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The role of culture in shaping tourism demand: evidence from panel data analysis of European living labs

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Abstract: The aim of this paper is to examine the role of culture in driving tourism demand across 35 local units within six European living labs. While prior research often relies on UNESCO World Heritage Sites as the sole proxy for culture, this study broadens the scope to include nationally protected sites, intangible cultural heritage, cultural infrastructure, cultural enterprises, and three cultural governance indices: policy support, institutional presence, and strategic planning. Based on dynamic panel data from 2007 to 2019, the findings reveal that cultural resources and the number of cultural enterprises have a positive effect on tourism demand, while cultural infrastructure produces mixed results. Stimulating culture through cultural businesses and government expenditure also supports tourism demand. Furthermore, all three cultural governance indices demonstrate positive and significant impacts. The results of our research indicate that successful cultural tourism development relies not only on cultural assets but also on their effective governance and management. In this context, the living lab model serves as a valuable collaborative platform for developing integrated, sustainable, and inclusive cultural tourism strategies in small-scale EU regions.

Keywords: cultural tourism, cultural indicators, tourism demand, panel data analysis, European living labs

Introduction

Tourism is one of the fastest growing economic sectors in Europe, contributing significantly to GDP, investments, employment, and social development in general (Perles-Ribes et al., 2024; Šimundić, 2022). As reported by the World Travel and Tourism Council (WTTC, 2024), tourism was a significant contributor to the European Union's economy in 2019, accounting for 10.4% of the GDP and providing 10.5% of total employment. Although the COVID-19 pandemic impacted the industry, tourism still held considerable weight in 2023, accounting for 9.1% of the EU's GDP and 10.0% of employment, with projections indicating further growth.

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While these economic issues have received increased attention in research on tourism demand (Yazdi & Khanalizadeh, 2016), especially in the context of developing exploratory models of tourism demand, cultural factors remain underexplored (Wu et al., 2017). The benefits of culture for the individual and the wider community are often difficult to evaluate, and applicable methodologies will depend primarily on the cultural context and social support for cultural heritage. In the context of seeking ways of evaluating cultural resources as economic resources, tourism is considered one of the key ways of commercialising cultural resources. This is the so-called "attraction paradigm" that explains the role of cultural resources in the tourist dynamics of certain areas (ESPON, 2019; Greffe & Noya, 2005; Jansen-Verbeke, 2009). The general agreement is that a diverse cultural offering in a destination can increase its attractiveness to tourists and provide economic benefits (González Santa-Cruz & López-Guzmán, 2017; Jiménez-Naranjo et al., 2016). However, most studies that have analyzed the impact of cultural offerings on tourism have focused solely on World Heritage Sites (WHS). These studies have examined the effects of being listed as a WHS on tourism demand (Canale et al., 2019; Huang et al., 2012; Patuelli et al., 2013; 2014; Su & Lin, 2014; Yang et al., 2010), performance (Cuccia et al., 2016), seasonality (Cuccia & Rizzo, 2011), and potential negative impacts resulting from tourism (Groizard & Santana-Gallego, 2018).

According to Panzera (2022), more research is needed on the relationship between cultural resources and tourism attractiveness due to three main reasons: (i) previous empirical analyses have produced mixed results, (ii) various methodologies have been used, and different geographic regions have been considered, leading to difficulties in comparing results (Panzera et al., 2021), and (iii) most studies have focused on cultural heritage as the primary factor that attracts tourists, usually measured by the number of United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Sites (Yang et al., 2019).

All of this underlines the necessity of exploring additional cultural dimensions, such as intangible cultural heritage, nationally protected sites, cultural infrastructure, cultural enterprises, and aspects of cultural governance, which remain largely overlooked (Bak et al., 2019; Bertacchini & Dalle Nogare, 2021; Petrić et al., 2021). Moreover, prior research has predominantly concentrated on national or regional levels, often neglecting the municipal perspective (García del Hoyo & Jiménez de Madariaga, 2024). Several authors also note that quantitative approaches in cultural tourism economics, particularly at the local level, are limited and yield less conclusive evidence (Dalle Nogare & Devesa, 2023; Falk & Hagsten, 2022).

This study aims to extend research on various cultural variables and explore the relationship between culture and tourism demand at the local level using a quantitative panel data analysis. Specifically, we ask: *How do different cultural dimensions, such as UNESCO and nationally protected tangible and intangible heritage, cultural infrastructure, cultural enterprises, and cultural governance, influence tourism demand at the municipal level?*

This paper adds to the body of literature in several ways by addressing our research question. Firstly, whereas most research on culture and tourism relies on a single indicator, typically UNESCO World Heritage sites (Cuccia et al., 2016; Mariani & Guizzardi, 2020; Muštra et al., 2023; Yang et al., 2019), recent work (Cellini & Cuccia, 2019; Kuliš & Šimundić, 2025; Panzera et al., 2021) has broadened the focus to include intangible cultural heritage, national heritage sites, and cultural infrastructure. Inspired by these findings, we concurrently consider diverse cultural resources and infrastructure.

Secondly, following Cuccia and Rizzo (2011), who observed that cultural resources alone are insufficient for cultural tourism without effective organization, management, and funding, we incorporate measures such as the number of cultural enterprises and government expenditure on culture per inhabitant. Additionally, we develop three indices of cultural governance (structural support for cultural institutions, policy measures supporting the cultural sector, and collaborative strategic planning in cultural tourism) complemented by government spending on culture per inhabitant, an aspect seldom addressed in empirical research. Different cultural indicators and indices performed in this paper are based on the research conducted in the context of the HORIZON 2020 SmartCulTour project.[4]

