doing business, the availability of human resources, the level of safety and security, the quality of the environment, and the level of government support. It has been used to identify areas of strength and weakness in a country's travel and tourism industry and to compare the performance of different countries (Agustin and Martini, 2022). The TTCI has also been used to inform policy decisions and assess the impact of policy changes on the travel and tourism industry. The current literature on the TTCI is largely focused on the development and application of the index. Studies have examined the factors that influence the TTCI, the impact of policy changes on the TTCI, and the use of the TTCI to inform policy decisions.

There are two distinct categories of models and studies on the determinants of competitiveness in tourism destinations in the literature: those created by institutions with a high reputation and those created by researchers or authors (Chin *et al*., 2015). According to Martínez-gonzález *et al*. (2021), the World Economic Forum (WEF) model is highlighted in the literature. The annual Travel and Tourism Competitiveness Report (TTCR-2019) is periodically prepared by WEF and included in this report is the TTCI (Gómez-Vega and Picazo-Tadeo, 2019; Rodríguez-Díaz and Pulido-Fernández, 2019). Both the index and report accelerate policy development, decision-making process, and tourism competitiveness evaluation in tourism that makes a destination appealing for international tourism (Rodríguez-Díaz and Pulido-Fernández, 2020b; Streimikiene *et al*., 2021). Furthermore, the TTCI and TTCR-2019 are useful resources for examining destinations' competitiveness from a benchmarking and macro-level approach (Andrades and Dimanche, 2017). A key component of the WEF model is the TTCI which measures a combination of policies and factors that enables sustainable development within the travel and tourism industry, which

ultimately contributes to a country's competitiveness and development (Woyo and Slabbert, 2021). The TTCI consistently employs the same factors and metrics, and comparisons between countries using this index are made easier. TTCI enables the adoption of a longitudinal paradigm due to its continuous formulation and structure over time (Nazmfar *et al*., 2019; Salinas Fernández *et al*., 2020). The structure of the TCCI consists of 90 indicators distributed across 14 pillars that are further divided into four subindexes: natural and cultural resources; infrastructure; travel policies and conducive conditions; conducive environment.

The TTCI is used to identify areas of strength and weakness in a country's travel and tourism industry and to compare the performance of different countries. The TTCI has also been used to inform policy decisions and assess the impact of policy changes on the travel and tourism industry. The current literature on the TTCI is largely focused on the development and application of the index. Studies have examined the factors that influence the TTCI, the impact of policy changes on the TTCI, and the use of the TTCI to inform policy decisions.

Hypotheses development

Tourism policies are a government-driven set of discourses, practices, and decisions (often in collaboration with social or private actors) to advance tourism (Velasco, 2016). Policies and enabling conditions can increase the economic growth of smart tourism destinations by proving incentives for businesses to invest in the destinations, such as tax breaks, grants, and other financial support. Additionally, it creates a favourable environment for businesses to operate in, such as providing access to infrastructure, technology, and other resources. This can help businesses expand their operations and create more jobs, which in turn can lead to more innovations and economic growth. Furthermore, with policies and enabling conditions, destinations remain well-maintained and attractive to visitors, which can help increase the number of tourists and their expenditures. Through the development of policies and regulations, the adoption of smart tourism technologies and strategies can be encouraged. This can include tax incentives for tourism businesses that invest in technology, funding for research and development, and collaboration between government and private sector stakeholders. Additionally, governments must create an enabling environment that supports the development and implementation of smart tourism initiatives, including a strong legal and regulatory framework, open data policies, and supportive institutional arrangements.

Furthermore, developing a comprehensive travel policy will encourage sustainable tourism (Escoto *et al*., 2019). These policies should include the environmental impact of tourism, such as promoting the use of public transportation, encouraging the use of renewable sources, and promoting responsible waste management. Also, by proving access to reliable and Internet, mobile services, and developing infrastructures that support, the use of digital technology, enabling conditions for smart tourism is created. The use of digital platforms for booking and digital platforms for booking and payment as well as providing access to digital tools for marketing and promotion will increase the number of tourist visitors, which will have a positive effect on the economic growth of such destinations. Similarly, policies that foster collaboration between the private and public sectors by creating a partnership between the sectors to develop innovative solutions for smart tourism will have a positive influence on economic growth (Boes *et al*., 2015). Additionally, policies that encourage investment in research and development, will help to identify new opportunities for smart tourism, develop new technologies and services, and engage in innovation activities, which will have a positive effect on the economic growth of the smart tourism destinations. Therefore, we posit that:

H1. Policies and enabling conditions in the travel and tourism industry will lead to economic growth in smart tourism destinations.

An enabling environment is critical for the success of smart tourism initiatives. This includes a robust telecommunications infrastructure, reliable electricity supply, and strong cybersecurity

measures. Additionally, access to capital, supportive legal and regulatory frameworks, and favourable macroeconomic conditions are important for the development of a thriving smart tourism industry. According to the World Intellectual Property Organization (WIPO), the institution index consists of the business, regulatory, and political environment (WIPO, 2020). The business environment entails the ease of resolving insolvency and private entrepreneurial endeavours while the regulatory environment captures the perception of the government's ability to devise and effect cohesive policies in promoting the private sector, evaluating the cost of redundancy dismissal and the rule of law. The political environment considers the security, operational, or political risk and quality of civil and public services, policy creation, and enactment. A study on tourism innovation and tourism entrepreneurship (Montañés-Del-Río and Medina-Garrido, 2020) considered social capital, intellectual capital, perceptual, sociodemographic, and economic factors that determine innovation propensity among tourism entrepreneurs. Findings from their study suggest that informal investment, level of education, age, and gender of tourism entrepreneurs determine their propensity to innovate. Tourism innovation in the business environment is also related to safe and sustainable transport within a smart approach to transport and mobility at regional and national levels (Kelemen *et al*., 2018), which will impact the economy.

