

TeMA

Journal of
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This special issue collects a selection of peer-review papers presented at the 8th International Conference INPUT 2014 titled "Smart City: planning for energy, transportation and sustainability of urban systems", held on 4-6 June in Naples, Italy. The issue includes recent developments on the theme of relationship between innovation and city management and planning.

Tema is the Journal of Land use, Mobility and Environment and offers papers with a unified approach to planning and mobility. TeMA Journal has also received the Sparc Europe Seal of Open Access Journals released by Scholarly Publishing and Academic Resources Coalition (SPARC Europe) and the Directory of Open Access Journals (DOAJ).

INPUT 2014

papers selected

Smart City

planning for energy, transportation
and sustainability of the urban system

SMART CITY

PLANNING FOR ENERGY, TRANSPORTATION AND SUSTAINABILITY OF THE URBAN SYSTEM

Special Issue, June 2014

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TeMA

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TeMA. Journal of Land Use, Mobility and Environment offers researches, applications and contributions with a unified approach to planning and mobility and publishes original inter-disciplinary papers on the interaction of transport, land use and environment. Domains include engineering, planning, modeling, behavior, economics, geography, regional science, sociology, architecture and design, network science, and complex systems.

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This special issue of TeMA collects the papers presented at the 8th International Conference INPUT 2014 which will take place in Naples from 4th to 6th June. The Conference focuses on one of the central topics within the urban studies debate and combines, in a new perspective, researches concerning the relationship between innovation and management of city changing.



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EIGHTH INTERNATIONAL CONFERENCE INPUT 2014

SMART CITY. PLANNING FOR ENERGY, TRANSPORTATION AND SUSTAINABILITY OF THE URBAN SYSTEM

This special issue of TeMA collects the papers presented at the Eighth International Conference INPUT, 2014, titled "Smart City. Planning for energy, transportation and sustainability of the urban system" that takes place in Naples from 4 to 6 of June 2014.

INPUT (Innovation in Urban Planning and Territorial) consists of an informal group/network of academic researchers Italians and foreigners working in several areas related to urban and territorial planning. Starting from the first conference, held in Venice in 1999, INPUT has represented an opportunity to reflect on the use of Information and Communication Technologies (ICTs) as key planning support tools. The theme of the eighth conference focuses on one of the most topical debate of urban studies that combines , in a new perspective, researches concerning the relationship between innovation (technological, methodological, of process etc..) and the management of the changes of the city. The Smart City is also currently the most investigated subject by TeMA that with this number is intended to provide a broad overview of the research activities currently in place in Italy and a number of European countries. Naples, with its tradition of studies in this particular research field, represents the best place to review progress on what is being done and try to identify some structural elements of a planning approach.

Furthermore the conference has represented the ideal space of mind comparison and ideas exchanging about a number of topics like: planning support systems, models to geo-design, qualitative cognitive models and formal ontologies, smart mobility and urban transport, Visualization and spatial perception in urban planning innovative processes for urban regeneration, smart city and smart citizen, the Smart Energy Master project, urban entropy and evaluation in urban planning, etc..

The conference INPUT Naples 2014 were sent 84 papers, through a computerized procedure using the website www.input2014.it . The papers were subjected to a series of monitoring and control operations. The first fundamental phase saw the submission of the papers to reviewers. To enable a blind procedure the papers have been checked in advance, in order to eliminate any reference to the authors. The review was carried out on a form set up by the local scientific committee. The review forms received were sent to the authors who have adapted the papers, in a more or less extensive way, on the base of the received comments. At this point (third stage), the new version of the paper was subjected to control for to standardize the content to the layout required for the publication within TeMA. In parallel, the Local Scientific Committee, along with the Editorial Board of the magazine, has provided to the technical operation on the site TeMA (insertion of data for the indexing and insertion of pdf version of the papers). In the light of the time's shortness and of the high number of contributions the Local Scientific Committee decided to publish the papers by applying some simplifies compared with the normal procedures used by TeMA. Specifically:

- Each paper was equipped with cover, TeMA Editorial Advisory Board, INPUT Scientific Committee, introductory page of INPUT 2014 and summary;
- Summary and sorting of the papers are in alphabetical order, based on the surname of the first author;
- Each paper is indexed with own DOI codex which can be found in the electronic version on TeMA website (www.tema.unina.it). The codex is not present on the pdf version of the papers.