Thirdly, the analysis is conducted on the sample proposed in the aforementioned project, which consists of six living labs (LL) encompassing over thirty micro-destinations in Belgium, Croatia, Finland, Italy, the Netherlands, and Spain. The research on the relationship between culture and tourism is often limited to a single destination, resulting in highly specific findings that are difficult to generalize (Afrić Rakitovac & Urošević, 2023; Tolić Mandić et al., 2024). Such studies can inform policy recommendations for that particular location or similar destinations. Another group of studies examines multiple regions or destinations within a single country (Cerisola, 2019; Cuccia et al., 2016; García del Hoyo & Jiménez de Madariaga, 2024), yet the general conclusion is that it is difficult to draw broad generalizations. In contrast, research at the country level, which employs large geographical units such as nations (Eugenio-Martin et al., 2004; Groizard & Santana-Gallego, 2018; Škrabić Perić et al., 2021) or NUTS 2 regions (Llorca-Rodríguez et al., 2020; Panzera et al., 2021), yields more generalizable results; however, it is very difficult to measure the impact of specific tangible or intangible heritage on an entire country or NUTS 2 region. It is evident that the effect of heritage is stronger and more visible in the local units where the heritage site is located (Al-Bqour, 2020; Bertacchini et al., 2024; Van Balen & Vandesande, 2016). Finally, to obtain more precise and generalizable results, Noonan (2023) suggests that smaller geographical

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units, such as cities, should be considered across countries. In this paper, we adopt Noonan's (2023) approach.

This study's framework integrates a wide range of site-specific cultural resources, infrastructure, enterprises, and governance policies with tourism demand outcomes, using data from over thirty municipal units across six European LLs. This means that this localized strategy emphasizes not only the relevance of LLs as a data source but also the uniqueness of examining how tourism demand at a more granular geographic level is shaped by culture's several roles.

The remaining paper is structured as follows: Section 1 provides theoretical background, while Section 2 describes data and methodology. Section 3 provides empirical results and discussion and finally, last section provides concluding remarks.

1. Theoretical background

Cultural tourism is a complex phenomenon. Its interdependence with other sectors of the modern economy and society makes it a major driver of development in European regions (ESPON, 2019). The cultural sector has been found to be a powerful driver of tourism development and a key attraction for visitors (UNESCO, 2018; 2019; UNWTO, 2018). Conversely, tourism is embedded in the socio-economic life of a destination and generates funds for the conservation, restoration, and cultural production of the visited places (ICOMOS, 1999; Richards, 2018). This is supported by indicators and data provided by UNESCO (2019).

In studying the impact of culture on tourism demand, UNESCO World Heritage Sites are often used as a proxy for tangible cultural heritage. However, the literature on this subject presents varying results. For instance, a recent study by Škrabić Perić et al. (2021) on the impact of cultural indicators on tourism development in the EU states, found that the number of UNESCO Heritage Sites did not significantly affect the number of tourism overnights, but had a positive effect on international tourism receipts and tourism employment. The inclusion of government expenditure on culture and employment in the cultural sector as control variables also produced significant positive effects on tourism development indicators. On a regional level, Panzera et al. (2021) discovered that UNESCO cultural World Heritage Sites have a positive impact on the number of international tourists visiting European NUTS 2 regions. Several other studies support a significant link between the presence of UNESCO World Heritage Sites and tourism demand (Canale et al., 2019; Castillo-Manzano et al., 2021; Patuelli et al., 2013; Su & Lin, 2014; Yang et al., 2010). However, Huang et al. (2012) found no significant impact of world heritage on tourist arrivals in Macau, in line with Cellini's (2011) argument. A more recent study by Noonan (2023) demonstrated that other cultural amenities, such as cultural institutions and cultural events, have a positive influence on tourism demand in 168 European cities.

Studies on cultural tourism have shown that museums are important attractions for tourists and can contribute to local economic growth and development. Superstar museums, in particular, have been the focus of analysis in this regard (Frey, 1998; Frey & Meier, 2006; Plazza, 2008). However, a time-series analysis conducted in the Italian context by Cellini and Cuccia (2013) found that museums cannot play a significant role in attracting tourists in the long-run. Instead, they may only have an impact on the average length of stay in the short-run. Nonetheless, museums still remain an important part of cultural tourism and continue to receive attention in research. Mommaas (2004) emphasises that a high level of cultural institutions can attract small companies in the cultural and creative sector businesses because they can take advantage of networks or clusters derived from the highly developed cultural institutions in the local area.

Panzera's (2022) research confirms that the value of cultural heritage is heavily influenced by the location in which it is situated. Camagni et al. (2020) argue that the impact of cultural heritage on local development is dependent on its interaction with other elements of territorial capital, particularly the intangible territorial components like creativity, identity, and quality of governance. The need for cultural governance has also been recognized by Su and Cai (2011) as essential to go beyond the aesthetic value of culture and to embrace its multidimensional applications. Cerisola's (2019) work suggests that creativity, in all its forms, can act as a mediator, enabling communities to fully capitalize on cultural heritage for economic gain. In her study of the Italian provinces at the NUTS 3 level, she found that cultural heritage indirectly affects economic performance by boosting artistic and scientific creativity.

It is crucial to understand that the overall quality of cultural tourism experiences and the competitiveness of cultural tourism destinations depend on more than just the intrinsic value of the cultural heritage itself. It is essential to consider the cultural resources in the broader context of other complementary resources and infrastructure (Wall, 2009).

Additionally, the emergence of new forms of consumption and production, especially in the context of creative economies, increases the importance of cultural resources, including both tangible and intangible aspects of cultural heritage (Romão, 2020). As a result of new social and economic trends, travel patterns and spatial organization of tourist flows and tourism development, are changing (Coccossis, 2009). The abundance and diversity of cultural resources represents a strong competitive advantage in attracting potential visitors (Girard & Nijkamp, 2009), being in the focus of researchers as powerful factors of territorial attractiveness and competitiveness (Panzera, 2022).

