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Contributions to the design of regional tourism innovation policies: Evaluation of determinants in Latin America☆

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ABSTRACT

In recent years, the transnational and regional dimensions of tourism have strengthened. Unlike in the past, we can now consider regional tourism policies, such as innovation policies. The recent creation of the UN Tourism Office for the Americas is a step in this direction. Within this framework, this study analyzes the competitive factors of tourism and innovation in Latin America. This study uses cluster analysis, multidimensional scaling, and FsQCA to answer two questions: Are there similarities in the tourism development profiles of different Latin American countries that would allow the design of common and specific tourism policies aimed at innovation and growth in each profile? If common profiles (regional clusters) exist, what are the determining factors that have driven the recent evolution of tourism performance? To answer these questions, this study uses data from the Travel and Tourism Competitiveness Index and the Global Innovation Index. The study shows that it is possible to identify two clusters of countries in Latin America with similar levels of tourism competitiveness. The first cluster includes Brazil, Mexico, Colombia, and Peru, which have higher but more heterogeneous levels of competitiveness. Additionally, there is a second cluster of more homogeneous countries with lower levels of competitiveness. The study also made it possible to identify a set of factors related to the enabling environment (business environment, safety and security, health and hygiene, human resources and labor market, qualification of the labor force, labor market, and ICT readiness) as pivotal for affirming the sector's competitiveness. Therefore, this study makes important contributions to the design of innovation policies in this sector.

Introduction

Tourism is an activity that occurs at sites, in many cases in communities, but always with a focus on foreigners - the tourists. The traveler is, by definition, always the one arriving from abroad ("A visitor is a traveler [...] outside his/her usual environment," UN-DESA [2010, p. 10]). This bond between what happens in one place (local) and the rest of the world—the traveler's origin—gives tourism both local and global dimensions. This is how Robertson's (1995) conceptual reflection on glocalization finds fertile ground in tourism (e.g., Bom, 2012; Vidal-González, Medrano-Ábalos, & Sáez Álvarez, 2022).

The underlying perspective is that of sharing local characteristics with the world (Bom, 2012; Vidal-González et al., 2022) or welcoming the "world" into the local reality (exemplarily described in Ivona, Rinella, & Rinella, 2019 study as "accommodating about 700,000 'temporary citizens' who, by adopting an active and participative approach, wish to live a unique and unrepeatable identity experience in the Lucanian community instead of being mere spectators" [p. 1]).

Despite extensive discussions on the dual dimensions of tourism, both global and local, there is a notable lack of research and articulation on public policies, particularly in the field of innovation. Few studies have explored this dual dimension with a focus on innovation. This gap is evident in the limited research addressing the integration of global and local dynamics into innovative tourism policies. Recent studies on smart specialization in Europe provide some insight but remain insufficient. Consequently, there is a significant need for research that bridges this gap by examining regional innovation policies in tourism, particularly in Latin American countries.

These studies sometimes characterize only a given subnational region (e.g., Benner, 2020; Del Vecchio & Passiante, 2017). In other cases, regions are studied from a subnational perspective, and their potential for smart specialization/innovation is assessed, as in the studies of Biagi, Brandano, and Ortega-Argiles (2021), Ndou, Hysa,

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and Maruccia (2023)), and Romão and Nijkamp (2019). There is a lack of research on the regional dynamics of tourism and even less on the regional dynamics of innovation in tourism.

In this context, the creation of the First Regional Office for the Americas of the World Tourism Organization (UN Tourism) in December 2023 in Rio de Janeiro, Brazil (UNWTO, 2023), which aims to intervene transversally throughout the region, marks another step toward the articulation of policies focused on innovation in tourism.

Given the lack of studies in this area and recognizing the need for them due to initiatives such as that mentioned above by UN Tourism, this study focuses on filling this gap in the literature.

The central focus of this research is on regional innovation policies in tourism, aiming to identify common elements across Latin American countries—Mexico, Central America, the Caribbean, and South America—to facilitate better policy articulation. Using data from the Travel and Tourism Competitiveness Index and Global Innovation Index, this study seeks to provide data-driven public policy recommendations to enhance tourism competitiveness by examining and articulating these regional innovation policies.

Using different data and methodologies, this study is similar to the works of Ndou et al. (2023)), Romão and Nijkamp (2019), and Biagi et al. (2021).

The study seeks to answer the following two research questions:

Q1. Are there similarities in the tourism development profiles of different countries in Latin America that would allow for the design of common and specific tourism policies geared toward innovation and growth for each profile?
Q2. If common profiles (regional clusters) exist, which determining factors have boosted the recent evolution of tourism performance?

To fill this research gap and answer the abovementioned research questions, we used a variety of methods. From the results, we hope to indicate to policymakers the public policies that they can adopt to increase tourism competitiveness in Latin American countries.

The rest of the paper is organized as follows. This initial introductory section is followed by a section reviewing the literature, in which it is possible to see an overview of the main topics of this subject. The third section presents the empirical model and the variables of the model that were tested to help understand the determinants of the public policies of tourism in Latin America. The fourth section presents the methodologies used in this study (FsQCA and cluster analysis) and the descriptive statistics of the sample. Sections five and six describe the results obtained by the two different methodologies applied in the study and the conclusions drawn from the work regarding public policies. The final section discusses the limitations of this study and provides directions for further research that can be developed from this work.

Literature review

This section is organized into three topics to define our conceptual model: tourism as a nationally based global activity, cross-border tourism and international cooperation, and tourism and regional innovation.

As previously mentioned, there is a gap in the literature on the regional dynamics of tourism, particularly the regional dynamics of innovation. Therefore, this section frames the issue based on the existing knowledge of topics relevant to the discussion of regional innovation dynamics in tourism.

Guided by the challenge that the creation of an office for the development of regional innovation policies in tourism by UN Tourism represents the academic community in the face of the aforementioned gap, we structured this section to discuss three topics:

- Tourism as a global activity with a national base
- Cross-border tourism and international cooperation
- Tourism and regional innovation

Tourism as a global activity with a national base

Tourism is a global activity with an economic, social, and cultural impact (Herman et al., 2022) and is strongly linked to global issues (United Nations Environment Program [UNEP], 2009) through global markets and consumers (Blazeska, Davkovska, & Nakovski, 2016). Another important reason for the globalization of tourism is that source countries are usually more developed, and destination countries are often less developed (Igoumenakis, Theodoropoulou, & Halkiopoulos, 2024; Ren, Can, Paramati, Fang, & Wu, 2019). These countries have specific competitive factors, namely, those linked to indigenous natural elements - beaches, mountains, forests, etc.—to which they add other easily mobilizable skills, particularly in terms of human resources. This combination of factors allows less-developed countries to enter the global economy (Hassan, Xia, & Huang, 2019; Ullah, Raza, & Mehmood, 2023).