SMART CITY PLANNING FOR ENERGY, TRANSPORTATION AND SUSTAINABILITY OF THE URBAN SYSTEM Special Issue, June 2014

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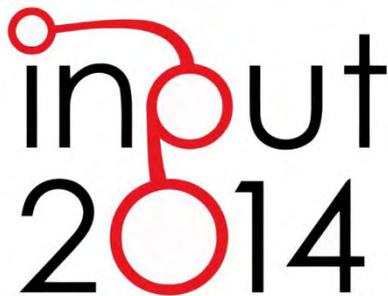
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The logo for the INPUT 2014 conference. It features the word "input" in a lowercase, sans-serif font, with the "i" and "n" connected by a red line that forms a stylized shape. Below "input" is the year "2014" in a larger, bold, sans-serif font. The "0" in "2014" is also connected to the red line above it.

SOCIAL MEDIA GEOGRAPHIC INFORMATION IN TOURISM PLANNING

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ABSTRACT

Social media are playing an increasingly important role as information resource in tourism both for customers (i.e. the tourists), who gather trustworthy information supporting the choice of destinations and services from peers, and for businesses, which can use the same information for improving their marketing strategies. The use of social media data can also offer new opportunities for decision-support in tourism planning. With improved understanding of the motivations of tourists and tailoring tourism service supply, decision making can be facilitated by emphasizing the strengths of tourist destinations for past and potential visitors. However, this kind of information about tourists perceptions and opinions is not always properly analysed by planners. Understanding the user satisfaction, which depends on factors related to both the location and the services that the local industry proposes, may offer valuable information in tourism planning at regional and local level.

In the light of the above premises, the goal of the study presented in this paper is to propose an integrated approach to investigate the relationships between tourists satisfaction, destination resources and tourism industry for supporting design and decision-making in regional tourism planning. The methodology developed in the study includes data collection from popular tourism social media platforms (i.e. Booking.com and TripAdvisor.com.com), and their integration with territorial and tourism data. Spatial and statistical analysis techniques are then applied to elicit insights from tourists perceptions on success factors which may be used in decision-making and planning support. The case study demonstrates the value of social media data and computational social science techniques in tourism planning. The paper concludes with a critical discussion on the potential of using such an approach in more general urban and regional planning setting.

KEYWORDS

Social media geographic information, Spatial analysis, Tourism planning, Spatial planning.

1 INTRODUCTION

This study focuses on tourism phenomenon, analysing relationship between demand, industry and location identified as fundamental variables. The research aims to study tourist preferences on destination and tourism industry services as represented by review judgments collected by two major tourism social networks, namely Tripadvisor.com and Booking.com. The investigations are carried on exploring the potential of publically volunteered comments, for providing useful knowledge about people preferences in space and time. For research purposes, a traditional method for collecting information about such preferences, performed via ad-hoc surveys can be expensive and time consuming. For this reason this work presents an alternative approach, by which tourist preferences for location and services are discovered by processing and analysing publically available social media data.

The paper explores three questions related to tourists preferences :

1. Which are the most popular destinations?
2. Why people chose those destinations?
3. What attracts tourists attention and what do they appreciate/disregard?

and eventually,

4. How this knowledge can be use as tourism planning support.

The underlying assumption is that this kind of study and its provided methods and tools can be used successfully in urban and regional planning as much as in tourist planning, for in both cases they contribute to take into account a pluralist customer- (or citizens) –oriented view on strategic development issues.

From the methodological perspective, the central challenge in answering the questions above is how to manage the big amount of available data to discover useful knowledge.