Cultural tourism, leveraging local knowledge, skills, and resources, is increasingly viewed as an effective means of driving social inclusion, innovation, resilience, and recovery (Kuliš et al., 2024; Mandić et al., 2025). In this context, the LL approach fosters collaboration among stakeholders to integrate cultural tourism

with sustainability and resilience through cocreation (Mandić et al., 2025; Neuts, 2023). As Mandić et al. (2024) explain, LLs represent an innovative model of research and development, bridging theoretical frameworks and practical experiences through the active involvement of communities and stakeholders. Characterized by public-private-people partnerships (4Ps), these Labs provide environments for conceiving, prototyping, validating, and testing groundbreaking technologies, services, and systems. Local-level units that take part in these larger LLs benefit greatly from LLs' ability to adapt their efforts to local needs and varied stakeholder expectations as a result of co-design in real-world settings (Mandić et al., 2024; Neuts, 2023).

Various attempts have been made to measure the significance of culture and creativity in development contexts, given the complexity of cultural production and consumption processes. A survey of related literature revealed different approaches, methods, and indicator types, primarily resulting from the diverse interpretation of the term culture and its role in tourism development (Petrić et al., 2020). While most papers examined selected cultural indicators, such as Ortega-Villa and Ley-Garcia (2018), a limited number have proposed composite cultural indicators for measuring cultural performance in destinations of various types and territorial scopes (Montalto et al., 2019; Vecco & Srakar, 2018, as cited in Petrić et al., 2020). The Cultural and Creative Cities Monitor (CCCM), which provides a more comprehensive conceptual framework of a dataset, acknowledges that a culture-based development approach should be based not only on a flourishing creative economy but also on a socially and culturally inclusive environment (Montalto et al., 2019).

Additionally, in its *Culture 2030 Indicators* document, UNESCO (2019) presents a system of cultural (development) indicators. In this document, 22 indicators are developed and grouped into four thematic categories: (i) Environment and Resilience, (ii) Prosperity and Livelihoods, (iii) Knowledge and Skills, and (iv) Inclusion and Participation. Notably, this framework also aligns with the five core principles of the 2030 Agenda (People, Planet, Prosperity, Peace, and Partnerships).

According to a detailed literature review conducted in the framework of the Horizon2020 SmartCulTour project (Petrić et al., 2020) about the relationship between culture and tourism indicators, it seems that the CCCM, as well as UNESCO's Culture 2030 Indicators framework (2019), cover most of the relevant indicators. Therefore, we decided to follow this approach of the SmartCulTour project (Petrić et al., 2020), based on a review of existing methodologies, mostly involving CCCM, UNESCO's Culture 2030, and other research literature where culture was operationalized through various, mostly spatial indicators, for measuring different aspects of culture.

A framework of 45 indicators, organized into four thematic dimensions, was the project's output. Each dimension, at the second level, contains multiple subgroups of indicators or standalone indicators. The groups are: (i) Spatial Indicators, which include the availability of cultural infrastructure and the presence of cultural resources;

(ii) Prosperity and Livelihood, which considers employment, cultural (tourism) businesses, and cultural governance (financial frameworks, institutional frameworks, and policies); (iii) Knowledge, which includes education in tourism management and cultural education; and (iv) Inclusion and Participation, which covers visitors (cultural events, museums, and attractions), participatory processes, and social cohesion. At the third level, there are only standalone indicators.

2. Data and methodology

To explore in more detail the role of different cultural segments in tourism demand, this paper employs cultural subindices and variables developed according to the methodology proposed by the SmartCulTour Project (Petrić et al., 2020; 2021). As previously explained, based on an extensive literature review within the mentioned project, our initial framework for constructing a cultural index divides indicators into four groups: (i) Spatial Indicators, (ii) Prosperity and Livelihood, (iii) Knowledge, and (iv) Inclusion and Participation. However, the data for the Inclusion and Participation group were obtained via surveys and were available only for one year, while the data for Knowledge indicators were not available at the local level. Therefore, this paper focuses on the first two groups of indicators.

From the Spatial Indicators group, we utilize two subindices: the Presence of Cultural Resources and the Availability of Cultural Infrastructure. From the Prosperity and Livelihood indicators related to cultural business, we use the Number of Cultural Enterprises indicator. Unfortunately, the variable Cultural Employment was excluded from the model, as consistent local-level employment data across all LLs were not available. Government expenditure is measured by using Government Expenditure on Culture per Inhabitant. Finally, three governance-related subindices are constructed: Cultural Governance (Institutional Framework), Cultural Governance (Policies), and Cultural Tourism Governance.

A comprehensive analysis was conducted across 35 small-scale destinations (cities and municipalities) located in six European countries: Italy, Spain, The Netherlands, Belgium, Finland, and Croatia, covering the years 2007 to 2019. The research involved gathering both quantitative and qualitative data from official statistics and local units. The qualitative data, particularly those related to policies and strategies at the local unit level, required a detailed review by each research partner. Each partner was responsible for collecting data from 2007 to 2019. After multiple consultations and rounds of data collection, it was decided to exclude indicators with fewer than 60% of observations. During the data collection process and due to data availability constraints for longitudinal analysis, the number of indicators was reduced from 45 to 23. However, with the available indicators, we constructed specific subindices and conducted a concise analysis.

The first step in indices construction was the normalisation of data because our original data was in different numerical scale. Additionally, for all indicators, higher

values signify better outcomes, meaning that increased amounts of the variables are associated with positive results and contribute favourably to the index score.

Therefore, for normalization, the linear max-min method is used. After normalization, all variables are on the same scale in the range from 0 to 1, and all variables are comparable and suitable to aggregate (Pollesch & Dale, 2016). In the report (Petrić et al., 2020; 2021) on cultural indicators, the Analytical Hierarchy Structure (AHP) on three levels, is formed. In this paper, we tried to use the same structure.

Data are not available for some indicators and the structure is adjusted. The weights on all three levels are obtained by using the Saaty scale. The Saaty scale is popular because it compares each pair of indicators without concern for other indicators (Saaty, 1990). Experts compare each two indicators on the same level and give one grade of the Saaty scale. In this paper we have not constructed one cultural index but 5 indices from indicators on the third level and, also, we have two stand-alone indicators: Number of cultural enterprises (CENT) and General government expenditure on culture per inhabitant (CEXP). The expected signs of all single variables are positive, indicating that higher values of the variable are associated with better outcomes and positively contribute to the index score.