In addition, the sector is organized globally through UN Tourism (Perdomo, 2016), the World Travel and Tourism Council, and other similar bodies, and there is significant financial flow of foreign direct investment, in many cases associated with global players who themselves function as tourism inducers (Gopalan, Khalid, & Okafor, 2023).

The ability of less-developed countries to compete in the global tourism market and grow from that competitive position has given rise to the Tourism-Led Growth model, which is based on the idea that the sector can lead economic growth (Brida, Cortes-Jimenez, & Pulina, 2016; Domingo, 1989; Gunduz & Hatemi-J, 2005). This model has been widely tested and mostly proven (e.g., Opuala-Charles, Omoke, & Uche, 2023; Solarin, Lasisi, Hossain, & Bekun, 2023).

This close link between tourism growth and economic growth has led many countries to establish their public policies for the development of the sector, that is, active public policies for economic growth through the development of the tourism sector (Pripoaie et al., 2023).

These policies were generally nationally based and did not usually take on a transnational character. Sialverstava, Hanchar, and Jalinik (2019) presented a systematic review of the literature on cross-border tourism, showing that even from an academic perspective, transnational tourism has been relatively minimal in the context of intense academic production on the subject, as it often focuses on very specific geographical situations: Portugal-Spain, Finland-Russia, and Germany-Czech Republic.

Cross-border tourism and international cooperation

Cross-border tourism and international cooperation are interlinked, as they involve collaboration in economic, cultural, environmental, and security aspects to create a conducive and sustainable environment for tourism across national boundaries. In the sparse field of study of cross-border tourism, one case has attracted unusual interest: tourism in the Great Limpopo Transfrontier Park (Chiutsi & Saarinen, 2017; Ferreira, 2004). This case is part of a broader SADC strategy for establishing cross-border nature conservation areas, with tourism playing an important role in economic viability (Blanken et al., 2022; Spenceley, 2018).

Therefore, it is natural to note that one of the objectives of the SADC Tourism Programme 2020–2030 (Southern African Development Community [SADC], 2019) is the Development of Tourism in Transfrontier Conservation Areas (Goal 3, p. 34) and that one of the initiatives to be implemented is the creation of a Senior Program Officer for Tourism Policy Harmonization (p. 5).

In the European context, transnational cooperation for tourism development is also advocated in European Comission (2011), suggesting that this cooperation should extend to promotion strategies (p. 18), product diversification (p. 31) and the development of joint projects and sharing of good practices (p. 44). This focus on corporatization and the sharing of good practices is an objective that was assumed when establishing a tourism policy for Europe (EC, 2010).

As can be seen from the examples of the SADC and the European Union, the 2010s were a decade of affirming this idea of international cooperation, but they also constituted a decade of affirming cross-border tourism as a reality that appeals to the emotions, intellect, and senses of modern-day visitors who want to live in the culture and character of a place and connect with local communities that they explore, asUNWTO and ETC (2017, p. 11) point out. However, the aforementioned study also warns of the challenges this model brings to administrative terms, such as differing models for the governance of tourism and different modes of funding.

To put it succinctly, the growth of transnational tourism is, therefore, dependent on enhancing efforts at regional collaboration, as demonstrated by the European Union and SADC and as theUNWTO and ETC (2017) attest to with several instances (the report showcases 17 instances of transnational tourist projects).

Several studies (e.g., Aghmiuni, Siyal, Wang, & Duan, 2020; Li, Wu, Zhang, & Yang, 2023) have shown that national innovation systems cannot function effectively without interaction between actors and cross-border knowledge flow; therefore, the development of regional innovation policies in tourism must have this element of international cooperation as a basic element.

Tourism and regional innovation

The idea that tourism generally has a regional perspective is deeply rooted in the literature. According to Cole (2007), tourism is a regional activity on all scales. The regional dimension of tourism considered at different scales was also referred to by Coppock (1982). This idea has led to the development of a significant body of literature on the consequences and characteristics of the regional and subnational dimensions of tourism, in many cases emphasizing the issues of cooperation and networking (e.g., Ferrante, Fritz, & Öner, 2020; Lazzeretti & Petrillo, 2006). Power, Doran, and Ryan (2021) considered that, in addition to the aspects mentioned above, there are also phenomena of agglomeration economies, which have an impact on the innovation process. Pechlaner, Herntrei, Pichler, and Volgger (2012) explored the synergies of regional actors and their implications for the governance of regional innovation systems. They showed how regional innovation processes can be initiated and governed by focusing on the roles of destination management organizations. Brandão, Costa, and Buhalis (2018)) applied social network analysis to measure and identify the dynamics of cooperation within institutional tourism innovation networks and their role in promoting tourism innovation. In these two previous studies, innovation dynamics are considered at the subnational level.

However, regional and supranational dynamics have not been studied, with the exception of the role of tourism in the development of regional and subnational innovation systems, which has been studied in international comparisons in works such as those of Weidenfeld (2013) and Luongo, Sepe, and Del Gaudio (2023). In the European Union, the effort to define Regional Research and Innovation Strategies for Smart Specialization (RIS3) at a subnational level (Neto & Santos, 2020; Roman & Fellnhofer, 2022) has led to the establishment of regional development proposals in which the tourism sector plays a decisive role (e.g., Romão & Neuts, 2017; Bourdin, Jean-Pierre, & Perrain, 2023; Luongo et al., 2023).

In other words, the theoretical framework of this research includes the concepts of innovation and supranational regional dynamics and is applied to the tourism sector, as shown in Fig. 1 (highlighted area).

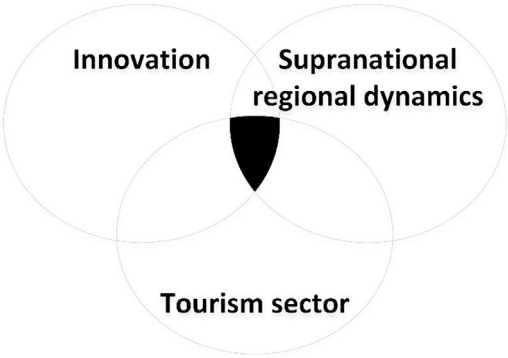

Fig. 1. Research theoretical framework. Source: the authors

Theoretical background and hypotheses

As a global activity, tourism has a significant economic, social, and cultural impact. It connects developed source countries with less-developed destination countries, leveraging competitive factors such as natural elements and mobilizable human resources (Blazeska et al., 2016; Herman et al., 2022; UNEP, 2009). Global organizations, such as UN Tourism and World Travel and Tourism Council, facilitate this connection through significant financial flow and investments (Gopalan et al., 2023; Perdomo, 2016). The tourism-led growth model suggests that tourism can drive economic growth, which has been widely tested and proven (Brida et al., 2016; Domingo, 1989; Gunduz & Hatemi-J, 2005; Opuala-Charles et al., 2023; Solarin et al., 2023). However, public policies in this sector are primarily national rather than transnational (Sialverstava et al., 2019). Based on this framework, we formulated our first hypothesis:

Hypothesis 1. Although tourism is fundamentally a nationally based activity, it is possible to identify common factors in the development of tourism in different countries that allow for the design of public policies on a similar basis.

