Spatial distribution of tourism supply in Andalusia

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ARTICLE INFO

ABSTRACT

This paper applies Geographic Information Systems (GIS) and Exploratory Spatial Data Analysis (ESDA) techniques to the Spanish Autonomous Community of Andalusia (Andalucía) to analyze tourism flows and their impacts with specific reference to the provision of accommodation and size of local population. Moran's I global index of spatial autocorrelation and LISA cluster maps are used and a persistent imbalance is found between the littoral and the inland areas. A positive spatial autocorrelation is found that is compatible with the high degree of concentration in the littoral area or, regarding the number of permanent residents, the pressure caused by tourism activity on some municipalities in mountain areas with high environmental and landscape quality. The dominance of traditional tourism zone in the Western Costa del Sol, West Almería or Bahía de Cádiz is highlighted but a more equitable territorial distribution of tourism with less pressure and more quality is found in coastal mature destinations and a special dynamism in the rural inland area is also observed. The implications for destination planning are discussed.

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1. Introduction

Although it is accepted that tourism has become one of the main drivers of development in a great number of countries or regions, it is also well known that tourism activity, as well as positive impacts, has others that are negative. A major contribution in this area was the one made by Mathieson & Wall in 1982 providing an overview of economic, physical and social impacts of tourism.

On the positive side, tourism as a complex economic activity has multiple linkages to a wide range of other economic sectors and activities, thus having positive multiplier effects and a potential to act as a catalyst for economic development (Vellas, 2002). In this sense, tourism can play a valuable role in stimulating higher growth, reducing regional asymmetries, creating employment and bringing about positive externalities that affect (directly or indirectly) other economic activities (Soukiazis & Proença, 2008). At a local level it offers opportunities for employment and income, spurring regional and local economic developments, which are often unique chances for many places, small and distant, and with limited options for development.

Negative impacts as the sectoral, technological, environmental, spatial and socio-cultural imbalances (Vera, 1994); economic, as property speculation (Sharpley, 2000); or regional development imbalances between coastal and hinterland areas (Andriotis, 2006), derived from the rapid and unplanned tourism development, have revealed the necessity of implementing alternative models of tourist planning (Getz, 1986) to take greater account effects on the economy, on the cultural identity, as well as on the physical surrounding and natural environment.

According to Ólafsdóttir and Runnström (2009), in order to secure long-term benefit from tourism, decision makers need straightforward planning tools to monitor the impact of tourism as regards environmental, cultural and economical sustainability. Tourism, when managed in a sustainable manner, is likely to provide long-term improvement in local economy and infrastructure. Moreover, as was cited in Andriotis (2006), it is likely to be the only growth industry for peripheral geographically isolated rural locations (Irvine and Anderson (2003, p. 229)) and has the potential to combat economic decline and eliminate the loss of population in hinterland areas (Nash & Martin, 2003; University of the Aegean, 2002).

Although the spatial aspects of tourism have been often overlooked in tourism development policy (Pearce, 1995), their importance in the process of sustainable tourism development is now recognized by governments and tourism development planners. In order to acquire better insights into the structure and functioning of tourism system in a given area, either for the purpose of planning its tourism development in a sustainable way or to monitor the effects of already implemented plans, Geographical Information Systems (GIS) have a great potential.

GIS is a tool for linking and visualizing geographically referenced data from different sources together with procedures and techniques for data collection, up-dating, query, spatial analysis and modeling (Burroughs & McDonnell, 1998). According to Dawod (2013), GIS technology has been utilized in the last two decades in a wide range of geographic, engineering, planning, and environmental applications,

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and its spectacular growth has allowed a much more realistic and detailed measurement and representation of the features of spatial phenomena that are relevant to their analysis (Anselin, 1998). GIS is now recognized widely as a valuable tool for managing, analyzing, and displaying large volumes of diverse data pertinent to many local and regional planning activities. Its use in tourism planning and management becomes imperative (Abomeh, Nuga, & Blessing, 2013).

Bahaire and Elliott-White (1999) and McAdam (1999) presented reviews of the applications of GIS in sustainable tourism planning and management, including definitions of GIS, summaries of functionality, and the opportunities that it provides for the visualization and analysis of spatial phenomena. More recently, Dye and Shaw (2007) emphasized that, since tourism consists of a wide variety of elements including facilities, activities, services, and industries which combine to deliver travel experiences, GIS can be so useful in tourism as in other applications involving management and planning. Also it can be a valuable tool for investigating specific questions related to tourism development including location, condition of the area, trends and changes, routing to and through the site, and patterns associated with resource use.

On the other hand, in statistical or econometrics analysis based on data geographically referenced there are two types of spatial effects that are of particular interest as they have a considerable influence: spatial dependence and spatial heterogeneity. Spatial dependence is usually described by spatial autocorrelation using statistics such as Moran's index. Spatial heterogeneity relates with spatial differentiation, which follows the intrinsic uniqueness of each location, and it can occur in the form of different distributions in different subsets, i.e., data non-stationary (Anselin, 1998). Exploratory Spatial Data Analysis (ESDA) focuses explicitly on these spatial effects.