The method builds on a set of spatial analysis and statistics techniques, useful in describing and visualizing the spatial distribution and detecting patterns and hot-spots. In addition, textual analytics techniques (Campagna et Al, 2013; Campagna, forthcoming) have been applied in order to discover the knowledge enclosed in the huge amount of qualitative social media comments. The findings provide insights into the Sardinia tourism industry which could aid in the development of new planning approaches. They also offer a benchmark for future comparative trend analysis and directions for tourism policy design. After examining the past studies on the travel consumers online social networks and the most popular web sites (Section 2), the paper focuses on the destination choices and judgments represented in numerical and linguistic terms (Section 3). In Section 4 the research methodology and the early results of the case study are summarized and briefly discussed. The paper concludes (Section 5) with the summary of findings and future steps for extending the presented work.

2 DEVELOPMENTS IN TOURISM SOCIAL MEDIA

In the last decade, the fast evolution of Information and Communication Technology (ICT) enabled consumers to have ubiquitous access to a broad range of information services. The degree of interactivity established by the Web 2.0 paradigm enhanced the role of Internet as information source, with a secondary role as opinion source (Grabner et Al, 2012). Combining the commercial, technical, social and psychological aspects of groups of people, the interacting individuals behave as an online community. Wenger et Al (2002) defined a community as a group of individuals who want to interact to develop knowledge, share experience and build up their own identity. The development of a common knowledge base is the driving force of a community. Social, economic and technological aspects are incorporated into the community. In addition with developments in social media every piece of information, can be commented or rated in some way.

Tourism is one of the sectors which exploited the advantage of the advances in ICT and in the development of online communities. On the supply side the tourism marketing (i.e. the way to promote tourism industry, the different destinations, or the holiday packages) have been totally transformed (Dippelreiter, 2010). It is no surprising to observe that travel and tourism related topics are among the most popular in on-line social networks. (Baggio et Al, 2008). Likewise, on the demand side, the travellers use the Internet to obtain tourist information, to share their experiences, to establish relationships with people from various destinations or to purchase travel related products. According to Chung and Buhalis (2008) Internet supports i) the pre-travel phase, where all the search and bookings can take place online; ii) the in-travel phase, through interactive forums and/or blogging while on the road; and iii) the post-travel phase where people can share experiences, review hotels and destinations, and post photographs and videos from their trips. Travel plans, destinations, hotels reviews and discussions within the tourists on line community denoted the ever growing trend within the so-called world of Travel 2.0 world (Conrady, 2007).

TripAdvisor.com and Booking.com are among the most popular platforms of the latter kind. They play a significant role in the online tourism market. They can be considered as market-driven social media. While on the one hand, these platforms represent an important marketing channel through which destinations and tourism enterprises can reach and persuade potential visitors (Biassoulis, 2002), on the other hand they assist consumers in posting and sharing their travel-related comments. Travellers opinions and personal experiences based on reconstruction of their trips in turn serve as information to others. TripAdvisor.com with its web and mobile applications is based on the idea that travellers rely on the reviews of other travellers to plan their trips, or at least they may be satisfactory helped in their decisions by them. Currently TripAdvisor.com contains 10 millions of travel reviews and opinions written by 5 million of registered members, and it counts 25 million visitors per month (Miguens et Al, 2008). The Booking.com website, established in 1996, attracts visitors from both the leisure and business sectors worldwide. Booking.com is available in more than 40 languages, and offers over 367.033 properties in 190 countries. From a quick look at TripAdvisor.com and Booking.com the following general ideas are evident: in both cases, information posted with regard to destinations, tourist operators, restaurants and tourists services and facilities is autonomously generated by its users. They also feature reviews, comments and ratings on destinations, hotels, attractions, or other tourism related services. Furthermore different kinds of multimedia posts are supported as well as discussion forums on specific topics.

When location also is available, all these type of information, as all information derived from forums, discussion blogs or social network, could be considered as Volunteer Geographic Information (VGI). In recent years the term VGI became popular to indicate the avalanche of information which every second is shared on the web by users acting as sensors (Goodchild, 2007). According to Sui and Goodchild (2011), more recently the convergence of GIS and social media granted by interoperability of geo-web tools is further enriching the possibility of sharing the knowledge not only about the Earth surface but also about all the biological, social and cultural phenomena there happening. In facts, as Campagna et Al argue (2013), VGI may include both geographic information collected by groups of people within crowdsourcing initiatives and geo-tagged multimedia collected for personal purposes by the Internet users and publicly shared through archives in the cloud. Social media information may be geocoded in different ways, using either the position of the author (if public), or the location of the post (i.e. recorded through a gps sensor of a mobile device if available), or through toponyms parsing in the text. VGI has been proven useful in many application contexts such as emergency response, environmental monitoring and spatial planning (Poser and Dransch, 2010).