Table 1. Variable explanation

Variable	Definition	Expected Sign
TOUR_pc	Tourism Arrivals per Inhabitant (local)	Dependent variable
Daily_km	Daily Number of Tourists per 1 km^2 (local)	Dependent variable
REVpc	Revenues of Local Government in EUR per Inhabitant (local)	+
POP	Population (local)	+
WGI	Governance (national)	+
EDU	Education (NUTS 2 level)	+
CENT	Number of Cultural enterprises	+
CRES	Presence of Cultural Resources (index)	+
CINF	Availability of Cultural Infrastructure (index)	+
CINS	Cultural Governance (Institutional Framework, index)	+
CPOL	Cultural Governance (Policies, index)	+
CTGOV	Cultural Tourism Governance (index)	+
CEXP	General Government Expenditure on Culture per Inhabitant	+

Source: authors' compilation based on Petrić et al. (2021)

The **CRES** was formulated by equally weighting four spatial indicators, each assigned a weight of 0.25 to reflect their equal importance. These variables are: the

number of monuments listed in national registries, the number of intangible cultural heritage elements recognized nationally, the number of UNESCO World Heritage Sites, and the number of entries on UNESCO's lists of intangible cultural heritage. All these variables are maximized in the index formulation, indicating that higher values denote a richer cultural resource base, which is favourable for tourism attraction. Cultural heritage as material and immaterial expression of the local culture has an important role as a potent driver of tourism development and has been thoroughly examined in empirical research.

Additionally, various cultural dimensions play a crucial role in making a tourism destination appealing. As highlighted by UNESCO (2015), cultural institutions have immense potential to elevate public awareness about the importance of cultural heritage and to motivate residents to participate in its preservation and dissemination. Museums are especially acknowledged as drivers of social and economic progress; they generate knowledge pertinent to society, offer platforms for community interaction and dialogue, and function as sources of creativity and innovation that invigorate the local economy (Organisation for Economic Co-operation and Development [OECD] & International Council of Museums [ICOM], 2018). The **CINF** assesses the availability and density of cultural facilities relative to population size, with measurements standardized per 1,000 inhabitants to ensure comparability across different regions. The number of museums was assigned the highest weight of 0.538961, underscoring its critical role in the index formulation. The number of theatres was assigned a weight of 0.297258, while the number of public libraries was assigned a weight of 0.163781.

With technology rapidly advancing, reshaping how businesses operate, creativity has become a key factor for companies striving to retain their market advantage (Cerisola, 2019). To explore this dynamic, we have incorporated **CENT** as an independent variable (a standalone indicator with a full weight of 1.0) in our model to assess whether enterprises within the creative and cultural sectors influence tourism demand. The creative industries, marked by significant growth potential, intertwine artistic innovation with research, technological progress, and forward-thinking strategies.

Sustainable use of different cultural resources in cultural tourism requires responsible policy of protection and creativity in product development. Analysing the question of whether the use of cultural goods can be compatible with their protection and the sustainable development of the territory to which the heritage belongs, Nijkamp and Riganti (2008) point out that the answer is to manage cultural heritage and to "optimise the use of this category of non-renewable resources". A significant portion of research exploring the influence of culture on tourism appeal emphasizes that priority should be given to frameworks and guidelines that focus on fostering cultural growth and enhancing cultural tourism (Sacco & Crociata, 2013; Throsby, 2007). The need for cultural governance has been recognized as essential to go beyond the aesthetic value of culture and to embrace its multidimensional

applications (Su & Cai, 2019). This involves harmonization of areas of different policies and resources; establishing appropriate frameworks for horizontal coordination between all actors involved in the development processes, vertical coordination between all administrative levels and coordination between the different sectors. Finally, the integral management model requires the understanding of the dynamics of cultural tourism and territorial features and social conditions. To outline all of these issues regarding cultural and tourism governance, these proxies have been used: CINS, CPOL, CTGOV and CEXP.

In the **CINS**, we assessed the structural support for culture by considering variables such as the existence of a Ministry of Culture or equivalent at the national level, the presence of local authorities responsible for culture, the existence of a culture-based regulatory framework, and examples of inter-ministerial initiatives designed to enhance the culture's impact across various sectors like tourism, education, and communication. Each of these variables was assigned a weight of 0.230769, except for the use of Destination Management Organisations (DMOs) to manage the tourism's impact on cultural values, which was weighted at 0.076923.

The **CPOL** focused on the specific policy measures in place to support the cultural sector. The analysis considered several factors, including the existence of strategic plans for cultural management or similar policy documents. It also examined specific initiatives aimed at boosting employment in the creative and cultural industries. Efforts to legalize and expand micro, small, and medium-sized cultural businesses were included, along with governmental policies regulating financial support and subsidies for cultural activities. Additionally, tax regulations affecting the cultural sector were part of the variables assessed. The weights assigned to these variables were 0.259855 for the first three, 0.138261 for public assistance regulations, and 0.082174 for tax policies.

The **CTGOV** evaluated the collaborative efforts and strategic planning in managing cultural tourism. The variables considered were coordination among public tourism administrations at different government levels, establishment of cooperative and collaborative public-private relationships regarding cultural tourism (such as partnerships with entrepreneurs and chambers of commerce), cooperation with nongovernmental actors and networks, and evidence of cultural tourism strategic documents at the local level. Each of these variables was equally weighted at 0.25.

Lastly, the government commitment to culture was further reflected through the **GEXP**, included as a standalone indicator with a weight of 1.0. This variable is to be maximized, as higher government spending per capita indicates a stronger investment in cultural development, preservation, and accessibility, which can positively influence a destination's attractiveness to tourists.