The choice of a regulatory framework and policy approach is based on governmental knowledge and the political environment (Rigelský *et al*., 2021). Political (in)stability (Nadeem *et al*., 2020) and corruption have been found to affect innovation (Xie *et al*., 2019). According to Mattsson and Orfila-Sintes (2014), when a destination country experiences political instability or the government does not implement favourable and sound policies, tourism of small and medium-sized enterprises (SMEs) often have a paucity of capacity and knowledge that encourages survival and growth, which are prerequisite to innovation. Also, this can cause a decline in the tourism demand of such destinations and since the tourism industry is a demand-driven activity once there is such a decline, there will be low-intrinsic motivation to exude innovative work behaviour (Surya *et al*., 2022).

H2. Enabling environment will facilitate tourism innovation, which will positively affect economic growth in smart tourism destinations.

The government is essential in shaping competitiveness and the degree to which the government emphasizes that sector can be viewed as the prioritizing of the tourism industry. Governments that prioritize the tourist industry and take action to create an effective destination-marketing strategy for the industry foster innovation. However, government-sponsored destination marketing initiatives strengthen the demand side of the tourism industry while its supply side remains unchanged. Under this circumstance, innovation prioritization switches traditional tourism to a sector that is far more strategically important. Barriers to innovation in tourism strategy and policy include a paucity of strategic vision and minimal emphasis on innovation. This is related to policy actors' limited awareness of tourism innovation and perceptions of the industry as a non-innovative sector. A government can direct funds to crucial development initiatives by stating that the tourism industry is one of its top priorities and by mirroring this in its budget priorities. Other ways that the government prioritizes the industry include establishing exceptional destination-marketing initiatives and striving to timely collect and make travel and tourism data available (Blanke *et al*., 2011).

Furthermore, the state budget's structure, the number of programs aimed at promoting tourism, the number of funds invested by the government in the industry, and other factors can all be used to determine the priority the government gives to the tourism sector. Since the tourism industry has a special structure and innovation is generally lagging and several tourism businesses are small, knowledge sharing, and collaboration are essential for a destination (Alford and Duan, 2018). When governments prioritize tourism, they are more likely to invest in the sector, which can lead to increased innovation. This investment can come in the form of funding for research and development, infrastructure, and marketing. This can lead to the development of new products and services, as well as the improvement of existing ones. Additionally, government prioritization of tourism can lead to increased collaboration between the public and private sectors, which can further spur innovation. Furthermore, government prioritization of tourism can lead to increased

access to capital, which can be used to finance new projects and initiatives. All these factors can lead to increased innovation in the tourism sector, which can benefit both the industry and the economy as a whole. Therefore, we posit that:

H3. The government's prioritization of tourism will facilitate tourism innovation, which will positively affect economic growth in smart tourism destinations.

The availability of a skilled workforce with expertise in areas such as data analytics, digital marketing, and software development is critical for the development of a successful smart tourism industry. The Human Capital and Research (HCR) index consists of the education, research, development (R&D), and tertiary education subindex (Shen and Zhao, 2022). The education subindex captures education and school life expectancy, achievements at both elementary and secondary levels, as well as government funding for these levels. The R&D subpillar captures the quality and level of research and development activities by researchers, and expenditures on R&D, to mention a few, while the tertiary education subindex captures the coverage (tertiary enrolment); sectors typically linked with innovation are given precedence, as evidenced by the proportion of tertiary graduates in fields such as science, engineering, manufacturing, and construction (WIPO, 2020) as mobility and inbound of tertiary students are important for skill and idea exchange needed for innovation.

No doubt, the foundation for the R&D of researchers stems from elementary to secondary and tertiary (Al Raee, Ritzen and de Crombrugghe, 2017). Studies on the human capital and research–tourism innovation nexus have concluded that a high level of education fosters research, creativity, and adaptation. For instance, a study by Bugnar *et al*. (2018) found that the number of scientific papers, inventions, and patents, and the standard of university determines the quality of innovation in the tourism industry as well as a correlation between the level of education and tourism incomes in the European Union. Uran Maravić *et al*. (2015), in their study of Slovenian tourism innovation, identified a motive for motivation (e.g. market share and profit, competitiveness), but found limited research activities in the tourism organizations and collaboration with external institutions (e.g. research institutes and universities). In the Australian tourism market, Divisekera and Nguyen (2018) found that human capital facilitates the innovation process, and innovation outputs are positively impacted by collaboration for innovation, which will positively affect the economy in the long run, therefore, we posit that:

H4. Human resources and the labour market will expedite tourism innovation, which will positively affect economic growth in smart tourism destinations.

The infrastructure index consists of ecological sustainability, information, and communication technologies (ICTs), and general infrastructure. Ecological sustainability includes efficiency of energy use, quality certifications, and environmental performance index. The general infrastructure subindex includes but is not limited to equipment and machinery, industrial, commercial, and residential buildings, schools, railways, and so on, while the ICTs subindex includes online participation of citizens, online services by the government, ICT use, and access (WIPO, 2020). The adoption of ICTs is a critical component of smart tourism. This includes the use of mobile apps, digital signage, and social media platforms to enhance the tourism experience. Most studies on tourism innovation- and the innovation–environment nexus have often considered the business environment in relation to innovation (e.g. Madanaguli *et al*., 2021; Prajogo, 2016). According to (OECD/Eurostat, 2019), the natural environment through firms' decisions influences innovation, and likely environmental factors include air, water, and soil pollution, climate change, epidemics, and pandemics. Jacomossi *et al*. (2021) used regression analysis and mediation techniques to determine the role of ecological sustainability in the innovation–competitiveness nexus in 119 countries. Findings suggest that ecological sustainability significantly mediates the positive relationship between the two variables.

Infrastructure is considered to be an important factor that collaborative business innovation that facilitates local and regional innovation (Kringelum *et al*., 2021). Launonen and Viitanen (2011) created a pyramid for innovation, similar to Maslow's hierarchy of needs, and physical infrastructure and service structures are considered to be vital and the bedrock of innovation.