Cross-border tourism relies on international cooperation across economic, cultural, environmental, and security aspects. The Great Limpopo Transfrontier Park exemplifies successful cross-border tourism supported by a broader SADC strategy and specific tourism programs (Blanken et al., 2022; Chiutsi & Saarinen, 2017; Ferreira, 2004; SADC, 2019; Spenceley, 2018). Similarly, the European Union advocates transnational cooperation in tourism development, focusing on promotion strategies, product diversification, joint projects, and the sharing of best practices (EC, 2010, 2011). The 2010s saw a rise in international cooperation and cross-border tourism driven by modern visitors' desire for cultural and community connections, despite challenges in governance and funding (UNWTO & ETC, 2017). Following the same path, the academy explored this trend. Weidenfeld (2013) studied how tourism contributes to regional innovation in border areas. This emphasizes the need for effective governance and funding to overcome challenges and leverage the potential of tourism for regional development and integration. Hardi et al. (2021) discussed how cross-border cultural tourism serves as a means of territorial integration in Europe, particularly emphasizing the role of cultural and community connections. This highlights the importance of cross-border cooperation despite challenges in governance and illustrates how EU-funded programs such as INTERREG support such initiatives.

From this assertion, a second hypothesis emerges:

Hypothesis 2. Transnational policies can be designed to promote tourism.

Tourism is inherently regional and requires cooperation and networking on various scales to drive development (Cole, 2007; Coppock, 1982; Ferrante et al., 2020; Lazzeretti & Petrillo, 2006). Agglomeration economies further impact innovation in tourism, fostering regional growth (Power et al., 2021). Although supranational regional dynamics have been less studied, regional innovation systems have been explored in the context of tourism, particularly within the European Union's Regional Research and Innovation Strategies for Smart Specialization (RIS3; Luongo et al., 2023; Neto & Santos, 2020; Roman & Fellnhofer, 2022; Weidenfeld, 2013; Romão & Neuts, 2017; Bourdin et al., 2023; Luongo et al., 2023). This framework highlights the importance of innovation and regional dynamics in the tourism sector. This leads us to our third and final hypothesis.

Hypothesis 3. Regional innovation in the tourism sector is pertinent for enhancing cooperation, networking, and economic development.

Empirical model

The Travel and Tourism Competitiveness Index from the World Economic Forum, Global Innovation Index from Cornell University, INSEAD, and World Intellectual Property Organization (WIPO) together provide disaggregated data on the competitiveness of the tourism sector. The World Bank provides data on the strength of the sector in each nation as measured by the average expenditure per international tourist (US$). All of these data points were used in the empirical study. The outcome is the average spending per international tourist.

The travel and tourism competitiveness index

The World Economic Forum (https://www.weforum.org) publishes the biennial Travel and Tourism Competitiveness Index (TTCI). In 2007, the initial report was released. In addition to being the focus of research, it has been utilized to support a wide range of studies (e.g., Krstic, Jovanovic, Jankovic-Milic, & Stanisic, 2016; Lee, 2015).

In their assessment of the index's capacity to explain tourist arrivals in African nations, Hiyab, Hassan, Hassanin, and Almakhayitah (2023) concluded that the application of sub-indices could account for 72.5% of those arrivals despite several structural flaws. In his analysis of the index, Dias (2017) drew attention to the inadequacies in the assessment of environmental factors. The index has also been assessed by Pulido-Fernández and Rodríguez-Díaz (2016), Wu, Lan, and Lee (2012)), and Salinas Fernández, Serdeira Azevedo, Martín Martín, and Rodríguez Martín (2020), who noted its limits as well as its usefulness.

As shown in Table 1, the TTCI is composed of four sub-indices, each of which combines several indicators.

Additionally, some studies in the literature have employed the TTCI in conjunction with innovative tourism research. Using the TTCI, Băbăț, Mazilu, Niță, Drăguleasa, and Grigore (2023) examined the competitiveness of Romanian tourism, with innovation being one of the components of competitiveness. Pripoaie et al. (2023) conducted a comparative analysis of competitiveness in Central European nations, focusing on its relationship with innovation, namely technology-driven innovation. Considering that the most developed nations in this field are those whose competitiveness is driven by innovation and based on innovation-related factors, Chim-Miki and Domareski-Ruiz (2018) also utilize the TTCI to examine tourist competitiveness.

Kubičková and Benešová (2020) conducted a specific investigation of innovation in the tourism sector, using the TTCI to inform their findings. They deduced that the inventiveness of economies might be viewed as a necessary condition for economic prosperity in the tourism sector.

Table 1
Travel and Tourism Competitiveness Index structure.

Travel and Tourism Competitiveness Index (TTCI)
A - Enabling environment subindex
A.01 - Business environment
A.02 - Safety and security
A.03 - Health and hygiene
A.04 - Human resources and labor market
A.04.01 - Qualification of the labor force
A.04.02 - Labor market
A.05 - ICT readiness
B - Travel and Tourism policy and conditions subindex
B.06 - Prioritization of travel and tourism
B.07 - International openness
B.08 - Price competitiveness
B.09 - Environmental sustainability
C - Infrastructure subindex
C.10 - Air transport infrastructure
C.11 - Ground and port infrastructure
C.12 - Tourist service infrastructure
D - Natural and cultural resources subindex
D.13 - Natural resources
D.14 - Cultural resources and business travel

Source: TTCI (2022).

The travel and tourism competitiveness index and innovation

As previously mentioned, the four sub-indices comprise the TTCI. Next, we examine the current state of knowledge regarding innovation in each sub-index domain.

Five factors are considered by the enabling environment subindex, namely, business environment, safety and security, health and hygiene, human resources and labor market (labor force and market qualification), and information and communications technologies (ICT) readiness, corresponding to favorable conditions for the growth of tourism activities.

Research has highlighted the role of governments in this process and emphasized the significance of establishing conducive environments for such development (Dieke, 2003; Baum & Szivas, 2008). Teare (2016) expanded on this theme by pointing out that insufficient regulatory frameworks can cause an imbalance in business operations and working relationships, which hinders the establishment of enabling environments, a crucial prerequisite for cultivating attitudes, knowledge, and abilities that support convenient service levels.

In addition to highlighting the significance of government engagement, Becken and Loehr (2022) emphasize the role that this supportive environment plays in facilitating the shift toward sustainable tourism.

Four factors comprise the second sub-index, which evaluates the policies and conditions related to travel and tourism: international openness, price competitiveness, environmental sustainability, and prioritization of travel and tourism.