3 DESTINATION CHOICES AND TOURISTS PREFERENCES

Most studies of tourists preferences address tourists destination choices as the key element in the travel decision-making process. According to Dellaert et Al (1998) this element is combined with accommodation or activity choices. The investigations of decision-making processes, mostly conceptual in nature, have focused on the types of decision rules and the decision-making stages that are likely to be adopted by tourists. On the other hand, research in choice factors has been primarily addressed with empirical examinations of critical attributes used by tourists as criteria for determining their travel alternatives (Crompton, 1979). This section provides a brief explanation of tourists travel destination choices and their travel motivation. In addition a brief explanation, based on literature review, of the main factors that influence costumer preferences is provided.

3.1 TRAVEL MOTIVATION AND DESTINATION CHOICE

Knowledge of consumer psychology is extremely important in determining the success of a destination (Rodriguez del Bosque and San Martin, 2008). In this sense, an exploration of psychological concepts such as attitudes, decision-making processes, emotions, experience and satisfaction is necessary for understanding costumers choices and preferences in tourist destination. Destinations consist of a well-defined geographical area, such as a country, a region or a city and they can be referred to a product or a brand. Many studies on tourist travel choice distinguish between various approaches to the definition of tourist destination. Van Raaij (1986) defined the travel destination as a product, which is partly given and partly man-made. The given part refers to natural features of the destinations such as climate, landscapes, beaches, mountains and historic-culture buildings. The man-made part refers to features such as hotels, package tours, transportation, sports and recreation facilities, which can all be adapted to customer preferences and budget. Ferreira (2011) claims that tourist destinations should be conceived as brands and they should be managed from a strategic point of view. Buhalis (2000) regarded destination as a defined geographical region with a political and legislative framework for tourism marketing and planning, and it is understood by the visitors as a unique entity. Destinations thus offer a mix of tourism products and services, which are integrated under a brand name.

Determining the factors that influence tourists choice for a destination is essential in developing appropriate marketing strategies. Age, income, gender, personality, education, cost, distance and nationality are factors that affect choices destination (Van Raaij, 1986). According to Kuang Hsu et Al (2009) travel motivation is a dynamic concept; it changes from one person to another and from one destination to another. Cooper (2009) pointed out that one popular typology for understanding travel motivation is the push and pull model by Crompton (1979). The push motivations are useful for explaining the desire for travel while the pull motivations explain the actual choice of destination. The Crompton model identifies seven socio-psychological (push) motivations (escape, self-exploration, relaxation, prestige, regression, kinship-enhancement, and social interaction) and two cultural (pull) motivations (novelty and education). Uysal and Jurowski (1994) further developed Crompton model: they summarized internal (push) and external (pull) motivators to travel. Internal motivators include desire for escape, rest, relaxation, prestige, health and fitness, adventure, and social interaction. External motivators were based on attractiveness of the destination, including tangible resources (i.e. beaches, cultural attractions and recreational activities), and travellers perceptions and expectations (novelty, benefit expectations, and marketing image). In more recent studies, researchers have added shopping as a motivational characteristic of the destination (Uysal and Jurowski 1994; Cooper, 2008).

3.2 COSTUMERS PREFERENCES

According to Crouch et al (2004), consumers judgments depend basically on the strength of their beliefs or expectations about the quality of various features or attributes associated with services. Personal preferences, like motivations, may be both intrinsic, reflecting individual likes and dislikes, and extrinsic, or socially conditioned. The weight of an attributes is usually related with the relative importance that consumers confer to each attribute. This means that each opinion strictly depends on tourists direct past experiences with other services of analogous nature. Kuang Hsu et al (2009) argued that tourists decisions are complex multi-faceted decisions in which the choices for different elements are interrelated and evolve in a decision process over time. Most studies of tourists travel choice address tourist destination choice as the key element in travel decision-making. These process is influenced by a number of psychological (internal) and no-psychological (external) variables, and consists of a number of different stages that are marked by specific actions.