As it has been pointed out by Anselin (1998), the application of spatial statistical techniques in conjunction with an operational GIS environment enhances the power of GIS extending the frontiers of the types of analytical studies that can be carried out in a realistic setting, as those that are geared to support policy analysis or business decision making. In addition, maps indicating different aspects of the spatial variation of tourism could be used to guide policymakers in devising targeted actions that closely match the contingencies of each destination or to inform and facilitate tourism-related planning and policy initiatives.

Applications of GIS in tourism analysis include the identification of potential development locations (Boyd & Butler, 1996; Butler, 1993; Dawod, 2013; Gunn, 1994); tourism impact, distribution and development (Cornelissen, 2005); the sustainable tourism infrastructure planning (Boers & Cottrell, 2007); the distribution of local tourism systems in Italy (Lazzeretti & Capone, 2008); the spatial distribution patterns of world heritage sites in China and their spatial relationships with tourist origin cities (Li, Wu, & Cai, 2008); the evaluation of ecological sensitivity for tourism development in fragile environments (Ólafsdóttir & Runnström, 2009), or the distribution of tourists' origins and/or movement patterns in a destination (Chancellor & Cole, 2008; Feng & Morrison, 2002; Lau & McKercher, 2007; Yang & Wong, 2013; Zhang, Xu, & Zhuang, 2011), among others.

The aim of this paper is to illustrate the combined use of Geographic Information Systems (GIS) and Exploratory Spatial Data Analysis (ESDA) techniques as valuable tools for monitoring changes in the spatial distribution of tourism, discover patterns of spatial association; suggest different spatial regimes or identify atypical observations (outliers).

Taking into account that consolidated destinations are of interest from academic, political and tourism management perspectives, in this paper we focus the analysis in the Autonomous Community of Andalusia (Andalucía), which is one of the Spanish Autonomous Communities with a most solidly established tourism sector and plays an important role in Spain's tourism industry, both at national and international levels. In order to analyze tourism development in this region we use the commercial software ArcGIS 10.1 by ESRI and its spatial

statistics toolbox. We work at a municipal level of geographic disaggregation (769 and 771 municipalities in years 2000 and 2011, respectively). Conclusions are based on official data provided by the Institute of Statistics and Cartography of Andalusia (ISCA) in SIMA.[1]

Regarding previously published literature, we highlight that an innovative element of this work is the use of very detailed data that cover the region and allow us to take an intraregional approach, and to deal with the substantial differences across the region. Furthermore, we based our study in several indicators associated with the municipal number of bed places in hotels and other regulated accommodations jointly with the number of permanent residents in each municipality and the surface that it covers. It can be interesting from a scientific point of view, given the lack in research and understanding the spatial dimension of the tourism accommodation sector (Ioannides (2006); Niewiadomski (2009, 2012), and Rogerson (2013), among others). Additionally, the spatial analysis of such numbers measured in densities (*per inhabitant* or *per km.²*) would provide information on the pressure caused by tourism development within the region. Finally, given that in a regional context it is common the uneven distribution of its tourism accommodations, because tourism development is strongly dependent on the environmental resources and the features of local communities, we remark the utility of ESDA in order to highlight agglomeration or diffusion patterns in an objective way.

The rest of the paper is organized into five additional sections. In Section 2 we briefly describe the geographical location of Andalusia, its importance in the Spanish tourism context and some remarks about its own legal framework for tourism, and Section 3 introduces the methodology and data that were used in assessing tourism's spatial structure for the case study. Section 4 examines the relative importance and main spatial characteristics of tourism in Andalusia through the municipal distribution of bed places in regulated accommodation establishments. Finally, Section 5 focuses on the evolution of the municipal distributions of regulated accommodation establishments broken down by accommodation type and quality, and Section 6 summarizes the study results, identify further research needs and provide some concluding remarks.

2. Andalusia and tourism

Andalusia is the most populated Autonomous Community in Spain, with 8,371,270 inhabitants at the end of 2011, representing 17.9% of Spain's total population. It is also the second largest in terms of size after Castilla-León. It is divided into 771 municipalities (769 in the year 2000) grouped into eight provinces: Almería, Granada, Málaga, Cádiz, Huelva, Sevilla, Córdoba, and Jaén. The capital, Sevilla (Seville), is the most populated city in Andalusia with 698,042 inhabitants (INE, 2013).

Andalusia's coastline has a length of 1101 km, approximately 17.5% of the Spanish coast, a significant factor in its geography. It is characterized by a wide variety of landscapes due to its coastal geomorphology and climatic conditions. The coast can be divided into three main regions: the western sector facing the Atlantic Ocean, the Strait of Gibraltar where the Mediterranean Sea and Atlantic Ocean meet, and the eastern sector, facing the Mediterranean. Currently, 30.4% of the coastline of Andalusia (335 km) is under some designation of official protection, making it the region with the greatest length of protected coastline in Spain (Guisado & Malvárez, 2009).

Due in part to its geographical location and to the relatively mild winter and spring climate, the south of Spain is attractive to overseas visitors, especially tourists from Northern Europe. While inland areas such as Jaén, Córdoba and the hill villages and towns remain relatively untouched by tourism, the coastal areas of Andalusia are visited by high numbers of tourists for much of the year. Nevertheless, together

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