According to Lasisi, Odei, and Eluwole (2023), governments play a crucial role in determining the competitiveness of the tourism industry, and how they highlight the industry can be interpreted as a reflection of their priorities. Actions reflecting this prioritization take several forms but are not necessarily equally effective. For example, Koerner, Sushartami, and Spencer (2023) examined how the Indonesian government prioritized tourism. They found that this has resulted in successful initiatives in some areas, such as price competitiveness and international openness, but nonexistent or ineffective initiatives in others, such as environmental sustainability,

infrastructure development, interagency coordination and cooperation, terrorism risk management, and human resource development and management.

The infrastructure sub-index considers three aspects:

- Air transport infrastructure
- Ground and port infrastructure
- Tourist service infrastructure

This research has long acknowledged the significance of infrastructure in understanding both transportation- and non-mobility-related tourism demand (Khadaroo & Seetanah, 2007, 2008).

Infrastructure affects numerous facets of tourism growth. Gonda (2024) examined its effects on accessible tourism, demonstrating the paucity of research on a subject important to a large segment of the population. The author also suggested that infrastructure development should consider accessibility for travelers with physical disabilities. Boers and Cottrell (2007) and Abbas, Mamirkulova, Al-Sulaiti, Al-Sulaiti, and Dar (2024) address the topic of infrastructure development and sustainable tourism. Finally, Fallon and Kriwoken (2003) and Kanwal, Rasheed, Pitafi, Pitafi, and Ren (2020) discuss the relationship to communities when developing infrastructure that is focused on tourism.

In the context of this study, the question of infrastructure innovation is pertinent. After researching the topic, Gavurova, Belas, Valaskova, Rigelsky, and Ivankova (2021) concluded that the effects on tourism visitor expenditure were mostly driven by developments in information and communication technologies (ICT). They also concluded that advancements in other infrastructure-related fields should not be disregarded. Makoni, Mazuruse, and Nyagadza (2023) aimed to support tourism stakeholders in their decision-making and planning processes by offering reliable projections of tourist arrivals, which are particularly critical because of Zimbabwe's foreign currency shortages. Additionally, this study emphasizes the necessity of having adequate transportation and accommodation facilities during peak seasons to manage the anticipated increase in the number of tourists. Martín Martín and Salinas Fernández (2022) contended that investing in improved train infrastructure not only fosters sustainable travel by lowering carbon emissions but also enhances the tourist experience by making destinations more accessible and less crowded. This approach can cultivate a more sustainable tourism model that benefits both the environment and the local economies.

Gallego Gómez and Vaquero Frías (2022) explored how artificial intelligence (AI) can enhance sustainable tourism. Their study emphasizes the importance of AI in optimizing tourism services and improving the customer experience by analyzing data generated by tourists through various digital interactions. The authors highlighted the role of AI in promoting sustainable recovery in the tourism sector, particularly in the aftermath of the COVID-19 pandemic.

Natural and cultural resources are the final sub-index that constitutes the TTCI. This sub-index comprises two indicators:

- Natural resources
- Cultural resources and business travel

Tourism products can be viewed as intangible commodities (Rusu, Rusu, Matus, & Botella, 2023). Tourist experiences are central to this activity and arise as a result of social or cultural interactions (Guan, Huang, & Guo, 2023), and it is from these that the intangibility referred to results. Natural and cultural resources play an important role in this context. Romão, Guerreiroa, and Rodriguesb (2013)) showed a positive relationship between the regional availability of natural and cultural assets, regional innovation efforts, and the evolution of tourism demand. The authors concluded that these regions incorporate specific local resources in innovative ways to differentiate their tourism offers. Apaza-Panca, Quevedo, and Reyes (2024)) highlighted the importance of green marketing strategies, including recycling and reuse practices, competitive pricing, and high service quality. Their study recommends focusing on reverse logistics and circular economy principles to ensure that tourism activities are environmentally friendly and resource-efficient. Social media should be utilized to optimize resource use and promote local eco-friendly souvenirs. These strategies aim to establish a sustainable tourism model that protects the environment while supporting local economies and improving visitor experience.

Set of variables

This study focuses on the average amount spent by foreign visitors in Latin America in 2019. As 2019 was the last year of available data before COVID-19 took effect, it was selected because after that point, the pandemic had a negative impact (Ahmad, Li, Hdia, Bélas, & Hussain, 2023; Nguyen, Phuc, & Tam, 2023).The paths for the average spending per international tourist (ASpIT) in the sample countries will be found based on the variables that make up the Travel and Tourism (T&T) Competitiveness Index, such as the Enabling Environment subindex (TT-Environ), T&T Policy and Conditions subindex (TT-Policy), Infrastructure subindex (TT-Infras), Natural and Cultural Resources subindex (TT-Natural), and Global Innovation Index (GII).

Data were collected from the World Bank (foreign visitors), World Economic Forum (TTC Index), and Global Innovation Index (GII) databases for 2019.

The analysis focused on these countries because they are in the same region and therefore, the comparison was more reliable. Not all of the 20 Latin American nations have data on the chosen variables accessible; as a result, in the specific cases of Haiti and Venezuela, they were excluded from the sample.

Method

Cluster analysis

The first problem in this research is to identify uniform groups in the data, which, as Hennig, Meila, and Murtagh (2016), p. 2) pointed out, corresponds to a clustering problem. Cluster analysis has established itself as the umbrella name for different clustering approaches and algorithms (Wierzchoń & Kłopotek, 2017, p. 9 ff.). However, Everitt, Landau, Leese, and Stahl (2011, p. 69) and Borg, Groenen, and Mair (2018), p. 90) warned that applying different cluster analysis procedures/algorithms to the same dataset can lead to distinct solutions. Thus, following the literature (Borg & Groenen, 2005, p. 108, 236), this study used cluster analysis with two different algorithms and multidimensional scaling.

Fuzzy set qualitative comparative analysis (FsQCA)

Linear association analysis has detractors in academic contexts because it restricts data exploration to the specific effects of each independent variable on the dependent variable (Vis, 2012). This limitation is addressed by FsQCA, which enables us to determine several combinations of causative factors that result in the same outcome (Ragin, 2008). Moreover, business and management research has recognized its resilience to varying sample sizes and objectives, offering an investigative perspective that facilitates the deciphering of intricate management choices (Kraus, Ribeiro-Soriano, & Schüssler, 2018). The equifinality, multi-causality, and asymmetry of this methodology are its primary advantages (Fiss, 2011; Furnari et al., 2021).

Sample

The requirements to accomplish the stated objective and the descriptive statistics of the variable outcomes (average spending per

Table 2
Statistics and calibration for descriptive (summary) data.