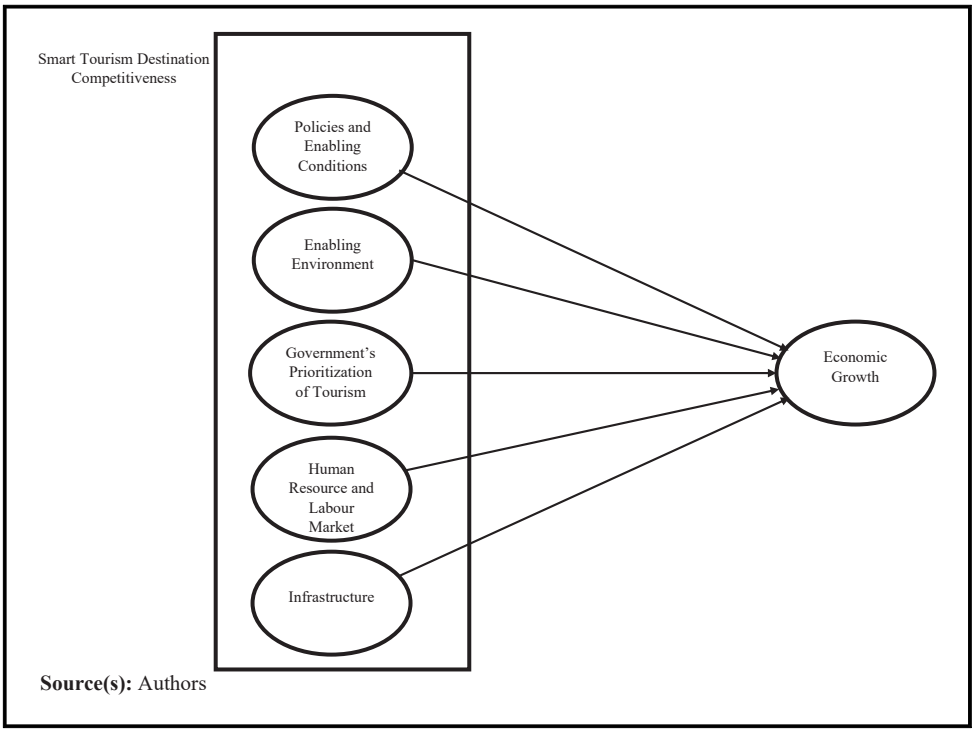
Roche (2020) in her study analysed the effect of cities' physical layouts affect innovation. The author theorized that when there is more physically connected infrastructure, there will be a more interpersonal exchange, and this will lead to a more serendipitous exchange of knowledge which will increase innovation. The result of the study revealed that regional innovation differentials may be explained by variations in street network density rather than conventional location. According to Ratten *et al*. (2019), tourism innovation is effective innovation that takes into account the existing resources, therefore existing infrastructure will determine the level of tourism innovation, which in turn affects the national/regional economic growth.

The development of infrastructure and airport transport infrastructure can play a crucial role in stimulating tourism innovation and positively impacting economic growth (Campos, 2023). When a country invests in building or upgrading its infrastructure, it provides tourists with easier access to different destinations, thereby promoting tourism. Additionally, the presence of a robust airport transport infrastructure can facilitate the movement and transfer of knowledge between different locations, leading to the development of innovative ideas that can benefit the tourism sector. Also, investing in infrastructure and airport transport infrastructure can improve the quality of travel experiences for tourists, leading to increased tourism revenues. For example, the construction of new airports, upgrading existing ones, and improving road networks can facilitate better connections between different regions and help to overcome existing travel barriers (Poulaki *et al*., 2022). These developments can enhance the attractiveness of a destination to tourists, leading to increased tourism revenues. Moreover, the positive impact of infrastructure and airport transport infrastructure on the tourism industry can spill over into other sectors of the economy, such as retail, hospitality, and construction. The development of new infrastructure can create jobs, stimulate local economies, and encourage foreign investment in the tourism sector. Therefore, we posit that:

H5. Infrastructure/airport transport infrastructure will aid the movement and transfer of knowledge which will encourage tourism innovation, thereby positively affecting economic growth

The relationship between the variables is depicted in the research model as shown in Figure 1.