The paper focuses on culture, expressed through a range of indicators as previously detailed, as the central independent variable, while the variable of interest on the dependent side is tourism demand. In the field of tourism economics, various proxies are often used to measure tourism demand, such as the number of arrivals by

tourists, total overnights spent in accommodation facilities, length of stay, as well associated receipts or expenditures (Šimundić, 2022). The constraints in temporal and spatial data resolution restrict the ability to provide a detailed characterization of tourism. To address this issue, Batista e Silva et al. (2018) proposed more precise indicators known as tourism intensity and tourism density. Tourism intensity is defined as the relative significance of tourism for an administrative area, calculated by the ratio of tourism demand to the resident population. The concept of tourism density evaluates the volume of tourist visits or overnight stays within a particular spatial area, like a square kilometre, thereby offering a more detailed geographical breakdown of tourism activity in a region. Consequently, these two indicators are used as proxy variables in this study.

After defining the dependent variable and our main independent variable of interest, cultural tourism, we also include control variables in our model. As Erjavec and Devčić (2022) pointed out, some of the most important determinants of tourism demand include tourists' income, population, and level of education.

Almost all tourism demand papers include some indicators of income. At the country level, income is usually represented by indicators such as GDP per capita, which is the most frequently used (Martins et al., 2017; Song et al., 2012). In most studies, GDP has a positive influence on tourism. However, since this paper focuses on local units rather than countries, we use revenues of local government in EUR per inhabitant as an indicator. This indicator reflects the development and autonomy of a local unit, and we anticipate a similar positive correlation.

The second control indicator for local units is population. Song et al. (2012) indicate that the origin population is important for tourism demand, although it is often omitted. Nadal and Gallego (2022) suggest that population is a measure of destination size. The existing empirical research that includes population generally finds a significant effect. However, the sign of the population variable varies across studies. For example, Weng et al. (2022) found that population has a positive impact on overnight visitors, while it has a negative effect on the perceived quality of a place. Additionally, Nadal and Gallego (2022) found that population is often used in gravity models and, in most empirical research, has a positive effect. Given the large heterogeneity in the size of local units in our sample, it was necessary to include population to control for the size effect.

As an indicator of human capital, we use the percentage of the population with tertiary education, measured at the regional level (NUTS 2), as data is not available at the local level. Although most tourism-related jobs require only secondary education, this paper uses tertiary education as an indicator because sustainable tourism development requires high-quality destination management. Such management, in turn, depends on the education and training of managerial personnel (Milovanović, 2017). The positive effect of tertiary education on sustainable tourism development is also confirmed by Škrabić Perić et al. (2021).

Previous research on tourism demand also considers one or more aspects of institutional quality in the destination. For example, Llorca-Rodríguez et al. (2020) include terrorism in their model, Neumayer (2004) includes political violence, and Škrabić Perić et al. (2021) focus on political stability. To capture the general impact of institutions, this paper uses a national-level aggregate indicator, calculated as the average of the individual World Bank World Governance Indicators (WGI), following the approach used by Muštra et al. (2023).

All the data was collected from the SmartCulTour project database (Neuts et al., 2021). The descriptive statistics of the variables are presented in Table 2.

Table 2. Descriptive statistics

Variable	Mean	Std. dev.	Min	Max	N	n	T / T-bar
TOUR_pc	3.24233	6.52625	0.00664	37.9314	261	29	9
Daily_km	0.039282	2.190925	-27.93	9.797001	255	28	9.10714
CENT	246.468	822.538	0	5870	323	34	9.5
CRES	0.40532	0.18055	0.25052	1.25256	442	34	13
CINF	0.12456	0.1795	0	0.70274	294	32	9.1875
CINS	0.82063	0.16269	0.46154	1	455	35	13
CPOL	0.89461	0.15999	0.22044	1	455	35	13
CTGOV	0.77802	0.24025	0.25	1	455	35	13
CEXP	78.0766	85.4047	0	584.89	362	34	10.6471
REVpc	1401.57	1358.71	247.015	9900.99	330	35	9.42857
POP	51484.6	106267	1212	644618	437	35	12.4857
WGI	0.9877	0.48368	0.36586	1.87299	455	35	13
EDU	29.2095	8.75011	12.2	42.8	455	35	13

Source: authors' compilation based on Neuts et al. (2021)

Based on the explained control variables, the basic model of tourism will be presented by two versions, (1) and (2), of the dynamic panel data model. They can be written:

$$TOUR\_pc_{it} = \mu + \gamma TOUR\_pc_{it-1} + \beta_1 REVpc_{it} + \beta_2 POP_{it} + \beta_3 WGI_{it} + \beta_4 EDU_{it} + \alpha_i + \varepsilon_{it} \quad (1)$$

$$Daily\_km_{it} = \mu + \gamma Daily\_km_{it-1} + \beta_1 REVpc_{it} + \beta_2 POP_{it} + \beta_3 WGI_{it} + \beta_4 EDU_{it} + \alpha_i + \boldsymbol{\varepsilon_{it}} \quad (2)$$

where $TOUR\_pc_{it}$ is the indicator of tourism intensity in the local unit i the period t, $REVpc_{it}$ is value of expenditures of local government of local unit i in the period t, POP_{it} is the number of population in the i-th local unit in the period t, WGI_{it} is the value of institutional quality for country of local unit i in time period t, EDU_{it} is the percentage of population aged 25-64 with tertiary education in the NUTS 2 region of local unit i in the period t, in the period t. β_1, β_2, β_3, β_4, are parameters to

estimate. Subsequently, both models will be expanded in equations (3) and (4) by incorporating a cultural tourism variable or index.

$$TOUR\_pc_{it} = \mu + \gamma TOUR\_pc_{it-1} + \beta_1 REVpc_{it} + \beta_2 POP_{it} + \beta_3 WGI_{it} + \beta_4 EDU_{it} + \beta_5 CUL_{it} + \alpha_i + \varepsilon_{it} \quad (3)$$

$$Daily\_km_{it} = \mu + \gamma Daily\_km_{it-1} + \beta_1 REVpc_{it} + \beta_2 POP_{it} + \beta_3 WGI_{it} + \beta_4 EDU_{it} + + \beta_5 CUL_{it} + \alpha_i + \varepsilon_{it} \quad (4)$$

To estimate the models, the dynamic panel data method was employed, more precisely, the Arellano-Bond estimator was employed (Arellano & Bond, 1991). Before the analysis, the correlation matrix was executed to confirm that there is no problem of multicollinearity in the model.