In order to meet the target of tourists expectations, hotels should provide an ample range of quality services, including reception, meals, room service, tennis courts, beach nearby location, swimming pools and gardens, among others. But how can we define service quality? Service quality can be considered as a composite measure of various attributes. According to Dubè and Renaghan (1999) it not only consists of tangible attributes but also of intangible or subjective attributes such as safety or quietness, which are difficult to measure accurately and which are usually studied by linguistic information (Benitez et al, 2007). Lewis and Booms (1983) define service quality as a measure of how well the service delivered matches customers' expectations. Benitez et al (2007, after Berry, 1985) argue that the "quality that consumers perceive in a service is a function of the magnitude and direction of the gap between expected service and perceived service". Judgments expressed by numbers are easy to interpret, but linguistic information is more difficult to measure through a mathematical function. Linguistic information characterizes subjective knowledge and is usually ignored by analysts when forming mathematical models that represent real world phenomena. However, attributes measuring service quality are characterized by uncertainty, subjectivity, imprecision and ambiguity (Benitez et al, 2007). When consumers make decisions, they usually employ this subjective knowledge and linguistic information. Beside tourism marketing and planning, tourists are an important target audience for urban planning: in order to take into account tourists preferences, planners must deeply study the phenomenon of tourism and attempt to understand and internalize tourists needs and perceptions (Dickey, 2005). An accurate identification of customer perception is a first step to maintaining the status of a city image as a popular travel destination.

In the light of the above premises the next section reports on the analysis from the spatial perspective of visitors perceptions of tourism destination and services in Sardinia.

4 MULTIDIMENSIONAL ANALYSES OF TOURISM SOCIAL MEDIA INFORMATION

In order to understand the tourist preference dynamics in Sardinia, as expressed by Social Media Geographic Information (SMGI), a two scales approach was adopted. Firstly analyses at the regional scale were carried on to describe tourists preferences spatial patterns and to identify location of interest; the latter may include clusters of positive or negative preferences, or individual spots of interest. Then, at the local level (i.e. within the single cluster or spot of interest) further analysis were carried on aiming at understanding the possible reasons beneath the patterns and singularities, with the assumption that they may help in explaining success or failure factors with regards to destination and services features. Both at the regional and the local levels, an investigation method was adopted including descriptive spatial analysis and spatial statistics coupled with

explanatory SMGI analyses, including Spatial-Temporal Textual analysis, which can be defined as the textual analysis constrained by space and time boundaries (STTx; Campagna, forthcoming).

In synthesis, operationally the study was carried on according to the following workflow:

1. Data collection and geocoding: data were extracted by Booking.com and TripAdvisor.com.com, geocoded and integrated in a geodatabase for analyses;
2. Regional preferences dynamics analysis: data were analysed for all the region at the municipal unit of analysis with spatial analysis, spatial statistics, and STTx in order to detect clusters and hot/cold-spot;
3. Local preferences dynamics analysis: data were integrated with authoritative data from the regional Spatial Data Infrastructure and other official open data sources in order to find explanatory hints on the preference dynamics and to get deeper insights on the relationships among tourist preferences, local territorial features and quality of industry services in selected destinations.

The last two steps were carried on iteratively on the relevant clusters and spots as in the examples reported in the remainder of this section.

4.1 DATA COLLECTION AND GEOCODING

In the first step, of the study a database was created extracting data from TripAdvisor.com.com and Booking.com in the period between May 2012 and May 2013. Through these applications customers can book, rank and review hotels, flights and restaurants (*or Tourism Services, TS*). The focus of the portals is to filter content based on rankings that are derived from other users ratings. Thus, rankings are split into several categories, such as value/price, rooms, location, cleanliness and sleep quality. Available rating categories however are determined by the type of reviewed item. The reviews are enriched by the possibility to add multimedia elements or travel maps of previous trips or to take part in discussion forums. Thanks to the availability of the location of the services they can thus be considered Social Media Geographic Information (SMGI; Campagna, forthcoming). Thus, the study required the adoption of a mixed methods approach, in which quantitative and qualitative information were collected in a database for analyses. The quantitative information concerns the score of tourist evaluation criteria, while qualitative information includes customers textual descriptive review.