Figure 1 Research model



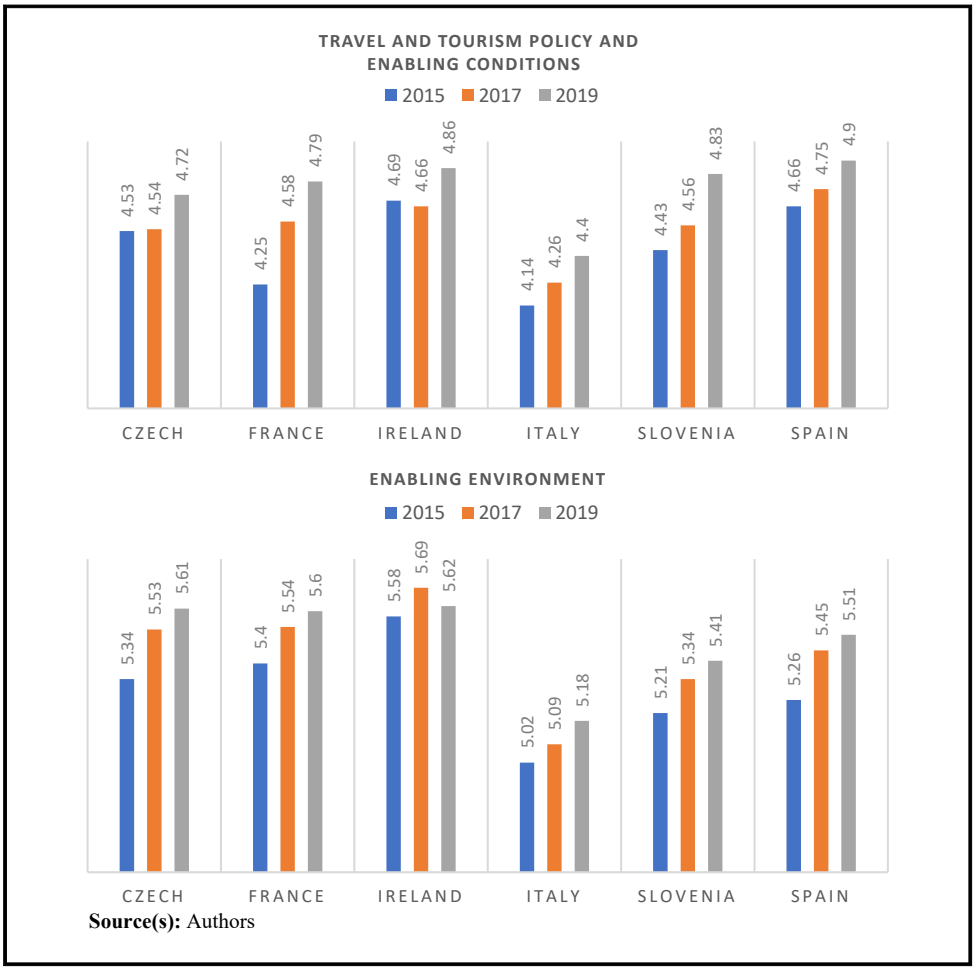
Source(s): Authors

Research context

Based on de Avila's (2015) in Gretzel *et al*. (2015) definition of a smart tourism destination, the study considers the six smart tourist destinations (France, Ireland, Italy, Slovenia, Spain, and the Czech Republic) to determine the impact of the travel and tourism competitive index on economic growth. According to the European Commission's initiative – European Capitals of Smart Tourism (ECST) (2022), cities with outstanding achievements in smart destinations were shortlisted in the ECST competition. Consequently, the top countries with smart cities were included in the current study. The analysis also focused on these countries because they are among the most popular tourist destinations in Europe, and therefore analysing their tourism industry could provide valuable insights into the potential benefits and challenges of developing smart tourism initiatives in other high-traffic destinations. Furthermore, this study also focused solely on these countries because it is part of a larger research project that focuses specifically on these selected countries. Ensuing, this section will discuss the World Economic Forum's TCCI of the research contexts.

Regarding Travel and Tourism (T&T) policy and enabling conditions, which capture the specific strategies or policies that directly impact the T&T industry, Figure 2 reveals that for the years 2015–2019, France recorded an average annual growth rate of 6.17%. Ireland has the lowest average annual growth rate of 1.83%, and Italy is performing below the European median between 2015 and 2019. The enabling environment subindex denotes the general condition to operate in a country. Figure 2 indicates that France experienced an average annual growth rate of 1.84% for the time.

Figure 2 Travel and tourism policy and enabling conditions and enabling environment subindex



Source(s): Authors

Of the countries under consideration, the Czech Republic has the highest average annual growth rate at 2.5%, while Ireland has the lowest average annual growth rate at 0.37%. Furthermore, with the government's prioritization of tourism, Spain experienced an annual average growth rate of 2.2% for the period 2015–2019 as shown in Figure 3. Of the countries under consideration, Ireland has the highest average annual growth rate at 9.19%, while Slovenia has the lowest average annual growth rate at −1.22%. For the enabling environment, from 2015 through 2019, the Czech Republic experienced an average annual growth rate of 2.5%. The highest average annual growth rate among the selected countries is 2.5% in the Czech Republic, while the lowest average annual growth rate is 0.37% in Ireland. For the human capital and research subindex, as shown in Figure 4, the Czech Republic experienced an average annual growth rate of 1.53% for the period 2015-2019. Of the countries under consideration, Slovenia has the highest average annual growth rate at 2.75%, while Ireland has the lowest average annual growth rate at 0.7%.

As shown in Figure 4, for the infrastructure subindex, the Czech Republic experienced an average annual growth rate of −0.71% for the period 2015–2019. Of the countries under consideration, Spain has the highest average annual growth rate at −0.53%, while France has the lowest average annual growth rate at −2.5%. All countries performed above the region median except Slovenia, which was just on the mark between 2017 and 2019. For the airport transport infrastructure, the Czech Republic experienced an average annual growth rate of 3.71% for the period from 2015 to 2019. Of the countries under consideration, Ireland has the highest average annual growth rate at 4.21%, while France has the lowest average annual growth rate at −1.31%.

Figure 3 Government prioritization of tourism and human resource and labour market subindex