3. Results and discussion

The study's findings for tourism intensity (Table 3 and Table 4) and tourism density (Table 5 and Table 6) are presented in this section. To address the non-stationarity issues in the dependent variable, when tourism density is used as an indicator, with a lagged dependent variable higher than the one in most of the models, the variant with the first differences was used. Diagnostic tests were performed to validate the results obtained from the eight models. The absence of second-order autocorrelation of differenced residuals was confirmed by p-values of AB2 tests above 0.05 in all models. Moreover, Sargan tests showed no endogeneity problem in all model specifications, except for Model (7) in Table 6.

The REVpc and EDU variables have a positive sign and are statistically significant in all model specifications. The results indicate that more developed local units recognized the importance of tourism which results in higher tourism demand, which is in line with almost all tourism research, regardless of unit of consideration. A higher-educated population at the NUTS 2 level has a positive effect on tourism demand within the LL. This supports the argument that educated managers are essential for sustainable tourism development, which is in line with the findings of Milovanović (2017) and Škrabić Perić et al. (2021). Although education is measured at a regional level, its relevance is likely to arise from the fact that tourism workers frequently operate across municipalities within a given region.

Table 3. Tourism intensity panel model (part 1)

	(1)	(2)	(3)	(4)
L.Tour_PC	0.448***	0.418***	0.449***	0.410***
	(0.0201)	(0.0190)	(0.0203)	(0.0165)
Rev_PC	0.00211***	0.00247***	0.00218***	0.00258***
	(0.0000722)	(0.0000806)	(0.0000720)	(0.0000711)
Pop	-0.000140***	-0.000360***	-0.000123***	-0.0000681
	(0.0000265)	(0.0000363)	(0.0000293)	(0.0000710)
WGI	-5.830***	-6.412***	-6.439***	-6.220***
	(0.789)	(0.782)	(0.873)	(0.790)
EduTet	0.156***	0.152***	0.0801***	0.183***
	(0.0144)	(0.0157)	(0.0179)	(0.0149)
CENT		0.00364***		
		(0.000654)		
CRES			10.32***	
			(0.693)	
CINF				39.81***
				(15.30)
Cons	6.997***	20.30***	4.580***	-1.427
	(1.942)	(3.730)	(1.770)	(4.018)
N	160	131	160	118
No. of groups	26	21	26	15
No. of instruments	16	17	17	17
Sargan test (p-value)	0.0539	0.2469	0.1352	0.3054
AB2 test (p-value)	0.2732	0.2733	0.2743	0.3362

Standard errors in parentheses, * p < 0.1, ** p < 0.05, *** p < 0.01

Source: authors' compilation based on Neuts et al. (2021)

Table 4. Tourism intensity panel model (part 2)

	(5)	(6)	(7)	(8)
L.Tour_PC	0.450***	0.437***	0.442***	0.428***
	(0.0216)	(0.0201)	(0.0196)	(0.0147)
Rev_PC	0.00235***	0.00208***	0.00212***	0.00201***
	(0.0000831)	(0.0000722)	(0.0000856)	(0.0000648)
Pop	-0.000130***	-0.000129***	-0.000126***	-0.000145***
	(0.0000299)	(0.0000243)	(0.0000343)	(0.0000330)
WGI	-6.212***	-5.446***	-6.294***	-4.641***
	(1.062)	(0.846)	(0.823)	(0.482)
EduTet	0.0806***	0.151***	0.166***	0.166***
	(0.0138)	(0.0134)	(0.0148)	(0.0164)

CINS	9.778***			
	(0.708)			
CPOL		2.245***		
		(0.523)		
CTGOV			-0.984***	
			(0.125)	
CEXP				0.00296***
				(0.000650)
Cons	-0.494	4.026*	7.079***	6.132***
	(2.009)	(2.329)	(2.197)	(1.733)
N	160	160	160	155
No. of groups	26	26	26	26
No. of instruments	17	17	17	17
Sargan test (p-value)	0.1481	0.0668	0.0437	0.0536
AB2 test (p-value)	0.2955	0.2724	0.2630	0.2730
Standard errors in parentheses, * p < 0.1, ** p < 0.05, *** p < 0.01				

Source: authors' compilation based on Neuts et al. (2021)

Table 5. Tourism density panel model, part 1

	(1)	(2)	(3)	(4)
L.Daily_km_dif	0.00933***	0.0154***	0.00853***	0.0146***
	(0.00115)	(0.000389)	(0.00133)	(0.000201)
Rev_PC	0.0000540***	0.0000639***	0.0000623***	0.0000707***
	(0.00000614)	(0.00000588)	(0.00000799)	(0.00000703)
Pop	-0.000176***	-0.000295***	-0.000165***	-0.000316***
	(0.00000569)	(0.0000145)	(0.00000664)	(0.00000371)
WGI	-0.250***	-0.810***	-0.688***	-0.711***
	(0.0861)	(0.111)	(0.261)	(0.0606)
EduTet	0.0137***	0.00190	0.00208	0.00762***
	(0.00273)	(0.00240)	(0.00415)	(0.00116)
CENT		0.00236***		
		(0.000156)		
CRES			1.985***	
			(0.475)	
CINF				-10.55***
				(0.776)
Cons	5.969***	14.25***	5.774***	12.59***
	(1.188)	(1.746)	(1.217)	(0.979)
N	167	142	167	129
No. of groups	25	20	25	14

No. of instruments	16	17	17	17
Sargan test (p-value)	0.1463	0.3294	0.2981	0.2880
AB2 test (p-value)	0.3563	0.3821	0.3777	0.3752