Variables	Mean	Std. Dev.	Min	Max	Obs.	Calibration
Average spending per int'l tourist (US$)	456.3337	39.58289	399.5	530.5	18	(525;450;400)*
Enabling environment subindex, 1–7 (best)	4.530802	0.3813454	3.9142	5.2552	18	(5.2;4.5;4)*
T&T policy and conditions subindex, 1–7 (best)	4.539686	0.2733441	4.0073	4.95	18	(4.9;4.6;4.1)*
Infrastructure subindex, 1–7 (best)	3.344924	0.5591492	2.383	4.3222	18	(4;3.5;2.5)*
Natural and cultural resources subindex, 1–7 (best)	2.965352	1.201415	1.6101	5.6283	18	(5;2.75;1.75)*
Global Innovation Index	30.20222	4.36687	22.55	36.64	18	(36.5;32;24)*

* Cuts: 95%; 50% and 5%.

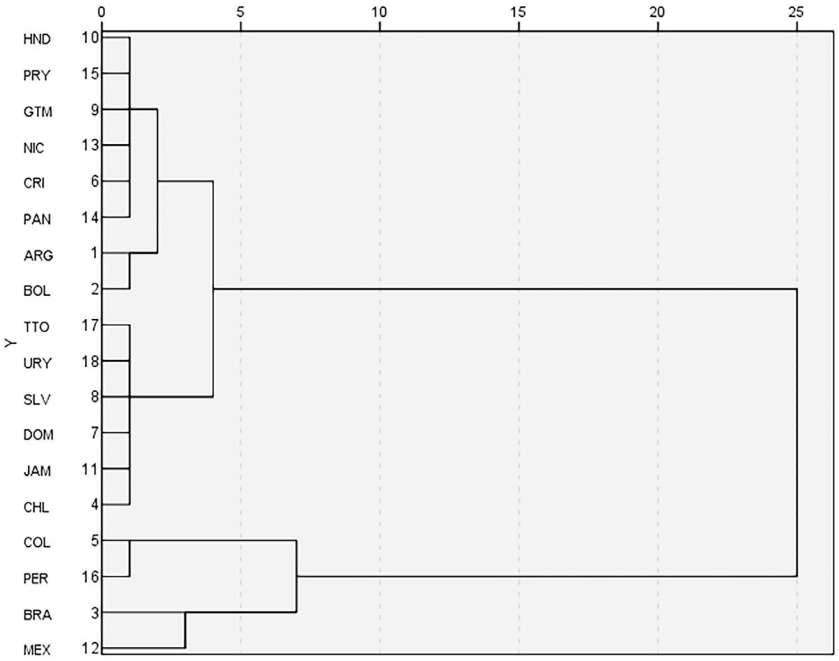

Fig. 2. Dendrogram, Ward's method.

international tourist) are displayed in Table 2. Argentina had the lowest international tourist receipts, whereas Uruguay had the highest average expenditure per foreign visitor in the sample, at 456.33 USD. Although it should be observed that the range of the enabling environment sub-index is higher, the sample averages for the T&T policy and conditions and enabling environment sub-indices, on a scale of 1 to 7, are very similar, with values around 4.5. The infrastructure index has the lowest maximum value compared to the other three sub-indicators on the scale of 1 to 7 used for the various T&T sub-indicators for Latin American countries; the greatest value observed is 4.32 and was recorded in Panama. Finally, among the sub-indices, natural and cultural resources had the largest ranges of any indicator. There was significant variation in the classification of the natural and cultural resources sub-index, with values ranging from 1.20 in Trinidad and Tobago to 5.62 in Mexico. It is noteworthy that the average value of the worldwide innovation index is 30.20, with Chile having the highest value (36.65) and Nicaragua having the lowest value (22.55). It is clear from these descriptive statistics that no nation dominates one indicator, highlighting the unique characteristics of tourism in this region.

Results

Cluster analysis and multidimensional scaling

As previously mentioned, the TTCI is organized into four sub-indices. The disaggregated data from the four sub-indices, with a total of 91 indicators, was analyzed using cluster analysis and multidimensional scaling, with the aim of identifying aggregations of countries with similar Tourism and Travel competitiveness profiles.

Cluster analysis using Ward's hierarchical clustering algorithm produced the dendrogram in Fig. 2, which shows two clusters: the four countries shown below - Colombia, Peru, Brazil, and Mexico - and the cluster of the remaining countries.

The data were also analyzed using another method of hierarchical aggregation: between-groups (average) linkage. The results are shown in Fig. 3.

As can be seen, the results are similar, which is not always the case when analyzing the application of different algorithms. Ward's method favors homogeneity within a cluster because it is designed to optimize the minimum variance within the cluster (Aldenderfer & Blashfield, 1984). The average linkage algorithm aims to achieve a compromise between single linkage solutions, which produce few clusters, and complete linkage solutions, which tend to produce many clusters (Kaufman & Rousseeuw, 1990).

To deepen the study, the data were analyzed with SPSS by applying multidimensional scaling as the analysis model and with the Proxscal algorithm. The Torgerson variant was selected for the initial configuration, and the Euclidean distance was used to measure the distance.

The result of applying the algorithm shows a stress of 0.00055 and dispersion that accounted for a Dispersion Accounted For (DAF) of 0.99945, which corresponds to a Tucker's congruence coefficient (ϕ) of 0.99973. These indicators are important for assessing the robustness of the solution by measuring the fit of the data and, thus, the reliability of the results obtained. The values presented are higher

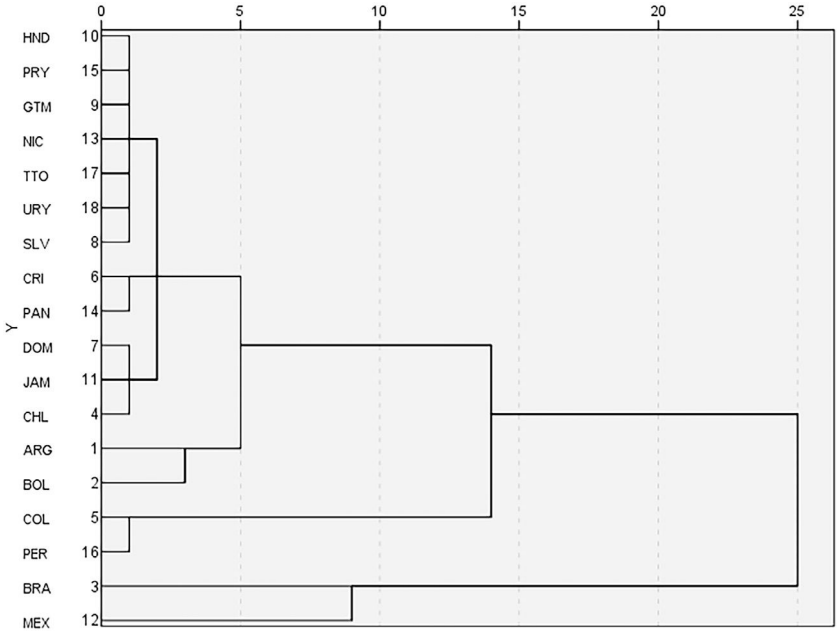

Fig. 3. Dendrogram, between-groups (average) linkage method.

than those of studies using the same technique (Proxscal), namely Lee, Kim, and Won (2018) in which ϕ of 0.97, Amin et al. (2022) in which ϕ of 0.99871, and da Silva, Medeiros, Gonçalves, and Gouveia (2022) in which ϕ of 0.94. The latter authors cite the literature to establish that studies with ϕ values higher than 0.90 are acceptable. Fig. 4 illustrates the distribution of the 18 countries in two dimensions.