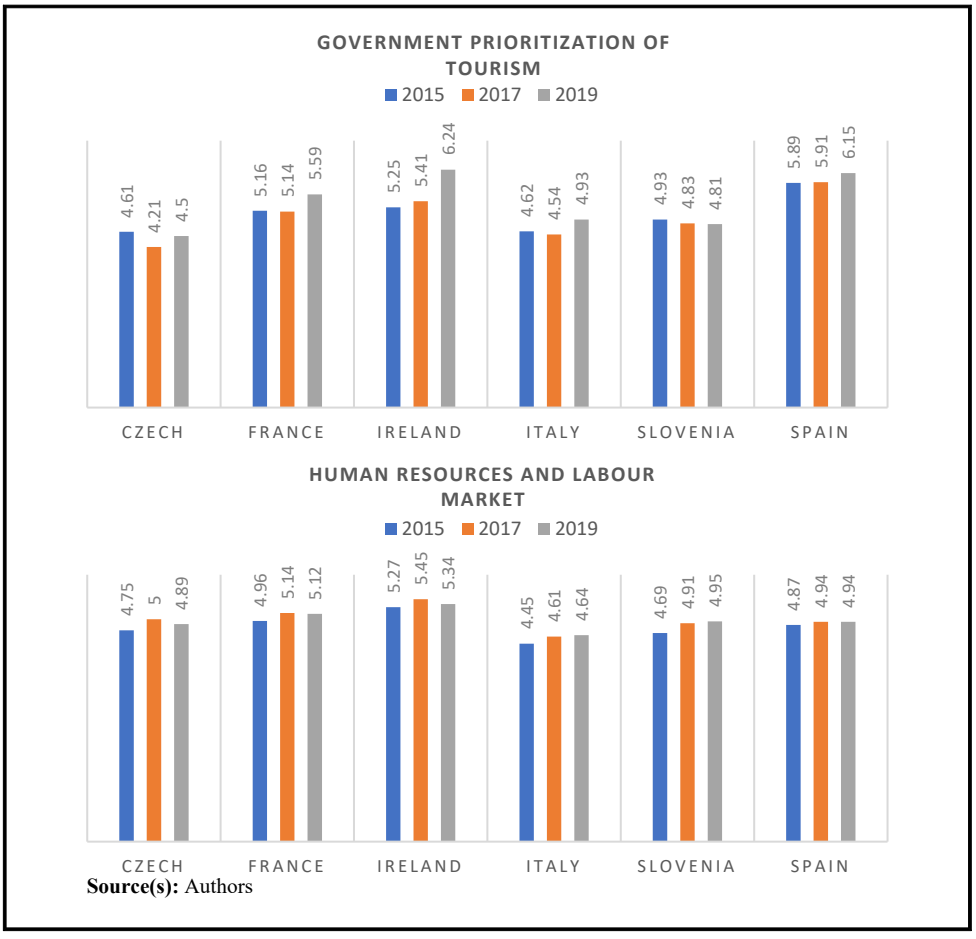


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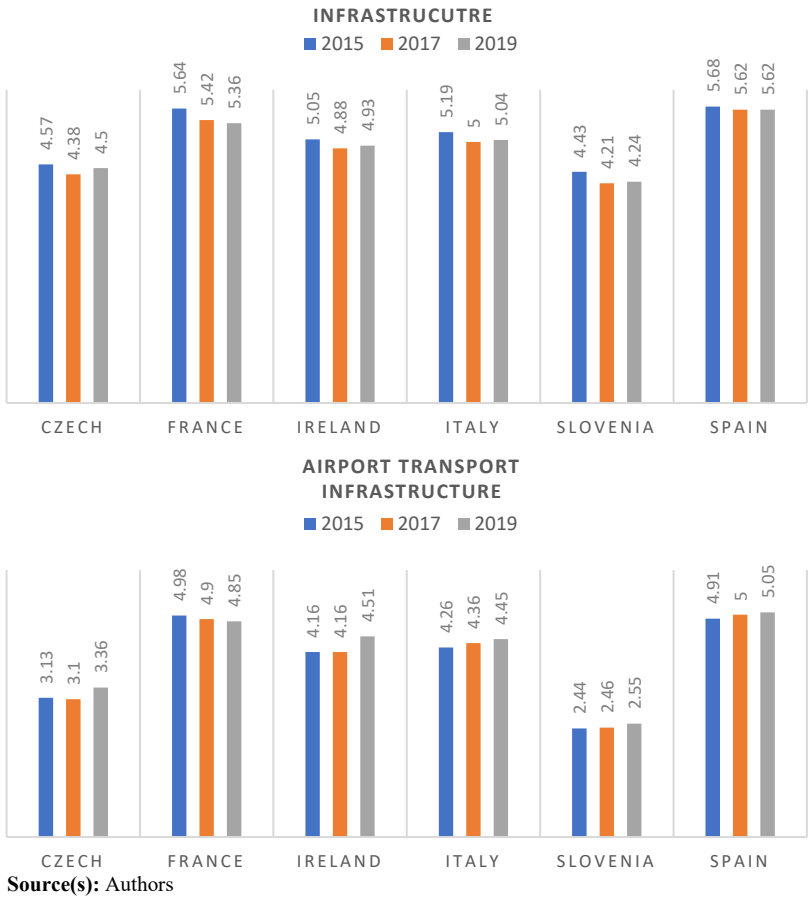
Figure 4 Infrastructure and airport transport infrastructure subindex



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Data and methodology

The TTCI was the source of data used for the empirical estimation and the data used spanned between 1995 and 2021. Data used for the empirical analysis were based on a sample of 162 observations from six smart tourist destinations (France, Ireland, Italy, Slovenia, Spain, and the Czech Republic). This included 27 observations from each country. The TTCI is a biennial report issued by the World Bank Group's Macroeconomics, Trade and Investment Global Practice. The TTCI aims to provide accessible data on countries' trade and competitiveness. It currently compares the competitiveness of 140 economies in the travel and tourism industry. The TTCI is perhaps the most used dataset for assessing the competitiveness of travel and tourism. According to Iunius *et al*. (2015), the TTCI measures a set of policies and factors that facilitate sustainable development in the T&T sector and also enhance a country's competitiveness and development. It is made up of four subindices, 14 pillars, and 90 individual indicators that are dispersed across the pillars. In this study, the enabling environment, Tourism Policy, Enabling Conditions, and Infrastructure indices were used for institutions, human capital and research, and infrastructure pillars of the Global Innovation Index (GII) and expressed as scores on a 1–7 scale, with 7 being the most desirable outcome. There are two main reasons why the TTCI framework is adopted by this study. TTC, for beginners, is built on a modern framework that is regularly updated. This implies that when analysing competitiveness, current changes in the travel and tourism industry are considered. Second, in recent tourist destination competitiveness studies, scholars have used

TTCI in their studies (e.g. Fernández *et al*., 2020; Perez Leon *et al*., 2021; Zaroki and Owliaaynasab, 2018). This research shows that the TTCI can be used in similar studies.

For the methodological approach, we used the Poisson Pseudo Maximum Likelihood regression model technique with high-dimensional fixed effects (PPMLHDFE). This was the model of choice because our dependent variable is count data with no negative values. The PPML regression is a suitable model that has the natural ability to analyse count data with zero values in dependent variables. According to Correia *et al*. (2020), the PPMLHDFE considers the advantages of the Poisson estimator (PPML) as well as having the ability to control individual fixed effects. It is known to provide a more robust technique to examine the presence of (pseudo) maximum likelihood estimates. In addition, it is able to manage multiple sources of heterogeneity in comparison to other high-dimensional fixed effect non-linear algorithm estimators. It also provides quick estimation of the parameters as it can eliminate the unnecessary number of iterations. The PPML regression was preferred to other log-linear regressions because, in the existence of heteroskedasticity, the estimations of log-linearized models fit by for instance the Ordinary Least Square (OLS) will be inconsistent (Correia *et al*., 2020; Martin and Pham, 2020). We used the PPML model applied to tourism's contributions to gross domestic product (GDP); this allowed us to account for zero values. We believe that not all firms can make profits from the sale of new products, and there will be firms that can break even. So, the PPML regression can be the solution to the zero values in GDP problems that can exist in our data helping us to avoid dropping such observations. This regression model helps us to overcome selection bias, which will not be in the case of the OLS model. Following the literature, see Larch *et al.* (2019), we provide the model to capture tourism contributions to GDP in these countries as