Concerning the quantitative analysis it should be noted that in TripAdvisor.com a rating scale consists of five ordinal values (or stars), ranging from 'terrible' to 'excellent'. A separate mandatory overall rating summarizes the total customer satisfaction. In Booking.com a rating scale consist of numerical integer ordinal values, ranging from 1 to 10 (i.e. the higher the better). Beside quantitative assessment, in both platforms, a text box records qualitative natural language reviews. The title is a concise short text formulation of the assessment, while the comment is a long text field. After the data collection, a geodatabase was created including 2100 Tourism Lodging Service (TLS) records extracted from TripAdvisor.com and 1900 TLS records extracted from Booking.com. As working set an unified database of 992 records was used. The records provide lodging services name, category, location, and related quantitative score. It should be noted that the lodging services category includes not only hotels, but also other types of accommodation such as resort, bed&breakfast or agritourism. The 992 record dataset shown in Figure 1, includes all and only the lodging services featuring in both sources for which all data were available, and can be considered a representative sample.

In order to analyse spatially the location of the tourism business patterns in Sardinia, geocoding was performed on the extracted addresses, providing the exact location of the tourism operators. Point locations were found automatically for around the 80% of the items. Due to a variety of reasons, approximately 20% of the geocoding required manual editing.

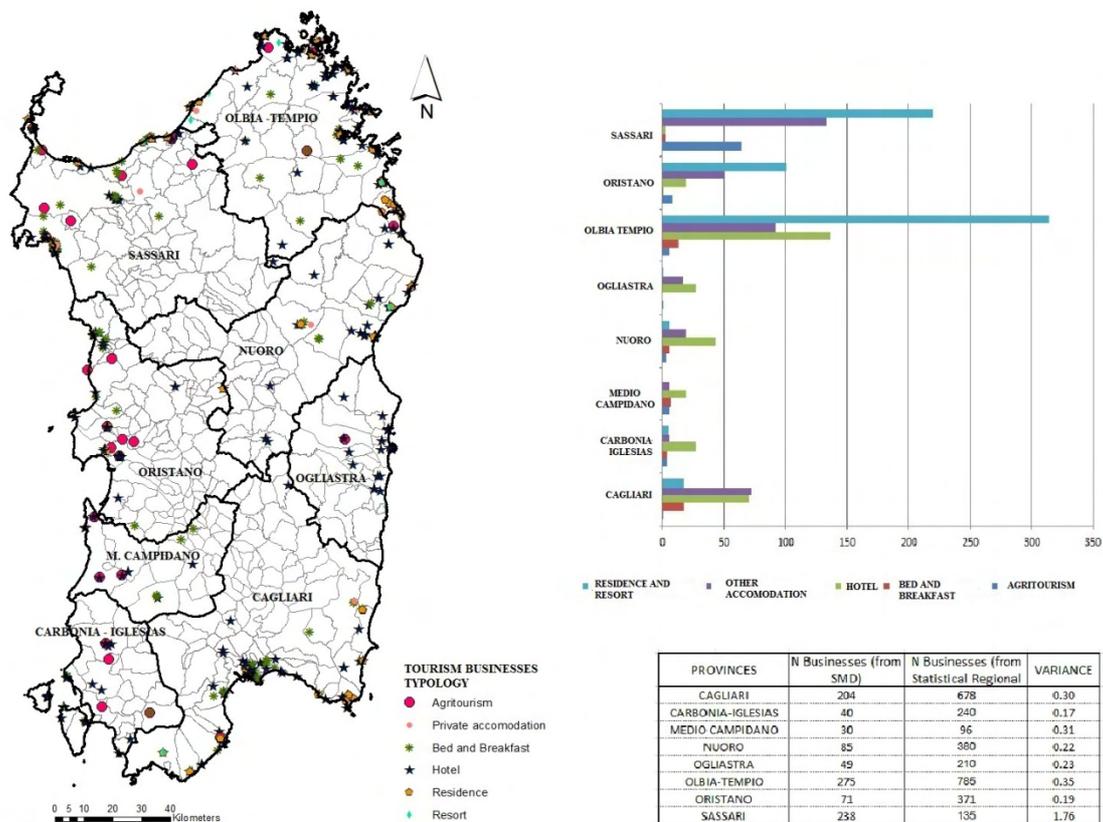


Fig. 1 Distribution of tourism businesses typology by provinces

Figure 1 shows the spatial distribution of the customers review on the TLS in Sardinia, divided into 5 main categories: agritourisms (6%), bed and breakfast (15.7%), hotels (42%), private accommodations (29%), residences and resorts (7.3% of total numbers of operators). The results of the analysis by provinces revealed that three provinces have emerged as important tourist destinations in the tourists perception: Olbia-Tempio (27,8%) Sassari (24%) and Cagliari (20,6%). Other four provinces (Nuoro 8,6%, Oristano 7,3%, Ogliastra 5%; Carbonia-Iglesias 4%) are well represented by tourism businesses; whilst the province of Medio Campidano is only represented by the 3% tourism businesses. In addition, analysis of the significance of tourist appreciation in the coast and in inner areas in Sardinia revealed that 92% of tourism reviews sample concerns LTS (917) in the coastal areas, while only less than 8% of popular tourism businesses is found inland. Nevertheless, Nuoro and Medio Campidano Provinces together provide notable inland popular TLS with almost the 13% of the total number of reviewed tourism businesses. This may mean that tourists visit these areas to discover a less popular side of the island, which is characterized by its nature, cultural heritage and traditions. However, in terms of number of visitors this kind of tourism still does not compete with massive preferences for tourism along the coast. The chart in Figure 1 shows the result explained above together with provinces distribution of the different types of tourism facilities.