Fig. 4 shows an aggregate on the left, which corresponds to a large cluster that is also visible in both dendrograms. Argentina and Bolivia, although on the periphery of this cluster, appear to be part of it. When analyzing the remaining four countries, the results seem to indicate that they can be considered to belong to the same cluster. Table 3 shows the average value for the TTCI and each of the subindices for the two identified blocks (BRA, MEX, PER, and COL versus the

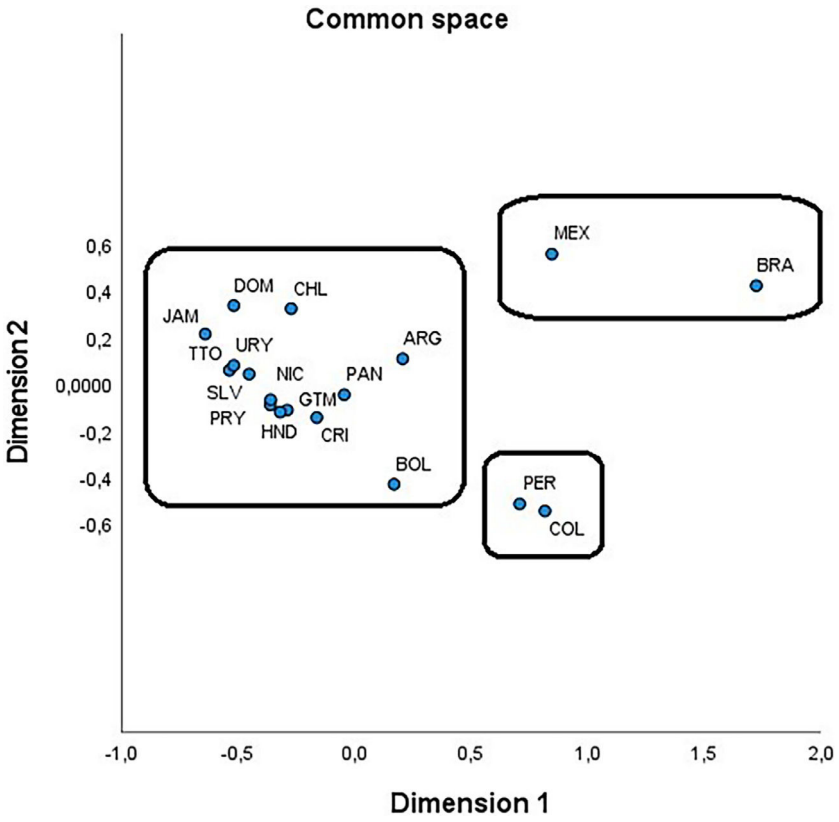

Fig. 4. Common space (MDS solution).

Table 3
Statistics for each cluster.

	TTCI	(TT-Environ)	(TT-Policy)	(TT-Infras)	(TT-Natural)
BRA	4.4564	4.5090	4.1771	3.5373	5.6023
MEX	4.6894	4.5300	4.5852	4.0140	5.6283
PER	4.1670	4.4716	4.7414	3.5609	3.8941
COL	4.0088	4.3836	4.7198	3.1209	3.8108
[average]	4.3304	4.4736	4.5559	3.5583	4.7339
[stand. dev.]	0.2621	0.0560	0.2267	0.3160	0.8820
ARG	4.1522	4.8539	4.0073	3.4255	4.3222
BOL	3.4959	4.1766	4.1785	2.5583	3.0700
CHL	4.1001	5.2023	4.7984	3.6060	2.7939
CRI	4.2682	5.0801	4.9500	3.8049	3.2378
DOM	3.7753	4.4388	4.6163	3.8226	2.2238
SLV	3.2321	3.9158	4.5927	2.6768	1.7429
GTM	3.3930	4.1176	4.5270	2.6831	2.2444
HND	3.4569	3.9142	4.8414	2.8824	2.1898
JAM	3.7493	4.5444	4.4767	3.9916	1.9844
NIC	3.4944	4.2943	4.7301	2.7579	2.1953
PAN	4.1937	4.7483	4.9187	4.3222	2.7854
PRY	3.2318	4.4145	4.2279	2.3830	1.9019
TTO	3.5832	4.7044	4.2613	3.7570	1.6101
URY	3.7658	5.2552	4.3646	3.3044	2.1389
[average]	3.7066	4.5472	4.5351	3.2840	2.4601
[stand. dev.]	0.3414	0.4300	0.2851	0.5973	0.6961

Table 4
Results of necessary conditions.

Outcome variable: fsASpIT			Outcome variable: ~fsASpIT		
Conditions tested:			Conditions tested:		
	Consistency	Coverage		Consistency	Coverage
fsTT-Environ	0.644550	0.646212	fsTT-Environ	0.580750	0.609570
~fsTT-Environ	0.610574	0.581778	~fsTT-Environ	0.662939	0.661314
fsTT-Policy	0.651094	0.643843	fsTT-Policy	0.625383	0.647438
~fsTT-Policy	0.643467	0.621309	~fsTT-Policy	0.655975	0.663109
fsTT-Infras	0.607320	0.608043	fsTT-Infras	0.540081	0.566098
~fsTT-Infras	0.566614	0.540603	~fsTT-Infras	0.626057	0.625346
fsTT-Natural	0.439854	0.495290	fsTT-Natural	0.634726	0.748262
~fsTT-Natural	0.776439	0.670006	~fsTT-Natural	0.571872	0.516638
fsGII	0.457500	0.507762	fsGII	0.636825	0.739956
~fsGII	0.765697	0.668197	~fsGII	0.576368	0.526579

remaining countries), which confirms the idea that there are only two clusters.

The results show that there are indeed common patterns in the competitive profiles of Latin American countries, with two distinct patterns identified (one that includes BRA, MEX, PER, and COL and the other that includes the remaining countries).

The results confirm that it is possible to identify common factors in the development of tourism in different countries, which makes it possible to design public policies on a similar basis for these countries, allowing us to admit that it is possible to design transnational policies in the field of tourism. Thus, Hypothesis 1 is validated, and it is likely that the same will happen for Hypothesis 2.