$$\mathrm{TC}_{\mathrm{ijt}} = \exp\left(\lambda_{\mathrm{it}} + \phi_{\mathrm{jt}} + E_{\mathrm{jt}} + \mathbf{P}'X_{\mathrm{ijt}}\right) + \varepsilon_{\mathrm{ijt}} \quad (1)$$

where TC is tourism contribution to GDP; λ_{it} and ϕ_{jt} are variables enhancing tourism contributions to GDP in smart tourism destinations; E_{jt} refers to fixed effects of smart tourism destinations; X_{ijt} denotes common variables between smart tourism destinations that vary over time; ε_{ijt} denotes the error term. Substituting our explanatory variables into equation (1), we provide our proposed structural gravity equation as

$$\begin{aligned} TC_{ijt} = exp(\alpha &+ \beta 1 Policy\ and\ enabling\ condition_{it} + \beta 2 Enabling\ environment_{it} \\ &+ \beta 3 Government\ prioritization_{it} + \beta 4 Human\ resource_{it} + \beta 5 ICT\ readiness_{it} \\ &+ \beta 6 infrastructure_{it} + \beta 7 Air\ transport\ infrastructure_{it} + \beta 8 country\ dummies_{ijt}) + \varepsilon_{ij} \end{aligned} \quad (2)$$

In the field of economics and other social sciences, the marginal effect has become widely embraced. Marginal effects analysis provides good and consistent estimates of the magnitude of changes in the dependent variable when there is a marginal change in the covariates (Ai and Norton, 2003). Using marginal effects estimations allows researchers to express how the predicted probabilities of explanatory outcomes change with its associated risk factors (Norton *et al*., 2019). In addition, the marginal effects allow for easy comparison that allows researchers to know what happens when there are any additional changes in the independent variables. Table 1 describes the variables used for the empirical estimations.

Results

We begin the results with the descriptive statistics in Table 1 to provide a general overview of the sample population. The average contribution of tourism to GDP is about $41.613 as shown in Table 1. The average of the policies and enabling environment was about 0.512. When it comes to enabling environment, the average contribution is about 0.605. The average of the government prioritization variable is 0.576. The variable on human capital or resources has an average of 0.552. Tourism ICT readiness also has an average of 0.613 while the maximum for that variable is 5.92. The general infrastructure component has an average score of about 0.558 with a maximum value

Table 1 Descriptive statistics of the variables

Variable	*Mean (Std. Dev.)*
Travel and Tourism's total contribution to GDP US$ in real prices	41.613 (40.261)
Policy and enabling condition subindex measure specific policies in the tourism industry (1 = low, 7 = best)	0.512 (1.451)
Enabling environment subindex focus on the general situations necessary for tourism operations (1 = low, 7 = best)	0.605 (1.711)
Government prioritization assesses the degree to which governments promote the tourism sector (1 = low, 7 = best)	0.576 (1.640)
Human resource assesses the availability of quality and efficiency of human resources allocation (1 = low, 7 = best)	0.552 (1.564)
Tourism ICT readiness measures ICT infrastructure development (1 = low, 7 = best)	0.613 (1.736)
Infrastructure subindex describes the quality and availability of physical infrastructure (1 = low, 7 = best)	0.558 (1.585)
Air transport infrastructure measures the extent country provides adequate air connectivity to travellers (1 = low, 7 = best)	0.451 (1.312)
Country dummies	3.5 (1.713)

Note(s): Data source: open trade and competitiveness data (https://tcdata360.worldbank.org/topics)
Source(s): Authors' estimation

of 5.68. Finally, the variable on air transport infrastructure has a mean value of 0.451. The mean results show that they are all far less than one.

The predictive power of our model as shown by the coefficient of determination score (R^2) is 0.894 as shown in Table 2, meaning that the combined effect of the endogenous variables on exogenous variables was high predictive accuracy of about 89%. We now test the various hypotheses using the poison pseudo maximum estimator.

Table 3 shows the average marginal effects of tourism contributions to economic growth, indicating the result hypothesized relationships. Regarding the first hypothesis focuses on policies and enabling conditions that impact economic growth in smart tourism destinations, we find no

Table 2 Results of factors driving tourism contributions to GDP

Tourism's contribution to GDP	*Coef*	*Robust Std. Err*	P-*value*
Policies and Enabling Conditions	0.180	0.171	0.293
Enabling environment	0.742**	0.273	0.007
Government prioritization	0.020	0.096	0.832
Human resources (labour market)	−0.533***	0.166	0.001
Tourism ICT readiness	−0.246	0.152	0.105
Infrastructure	−0.341***	0.106	0.001
Air transport infrastructure	0.222**	0.070	0.002
Country dummies			
Czech Republic	1.254***	0.033	0.001
France	4.115***	0.031	0.001
Ireland	1.060***	0.068	0.001
Italy	4.148***	0.035	0.001
Spain	3.689***	0.044	0.001
Constant	0.356***	0.025	0.001
Model summary			
Observations	161		
Pseudo R^2	0.8940		
Prob > χ^2	0.000***		

Note(s): Std. Err. represent standard errors
*The coefficients are significant at 10%
**The coefficients are significant at 5%
***The coefficients are significant at 1%
Source(s): Authors' estimations

Table 3 Average marginal effects of tourism contributions to economic growth

Tourism's contribution to GDP	*dy/dx*	*Std. Err*	P-*value*
Policies and enabling conditions	7.525	7.143	0.292
Enabling environment	31.055**	11.428	0.007
Government prioritization	0.853	4.031	0.832
Human resources (labour market)	−22.332***	6.893	0.001
Tourism ICT readiness	−10.310	6.350	0.105
Infrastructure	−14.272***	4.448	0.001
Air transport infrastructure	9.296**	2.935	0.002
Country dummies			
Czech Republic	3.640***	0.123	0.001
France	87.618***	1.695	0.001
Ireland	2.744***	0.268	0.001
Italy	90.626***	2.250	0.001
Spain	56.729***	2.073	0.001