Standard errors in parentheses, * p < 0.1, ** p < 0.05, *** p < 0.01

Source: authors' compilation based on Neuts et al. (2021)

Table 6. Tourism density panel model, part 2

	(5)	**(6)**	**(7)**	**(8)**
L.Daily_km_dif	0.0141***	0.00983***	0.0106***	0.00122
	(0.00198)	(0.00124)	(0.00119)	(0.000839)
Rev_PC	0.0000583***	0.0000591***	0.0000478***	0.0000577***
	(0.00000843)	(0.0000103)	(0.00000996)	(0.00000605)
Pop	-0.000162***	-0.000154***	-0.000165***	-0.000173***
	(0.00000816)	(0.00000807)	(0.0000102)	(0.00000687)
WGI	-0.751**	-0.197	-0.396**	-0.707***
	(0.297)	(0.221)	(0.195)	(0.249)
EduTet	0.00130	0.00390	0.00248	0.00961**
	(0.00498)	(0.00364)	(0.00352)	(0.00378)
CENT				
CRES				
CINF				
CINS	2.772***			
	(0.359)			
CPOL		3.210***		
		(0.279)		
CTGOV			0.756***	
			(0.107)	
CEXP				-0.000106
				(0.0000998)
Cons	4.450***	2.592**	5.814***	6.718***
	(1.035)	(1.035)	(1.155)	(1.459)
N	167	167	167	163
No. of groups	25	25	25	25
No. of instruments	17	17	17	17
Sargan test (p-value)	0.3011	0.2841	0.3107	0.0678
AB2 test (p-value)	0.6792	0.4982	0.3808	0.2057

Standard errors in parentheses, * p < 0.1, ** p < 0.05, *** p < 0.01

Source: authors' compilation based on Neuts et al. (2021)

On the other hand, the institutional quality indicator WGI has a negative sign and indicates a statistically significant impact in all model specifications. This result is not in line with theoretical expectations. One explanation for this result lies in the aggregation of the WGI at the national level, which may not accurately reflect the performance of local administrations. Since this study focuses on local units within the European Union, where issues such as corruption and terrorism are relatively minor according to WGI indicators, the quality of national institutions may not be a decisive factor influencing tourism demand. Similar findings were reported by Beha (2023), who observed that institutional improvements in certain segments could paradoxically result in negative effects on variables such as employment or tourist arrivals, often as unintended consequences of structural changes.

Referring to the effects of different cultural indicators/indices on tourism demand, the results of the models reveal several important issues. Four cultural indicators/indices, e.g. CENT, CRES, CINS, CPOL are statistically significant with positive effects on tourism demand, as expected.

Although the existing research presents mixed findings on the role of cultural resources in stimulating tourism demand (Yang et al., 2019), our results support the view that cultural resources (CRES) have a positive influence. These findings are in line with a body of empirical work highlighting the positive role of cultural heritage, particularly World Heritage Sites (Canale et al., 2019; Castillo-Manzano et al., 2021; Patuelli et al., 2013; Su & Lin, 2014; Škrabić Perić et al., 2021; Yang et al., 2010). Moreover, our results align with more recent studies emphasizing the rising importance of intangible heritage and nationally protected cultural assets (Bak et al., 2019; García del Hoyo & Jiménez de Madariaga, 2024; Kuliš et al., 2024; Panzera, 2022; Kuliš & Šimundić, 2025). Besides, the positive role of cultural heritage appears to be more pronounced at finer spatial scales, particularly at the local level (Noonan et al., 2023), an aspect also supported by our research.

Since the results confirm the positive impacts generated by the number of cultural enterprises (CENT), those enterprises could be considered as high-value-added activities (ESPON, 2019). The results show that CINF only has a significant positive influence on tourism arrivals per inhabitant, while for the other indicator considered (daily number of tourists per 1 km^2), the result is not robust. The differing findings for the availability of cultural infrastructure (CINF) support the opinion of Cellini and Cuccia (2013) who believe that different types of cultural amenities may have different relationships with tourism flows. Panzera et al. (2021) found that a higher number of monuments or museums and galleries does not necessarily result in an increase in demand. The same authors argue that the mere existence of cultural institution cannot be the main tourist attraction and that using such indicators of cultural resources expressed in their quantity can be problematic because “it only points to the quantity without any explanation of cultural values, authenticity, state of preservation or international recognition of cultural goods”. Therefore, they conclude that such a typology of cultural heritage may be more relevant for the local

community than for international tourists. Additionally, this mixed result may indicate that the mere existence of cultural infrastructure is not sufficient to drive tourism demand. Effective management is needed to fully realize their potential, which is in line with Cuccia and Rizzo (2011), who found that while the presence of cultural resources and infrastructure is important, it is not a sufficient condition for promoting cultural tourism.

From the perspective of cultural policies, the way culture contributes to economic development is a complex issue that depends on each specific case. The success of a particular cultural institution depends on the overall environment in which it is situated and, in particular, on the structure and level of cultural activities in the area (Bille & Schulze, 2006). Cultural indicators regarding cultural governance (CINS and CPOL) are of high importance when tourism development is concerned**.** Cultural governance establishes rule systems that regulate cultural meanings and interpretations, reflecting the interests and priorities of various stakeholders, enables cultural actors to integrate their interests in public policies, while providing cultural entrepreneurs and civil organisations a status in policy design and in administrative and institutional structures (Hall, 2011; Su & Cai, 2019).

In addition, the results of the tourism density panel model indicate statistically significant and positive effects of tourism governance (CTGOV). Analysing the discussion by Hsu et al. (2013) on the importance of governance in tourism policy analysis, Topcu et al. (2023) highlight two key reasons relevant to this issue. The first relates to understanding the gap between the creation and implementation of policies of special importance for tourism and the establishment of an institutional framework at different levels of governance. The other key reason concerns the improvement of co-operation mechanisms between the administration, civil society and other interest groups. The same authors, citing Ghalia et al. (2019), stress that the poor quality of governance can affect a country's international image and, consequently, reduce tourist demand, while from the supply perspective, the same problem can result in a decrease in the destination's tourism capacity.