FsQCA results

We converted the variables into fuzzy scores, or values between 0 and 1, to calibrate the data(Fiss, 2011). Fuzzy scores represented the degree of membership (Woodside & Zhang, 2013). Pappas and Woodside (2021) adopted thresholds of 95%, 50%, and 5% in accordance with Ragin (2008), where 95% signified all cases of membership, 50% represented situations of ambiguity, and 5% represented cases of absence. In other words, scaling cases into meaningful groups that represent the level of spending per international tourist is mandated by the FsQCA. The degree ranged from zero (lower spending by international tourists) to one (higher spending by international tourists). The crossover point is indicated by a score of 0.5 (Ragin, 2008). Table 2 presents the calibration results.

Analyzing the necessary conditions to obtain the result is the next stage in the FsQCA methodology after the calibration process is complete. Every variable must contain the prefix "fs" before its name in order to identify the essential requirements. Testing for the existence and absence (where ~ denotes absence) of each model's independent variables is necessary.

If a condition is more than 0.9, it is deemed "necessary", and if it is more than 0.8, it is deemed "almost always necessary" (Fiss, 2011; Schneider, Schulze-Bentrop, & Paunescu, 2010). Table 4 shows that for average spending per international tourist, there are no necessary conditions.

The main goal of this study is to identify “recipes” to achieve higher average spending per international tourist in 2019 on Latin American region. Once the necessary conditions have been verified, the FsQCA methodology requires the truth table to be created, that is, the fuzzy set algorithm to be run. Obtaining the truth table made it possible to determine the necessary conditions for paths to high average spending per international tourist and for absence. Based on the suggestions of Cruz-Ros, Guerrero-Sánchez, and Miquel-Romero (2021) and Schneider and Wagemann (2012), an inclusion cutoff of 0.9 was used to compute both individual consistency and coverage and total consistency and coverage (Rihoux & Ragin, 2009).

Table 5
Results of intermediate solutions (outcome of informality and absence of ASpIT).

	fsASpIT		~fsASpIT		
Variables	1	2	1	2	3
fsTT-Environ	•	O	O	O	•
fsTT-Policy	o	•	O	•	O
fsTT-Infras		•	O	•	O
fsTT-Natural	O	•	•	O	•
fsGII	O	•	o	•	•
Consistency	0.961982	0.960562	0.973758	0.941584	0.963379
Raw coverage	0.323448	0.203357	0.245161	0.188534	0.249745
Unique coverage	0.221838	0.101748	0.064032	0.068689	0.052847
Overall solution consistency	0.952654		0.959621		
Overall solution coverage	0.425195		0.390129		

Note: • and o represent the presence and absence of a condition, respectively. Large circles indicate core conditions, and small circles indicate peripheral conditions. Blank spaces indicate “does not contribute to the configuration”.

Table 5 shows the results for the solution coverage and consistency, where each column represents a different configuration. A proportional reduction inconsistency (PRI) greater than 0.5 was also carefully examined considering the truth table to determine the necessary result criteria to prevent "false positives". Configurations with PRI scores of less than 0.5, which indicate a severe discrepancy, support the selection of this number (Greckhamer, Furnari, Fiss, & Aguilera, 2018). An identical process was carried out in the absence of the average spending per international tourist.

Causal configurations for average spending per international tourist (ASpIT) and absence of ASpIT

The main goal of this study is to identify “recipes” for a higher average spending per international tourist (ASpIT) in Latin America countries as well as “recipes” for its absence. We proceed to the following phase, which creates a truth table by executing the fuzzy set method. The examination of the "sufficient conditions" came before the consideration of the "necessary conditions." In this situation, pathways leading to ASpIT and those leading to its absence can be identified using "sufficient conditions" and causal configurations. Based on the suggestions of Cruz-Ros et al. (2021), Ding (2022), and Schneider and Wagemann (2012), an inclusion cutoff of 0.8 was used to compute individual consistency and coverage as well as total consistency and coverage. Table 5 lists the solution consistency and coverage for the ASpIT (each column denotes a distinct path). A PRI greater than 0.5 was also carefully examined considering the truth table to determine the necessary result criteria to prevent "false positives". Configurations with PRI scores of less than 0.5, which indicate a severe discrepancy, support the selection of this number (Greckhamer et al., 2018). The same process was repeated in the absence of ASpIT.

> "The complex", "the parsimonious", and “the intermediate solution” are the three results that the software displays. It is implied that these solutions enable the achievement of a greater ASpIT based on the "intermediate solution" that the program offers.

The findings emphasize a few key points: a pronounced trend of high independent variable values and "core" conditions. It is evident that there is an opposition between configurations 1 and 2. In the first solution, variable "TT-Environ" must have high values along with low values for variables “TT-Policy”, “TT-Natural”, and “GII” for “ASpIT” to have high values. The opposite is true for the second configuration.

In the absence of ASpIT, the output presents three solutions. Notably, the predominance of low values of the variables TT-Environ, TT-Policy, TT-Infras, and TT-Natural behaved similarly, with TT-Policy and TT-Infras having low values and TT-Natural having high values and vice versa. Every result for overall coverage, individual consistency, and overall consistency was higher than what Greckhamer et al. (2018) suggested.

The following results are consistent with the FsQCA’s assumptions (Fiss, 2011). Three concepts were identified: (1) equifinality, which occurs when more than one combination of conditions can result in fs TT-Infras and ~fsASpIT; (2) that different causal configurations can lead to the same result (various routes were discovered to reach fsASpIT and ~fsASpIT); and (3) asymmetry, which occurs when the conditions of the outcome are different from those of its absence.

These findings definitively confirm Hypothesis 2 and also validate Hypothesis 3.

Discussion

Theoretical contributions

When cross-country and cross-border tourism assert themselves, understanding how tourism is regionally competitive is a determining factor in the establishment of public policies, especially those based on innovation and development. With this in mind, this study aimed to answer two questions:

Q1. Are there similarities in the tourism development profiles of different countries in Latin America that would allow for the design of common and specific tourism policies geared toward innovation and growth for each profile?
Q2. If common profiles (regional clusters) exist, which determining factors have boosted the recent evolution of tourism performance?

The study focused on a group of Latin American nations, and the findings of the cluster analysis, when combined with multidimensional scaling, allowed us to conclude that groups of nations with comparable circumstances regarding their ability to compete in the travel and tourism industries have been discovered. The findings depicted in Figs. 2–4 indicate a cluster of 14 nations that are comparatively similar and represent the least competitive nations (see Table 3). Apart from this cluster, there is an additional slightly more diversified group of countries (Brazil, Mexico, Peru, and Colombia) that correlates with highly developed tourism.

The existence of these clusters enables the design of specific tourism innovation promotion policies for each cluster.

FsQCA was utilized in the second section of the study to assess the variables affecting each nation’s competitive standing. According to this study, three configurations place a competitive position in jeopardy or compromise and two configurations result in strong competitive positions.