Note(s): dy/dx is marginal effect coefficients, Std. Err. represent standard errors estimated with the Delta-method
*The coefficients are significant at 10%
**The coefficients are significant at 5%
***The coefficients are significant at 1%
Source(s): Authors' estimations

statistically significant evidence in the sample supporting this relationship ($\beta = 0.180, p > 0.293$), so we reject this hypothesis. Hypothesis 2 also focuses on establishing the relationship between enabling environment's role in facilitating tourism innovations as expected. We find a positive and statistically significant relationship with the sample ($\beta = 0.742$, $p < 0.007$). We, therefore, accept hypothesis 2. Our hypothesis three is not supported. We find no positive and statistically significant correlation between government prioritization and economic growth ($\beta = 0.020$, $p > 0.832$). The results show that when government prioritizes tourism and focuses resources in that sector, it does not potentially contribute to economic growth. The fourth hypothesis stating that human resources and the labour market could contribute to positively affecting economic growth in smart tourism destinations is not supported. We find a statistically significant but negative relationship in the sample supporting this ($\beta = -0.533, p < 0.001$). This negative relationship means that we reject hypothesis 4.

Finally, hypothesis 5 which sort to establish the nexus between infrastructure and knowledge transfers is partially supported. We find evidence positively supporting air transport infrastructure ($\beta = 0.222$, $p < 0.002$), while we find a negative correlation between general infrastructure probability to influence tourism's contributions to GDP ($\beta = -0.341, p > 0.001$). The results on the country dummies also point to the expected benefits of tourism's contributions to these countries' growth. We find that in all the sampled countries, tourism demonstrates to have a positive and statistically significant contribution to GDP. However, the expected benefits were lower for the Cech Republic, and Ireland as shown by the lowest coefficient ($\beta = 1.254$, $p < 0.001$) and ($\beta = 1.060$ $p > 0.001$). France, Italy, and Spain demonstrated to have the highest contributions from Tourism to GDP. France was probable to have the highest tourism contribution based on the highest coefficient ($\beta = 4.115$, $p < 0.001$) followed by Italy ($\beta = 4.148$, $p < 0.001$).

Discussions

Every economic activity is aiming to employ innovative approaches that can help provide a competitive advantage over market rivals, and the tourism sector is no exception. The economies of these countries support the tourism-led growth hypothesis, and the economic growth of these economies is dependent on tourism. An increase in tourism positively leads to increased growth. Most of these tourist countries have applied the concept of innovations with varying degrees of success over the past years (WIPO, 2020). But existing research has not highlighted the

importance of innovation adoption in the tourism sector. This means that the factors capable of inducing tourism innovations need to be examined to influence tourism innovation policies. This paper has focused on analysing the key determinants that can enhance innovations in this vital sector in these six important tourist destinations in the European Union. Our results have surprisingly demonstrated that policies and enabling conditions in these countries are not statistically significant factors capable of driving improved tourism's contributions to economic wealth. This insignificant result means that we reject hypothesis 1. The marginal effect results show that existing policies and enabling conditions in these countries do not marginally influence GDP. This can be because the policies that focus on the specific policies or strategic characteristics impacting the tourism industries directly in these countries are not effective in achieving their intended objectives of boosting tourism. This result calls for comprehensive reviews of various country-specific policies to assess their effectiveness or otherwise and find ways to improve upon them. The ineffectiveness of Italy's tourism policymakers has also been acknowledged by a study by Işık *et al*. (2020) who called for a comprehensive review country's tourism policy to make them more sustainable. Niavis *et al*. (2022) found that intervention policies in most Mediterranean countries are ineffective in boosting tourism activities.

Our result on the enabling environment's positive role in influencing tourism's contributions to GDP is as expected and supports hypothesis 2. The results show that when the enabling conditions improve, it can contribute to improved tourism contributions to GDP. As shown by the marginal effects results, any improvements in enabling conditions in these countries could potentially increase tourism's contribution to GDP marginally by US$ 31.055. This result signifies that these countries must work on improving upon the enabling conditions such as specific policies capable of directly impacting the tourism sector. These countries should enhance tourism activities by diversifying individual markets and also by supporting promotion bodies such as travel and tour organizations. Policies on the enabling conditions should focus on the international openness of these countries to make them more attractive to future tourists. The regulation of travel and tourism sector business operations to ensure they do not distort the prevailing prices of tourism products among others. Our result is comparable to the findings of a similar by Goral (2016) conducted in eight Mediterranean tourist destinations that included Spain, France, Italy, Greece, and so on. They also find that enabling conditions in these popular tourist destinations significantly influence tourism income.

Furthermore, the study did not find any statistical significance in the government prioritization variable. Due to the insufficient compelling evidence in the sample supporting this relationship, we reject hypothesis 3. The countries are expected to benefit from a clear prioritization of the tourism sector with high government investments to support tourism activities and promotions. What this means is that when governments in these popular tourist destinations put tourism high on their agenda and promote it, the expected benefits from the priority do not impact the returns to tourism. However, the results should be interpreted with caution as the countries are not homogenous in terms of their abilities to attract tourists. The results could be impacted by the countries such as Ireland that are not bigger in terms of attracting tourists in relation to the other countries. Despite the insignificant relationship, we believe the government of these countries where tourism is the backbone of economic growth should focus on promoting and prioritizing tourism development to continuously provide the needed economic benefits. The prioritization can be in the form of supportive policies and infrastructure to ensure becomes beneficial to economic and regional growth (Lee and Brahmasrene, 2013).

The results point to a negative correlation between human resources and their ability to contribute to economic growth (GDP). This negative relationship implies that we did not find compelling evidence in the sample supporting hypothesis 4. This inverse relationship means that the human resources in the tourism sector do not make a significant impact on its ability to drive economic growth. We did not find causality buttressing the economic-motivated tourism growth, meaning that tourism development is not a product of human resources. The results could mean that levels of training received by tourism staff do not lead to satisfaction with tourism services hence their ineffectiveness in promoting tourism. As shown by the marginal effects results, whenever there is an increase in

human resources in tourism, it rather exerts a negative influence on the expected contributions to GDP, reducing it by US$ 22.332. The results could mean that the human resources in tourism in these countries might not have the necessary skills that could help them to contribute better to tourism activities which can influence GDP. This calls for these countries to upgrade their human resource with the requisite skills that will make them contribute better to improving tourism services. Our result differs from the findings of a related study (Rivera, 2017), which found that human development promotes tourism by creating an unbalanced connection. Fahimi *et al*. (2018) also find that human capital development positively contributes to economic growth.