Consistent with expectations, although not robustly confirmed, the analysis finds that general government expenditure on culture per inhabitant (CEXP) significantly and positively contributes to tourism demand, reinforcing the idea that public cultural spending enhances destination attractiveness and stimulates tourist interest (Falk & Hagsten, 2017).

Previous research considers data at the regional or national level (Cuccia & Rizzo, 2011; Yang et al., 2010), while this research adds to the existing literature by constructing cultural indices for local units. This captures local dynamics and offers insights into how local cultural assets influence tourism demand. Moreover, it considers the influence of local cultural governance through three indices and cultural expenditure. This methodological approach gives a broad picture and enables more precise policy recommendations.

Our empirical findings highlight the importance of integrated and well-coordinated local cultural policies, along with cultural assets, in enhancing tourism development. The positive and statistically significant influence of the cultural resources index, as well as all three cultural governance variables, confirms the importance of integrated and well-coordinated cultural policies, emphasizing that the effectiveness of policies depends not only on the number of cultural amenities but also on their management, governance, and alignment with broader community values.

Different authors indicate the advantages of the LL model approach. Dickinger and Kolomoyets (2024) indicate LLs as practical platforms for innovation, geographical embeddedness, and real-life contextualization. Hall (2011) and Su & Cai (2019) highlight the importance of policymakers investing in institutional capacity at the local level by including different stakeholders in cultural policy design. Other authors (Clincu & Bănică, 2024; Puerari et al., 2018) suggest that LLs serve as polygons for the implementation of new policies, which simultaneously promote cultural development and tourism, achieving sustainability goals.

Some authors (Bettin et al., 2023; Mandić et al., 2024; Neuts, 2023) indicate the importance of LLs in testing and refining cultural policies in real-life settings. LLs also develop the ability to react to technological and socio-economic changes, particularly following crises such as COVID-19 (Mandić et al., 2025). Governance, community involvement, and policy testing shape culture as a process rather than culture as heritage. Thus, these results call for such a shift. Linking cultural tourism plans with LLs provides a means to enhance competitiveness and assist territorial development for small-scale EU locations (Clincu & Bănică, 2024; Panzera, 2022; Kuliš & Šimundić, 2025).

Conclusions

This study aims to fill the research gap in the existing literature on the importance of a broader scope of culture in tourism development analyses and expand research on various cultural variables while exploring the relationship between culture and tourism demand. Through an extensive and systematic literature review and in line with the framework established by the Horizon 2020 SmartCulTour project, a more comprehensive list of cultural indicators is provided.

This is the first research that employs a comprehensive set of cultural indicators, a total of 23, ranging from the presence of cultural heritage, cultural infrastructure, and cultural enterprises, as well as including cultural policies, at the municipal level, employing quantitative panel data analysis, which makes it a unique study setting to investigate the role of culture in shaping tourism demand.

The analysis was conducted across 35 small-scale destinations (cities and municipalities) located in six European countries in the period from 2007 to 2019 by employing the Arellano and Bond estimator for dynamic panel data. The results highlight the importance of considering the broader aspects of culture and related

cultural indicators in tourism demand analyses. It is confirmed that the existence of cultural resources is important but not sufficient for cultural tourism. An important issue is the type of cultural goods that attract visitors. Moreover, the main finding of this paper is the importance of all government indices which highlight the importance of the strategic integration of the cultural dimension with other policy dimensions in cultural tourism development.

However, this paper has several limitations. One major limitation is the lack of data available at the local unit level for a number of relevant indicators, especially over a longer time frame. Due to the limitation of data, two groups of important indicators are excluded from the research. To more deeply investigate all aspects of culture, it is necessary that local units collect the data on a yearly basis for employment in culture, and for two dimensions: Knowledge and Skills and Inclusion and Participation. However, the dimension of knowledge and skills can be very important to ensure good management of cultural resources and infrastructure. Therefore, it is very important to collect data about highly educated people in culture and tourism on the local level. Finally, the participation of the local population in culture is equally important as the satisfaction of tourists with culture. Therefore, local units have to conduct surveys on a yearly basis about tourism satisfaction, local population participation in culture, and tolerance for different forms of diversity (gender equality, immigrants, religion, etc.).

Except for missing data, there were inconsistencies in the definitions, concepts, and units of measurement used, as well as in the methodology for collecting data over a longer period. Thus, further research should employ better quality data once it becomes available and expand analyses to other local units. Another suggestion is to conduct research at the municipal level within individual countries to obtain results and policy implications for one country. Finally, different quantitative methods, for example, spatial econometrics, could be applied.

The results of this research have important implications for policymakers. Except for the usual determinants of tourism demand such as income, size of destination, and higher educated inhabitants in a destination, most cultural indicators confirm a positive and statistically significant influence of culture on tourism. Our findings highlight that effective cultural tourism development depends not just on cultural assets but also on how they are governed and managed. The LL model, as a collaborative and user-driven innovation ecosystem, offers local governments and stakeholders a platform to co-create and test integrated cultural policies in real-life settings. Integrating cultural tourism within LL ecosystems thus supports sustainable and inclusive territorial development, particularly in small-scale EU destinations.

Due to the complexity of the concept of culture, there are numerous ways to assess it, many of which are difficult to measure. This paper highlights the importance of cultural governance in the recognition of cultural resources and cultural infrastructure. A deeper understanding of the complex exchange between cultural and economic value provides an opportunity to develop better models for managing

cultural tourism. This requires harmonization of different policy areas and coordination, cooperation, and collaboration among various levels of government. It also involves establishing collaborative public-private relationships, as well as the public administration's cooperation with other non-governmental actors and networks of actors related to cultural tourism. Finally, it requires the presence of strategic documents on cultural tourism which have to be evaluated and updated annually.

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