It is evident that the fsTT-Environ variable, or enabling environmental factor, is a decisive factor for competitiveness with respect to the configurations that result in strong competitive positions. If it is strong, even with weaknesses in other variables, the sector asserts itself in competitive terms. However, if the values of this variable are low, only a combination of high values for the other variables (fsTT-Policy, fsTT-Infras, fsTT-Natural, and fsGII) leads to strong competitive positions.

Three main configurations exist for the set of conditions that result in the absence of competitive positions. The first demonstrates that if all other variables are weak, the fsTT-Natural variable—natural and cultural resources—by itself cannot ensure the sector's competitiveness. The country's competitive position will remain weak if the fsTT-Environ and fsTT-Natural variables simultaneously exhibit poor results, even if all other variables show good results. This is demonstrated by the second configuration. Finally, if deficiencies in the fsTT policy and infrastructure factors are combined simultaneously, the nation's competitive position in terms of tourism will remain competitive.

These results allowed us to answer the research questions. In both cases, the responses were clear and positive.

There are similarities in the tourism development profiles of different Latin American countries, which allow for the design of common and specific tourism policies aimed at innovation and growth in each profile.

Additionally, the study identified the determining factors of competitiveness in tourism. The enabling environment factor is a determining factor for competitiveness and is strong even with weaknesses in other variables. If the enabling environment is weak, only a coalition of factors (strong positions in the dimensions of TT-Politics, TT-Infrastructure, TT-Natural, and innovation [GII]) will lead to strong competitive positions.

Implications

The observations drawn from this study have several implications for public policies and strategies related to innovation and tourism development in the Latin American nations examined. Here are some key implications:

1) Differentiated Tourism Policies:

The identification of clusters with similar tourism development profiles suggests that a one-size-fits-all approach to tourism policies may not be effective. Policymakers should design specific policies to promote innovation in tourism for each identified cluster, considering their unique circumstances and challenges.

2) Focus on Competitive Factors:

This study emphasizes the importance of the fsTT-Environ variable (enabling environmental factors) in determining a competitive position. Policymakers should prioritize actions to create and maintain a strong enabling environment for the tourism sector. Understanding the factors that contribute to a strong competitive position, as highlighted by the study, can guide policymakers in formulating targeted interventions.

3) Holistic Approach to Policy Design:

This study underscores the need for a holistic approach to policy design, considering multiple variables, such as fsTT-Policy, fsTT-Infras, fsTT-Natural, and fsGII. Policymakers should recognize the interaction between these variables and work toward comprehensive policies that address various aspects of the tourism ecosystem.

4) Addressing Weaknesses in Specific Variables:

This study identifies configurations that result in the absence of competitive positions, highlighting scenarios in which specific variables such as fsTT-Natural or fsTT-Environ exhibit weaknesses. Policymakers should focus on addressing these weaknesses, recognizing that the absence of competitiveness can be influenced by deficiencies in specific variables, even if others show good results.

5) Strategic Planning for Highly Developed Tourism Nations:

For countries identified as part of a more diversified and highly developed group, such as Brazil, Mexico, Peru, and Colombia, strategic planning should consider their unique circumstances. Policymakers in these nations can leverage their comparative advantages and continue investing in areas that contribute to high tourism development.

6) Continued Monitoring and Adaptation:

These findings highlight the dynamic nature of the competitive positions in the tourism sector. Policymakers should establish mechanisms for continuous monitoring of variables and configurations that impact competitiveness, allowing for timely adjustments and adaptations in response to changing circumstances.

In summary, this study suggests that tailored, comprehensive, and dynamic tourism policies are pertinent for fostering innovation and growth in the tourism sector, considering the specific development profiles and competitive factors identified in the clusters of Latin American nations.

Limitations and further research

As with any study, this investigation has limitations and offers avenues for future research. From a constraint perspective, the first factor was related to the selected sample. Not every country in Latin America has access to the selected indicators. Another issue to consider is that 2019 was selected to represent the competitiveness of tourism in this group of countries because it is impossible to examine how nations have changed over time in terms of their level of competitiveness in this area using data from a single year. Another limitation of the study is that we chose to work with aggregated variables. If we had worked with disaggregated variables, it might have been possible to capture other phenomena that might have been hidden due to data aggregation. Finally, the techniques employed have specific limitations.

In terms of further research based on this work, studies could be conducted in other areas in which tourism plays a major role in the economies of these nations, including Southeast Asia and the Mediterranean region of Europe. Long-term research should also be conducted to understand how public policies in this area have changed in different nations over time. Understanding the effect of COVID-19 on travel in these nations is also crucial as it determines whether any indicators have improved or worsened because of this extraordinary event that has influenced all forms of economic activity, including travel. The use of disaggregated data for the variables used in this study may be interesting for capturing any particular phenomenon that may have passed through this analysis.

Finally, the link between competitiveness and innovation in the tourism sector, particularly within the regional framework provided in this study, has considerable potential for further research.

Conclusions

This work was inspired by the challenge posed to academia by UN Tourism's creation of an office to develop regional innovation in

tourism. A gap was identified in the existing literature: there is little structured knowledge on the dynamics of regional and cross-border innovation in tourism.

This study used data from the Travel and Tourism Competitiveness Index (TTCI) and Global Innovation Index to test the factors of competitiveness in tourism. The combination of cluster analyses, MDS, and FsQCA made it possible to answer the two research questions posed in the affirmative and identify the enabling environment (business environment, safety and security, health and hygiene, human resources and labor market, qualification of the labor force, labor market, and ICT readiness) as the determining factors for competitiveness in tourism.

The study thus allowed us to evaluate our hypotheses.

Hypothesis 1. Although tourism is fundamentally a nationally based activity, it is possible to identify common factors in the development of tourism in different countries that allow for the design of public policies on a similar basis.

These results confirm that there are common factors in tourism development in different countries that allow public policies to be designed on a similar basis.

Hypothesis 2. Transnational policies can be designed to promote tourism.

Again, these results confirm the possibility of designing transnational tourism policies.

Hypothesis 3. Regional innovation in the tourism sector is pertinent for enhancing cooperation, networking, and economic development.

Additionally, the results confirm the possibility of establishing regional cross-border innovation policies for tourism.

The study's conclusions have obvious consequences for practitioners. First, they validate UN Tourism's choice and provide clues as to how they can carry out their work.

This study has implications for the body of knowledge on innovation. A relevant element for establishing innovation policies is the national innovation system (i.e., the national dimension). When considering regional elements, we usually refer to subnational dimensions. This study shows that there is a supranational regional dimension that can also be considered.

Declaration of competing interest

The authors declare that I have no conflicts of interest related to the submitted research for Journal Innovation Knowledge. The authors have not received financial support or compensation from any organization with a direct or indirect interest in the findings, and they have no personal relationships that could pose a conflict. The commitment is solely to the objective and unbiased advancement of knowledge.

CRediT authorship contribution statement

José Dias Lopes: Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **João Estevão:** Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation.

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