We did not find compelling evidence in our sample to support the relationship between ICTs readiness and tourism contributions to economic growth. This result means that tourism' ICT readiness does not significantly impact tourism's contribution to economic growth implying they do not promote tourism competitiveness. The marginal effect result has proven that tourism ICT readiness in these countries reduces tourism-related GDP by US$ 10.310. This is result surprising because ICT infrastructure is anticipated to positively impact the tourism sector and accelerate smart tourism (Park *et al*., 2016). This result means that the use of ICT in the tourism sectors in these countries does not result in any changes in expected tourism outcomes. This result is a bit surprising as the tourism sector has become ICT-based, and tourists require information to help with the planning of their trips, for flight and hotel reservations. Internet penetration through the Internet and smartphone technologies are expected to bring positive gains to tourism promotion, but our results confirm otherwise. For these tourism destinations, ICT helps in the promotion of their various attractions that can help attract people. However, we find that the adoption of ICT in these tourist destinations does not help to drive tourism activities. This result calls for these countries to examine their ICT infrastructure for possible improvements to make the significant promotion of tourism. Our results differ from the findings of a related study by Pierdicca *et al*. (2019) who find that innovative ICT infrastructure facilitates tourist attractions to regions that further contribute to overall territorial economic growth.

Finally, we find mixed results on the role of infrastructure in promoting tourism contributions to economic growth. These results partially supported our hypothesis 5. Regarding the general infrastructure, we witnessed a negative relationship, implying that general infrastructure negatively influences tourism's contribution to GDP. The results on the marginal effects show that any increase in infrastructure leads to a reduction in tourism's contribution to GDP by about US$ 14.272. However, when we consider airport infrastructure, we find that it significantly and positively contributes to increasing GDP growth marginally by US$ 9.296. This is an expected finding because airport infrastructure facilitates the swift movement of people, goods, and services, so when there is the availability of such infrastructure, it can attract more people to these destinations. Adequate airport infrastructure can promote the tourism drive of these countries and make them preferred destinations. Where these airport infrastructures are inadequate, it leads to higher transport fares which will make these destinations unattractive. It is therefore expected that the marginal effects results show that airport infrastructure marginally contributes to the GDP of these countries. The results also suggest that investment in airport infrastructure in these countries can promote tourism and its spillover effects on regional economic growth. Our results on the significance of airport infrastructure in promoting tourism are supported by a study by Doerr *et al*. (2020), who also find that airport infrastructure promotes tourism in German regions.

Conclusion

This paper aimed at analysing the factors driving tourism's contributions to the economies of six smart tourist destinations across the European Union. The analysis of the tourism competitiveness of these countries based on tourism-related data has provided interesting results. The study finds among others that tourism competitiveness in these countries is significantly and positively influenced by enabling environment and airport infrastructure. These significant results supported our hypotheses 2 and 5. Contrarily, our hypothesis four was not supported, as the study revealed that determinants such as human resources (labour market) and general infrastructure in these

countries exert a negative influence on tourism contributions to economic growth. Other factors such as policies and enabling conditions, government prioritizations, tourism ICT readiness, and general infrastructure were not statistically significant factors capable of driving tourism's ability to contribute to economic growth in these smart tourist destinations. These insignificant results led to the rejection of hypotheses 1 and 3.

This study contributes to literature in several ways. Firstly, academic scholarships have acknowledged the role of tourism/destination competitiveness in driving economic growth and performance (Zadeh Bazargani and Kiliç, 2021) in developed, developing, and emerging economies, the focus of scholars has been on uncovering the viable models for competitiveness (Pérez León *et al.*, 2021). Yet, a gulf exists between the understanding of the impacts of tourism competitiveness and the knowledge of the enabling factors for its development, which this study bridges. Secondly, our result gave empirical evidence that government prioritization of tourism, policies, enabling conditions, ICT readiness, and general infrastructure does not have any significant effect that leads to economic growth. This begs the question and the need for further research to understand if pre-existing conditions and the state of these countries need to be improved even though technology helps in achieving the smartness of the cities but does not reflect in its tourism sector. Lastly, as most of these hypotheses were rejected, and further empirical and comparative investigations can be carried out for top tourist destinations, as this will further shed light on tourism competitiveness in this comparative model, thereby improving literature.

This study has managerial and policy implications. Our results also make significant contributions to gaining a better understanding of the benefits countries could derive from tourism and the travel sector. First, we have shown that enabling the environment is a vital driver of tourism's impact on economic growth. This result calls for policymakers and stakeholders in these countries to pay attention to specific policies that aim at facilitating tourism activities. The calls for strong political will and commitments of various respective governments will in providing and supporting the enabling environment tourism needs to thrive. Various levels of government in these countries need to collaborate and coordinate their activities to create this enabling environment. The second significant finding of this research is that airport infrastructure significantly contributes to sustainable tourism contribution to economic growth. This result calls for these destinations to improve upon their existing airport infrastructure to be able to accommodate the numerous tourists. This investment can help reduce transportation costs and make them more attractive to tourism. Policymakers also need to consider the cost and benefits of such airport infrastructure projects and make commitments to improve them. Lastly, these countries should enhance their international competitiveness through bilateral agreements which could be enhanced by including various consulates and embassies.

Few limitations have been recognized in this research, which could provide further directions for future research. First, the study was based on the empirical analysis of TTCI data involving just six smart tourist destinations. To fully understand and generalize our results on whether the outlined factors influence tourism contributions to GDP, will require more studies to be replicated in other well-known tourist destinations. The study was based on four-year panel data, we recommend further studies use longer panel data to comprehensively capture the trends, changes, and long-run effects of tourism's contribution to economic growth.

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