Analysing the spatial patterns of TLS typology together with the semantic of their reviews may offer interesting hints to characterize different destinations for tourism planning purposes. As an example, it can be noted from the analysis that Cagliari TLS supply is characterized by a strong dominance of B&B, while for Alghero and Olbia, which are also major coastal city tourism centres, hotels and residences are more popular among tourists. This determines different overall TLS models for the destinations. The analysis of the content of the reviews for the different models may help to get better insights on the success factors of the

different models, and give useful hint for the choice of the more sustainable tourism development model for other underdeveloped destinations.

4.2 SPATIAL ANALYSES OF TOURISM PREFERENCES

After the preliminary descriptive analyses of the preferences dataset, the second step of the methodology is the application of spatial analyses of tourism preferences to explore spatial patterns of positive visitors judgments at the regional level. The application of spatial analytical techniques allows the exploration of the spatial dynamics of visitors perception and their relationships with different variables. For each TLS the database includes a score record, which is the average of six main attributes:

- 1. Location, which is related to the geographic position of the structure;
- 2. Services, referring to all transport facilities, shopping areas, bars and restaurants;
- 3. Price/quality ratio, referring to structure cleanness, staff kindness and all type of comforts offered by the operators;
- 4. Staff (kindness);
- 5. Room cleanness(Cleaning);
- 6. Comfort, referring to all facilities and services that hotels provide to their customers.

It should be noted that the attributes *Location* and *Services* explain the territorial features of the destination while the others express the perceived quality of the TLS supply.

Thus the data model allows the investigation of the spatial patterns of both preferences on territorial and tourism industry features at the local level across the whole region. The following analysis show some examples to explain which are the favourite destinations globally and by the two perspectives. The analysis starts by mapping the Tourist Positive Preferences Incidence (TPPI, i.e. the ratio between the positive scores and the TLS by municipality) in Sardinia. Figure 3 shows the distribution of the TPPI (left). The TPPI shows an overall high spatial concentration in the North-East of Sardinia. The Costa Smeralda district appears as the only area where the global tourism preferences fulfil overall visitors expectations. Looking at individual municipalities, the analysis shows that Alghero exposes the highest TPPI rate. The other two municipalities with a high TPPI are Cagliari and Olbia. Also in Figure 3, two maps show the pattern of TPPI by destination territorial features (centre) and by tourist industry services quality (right).

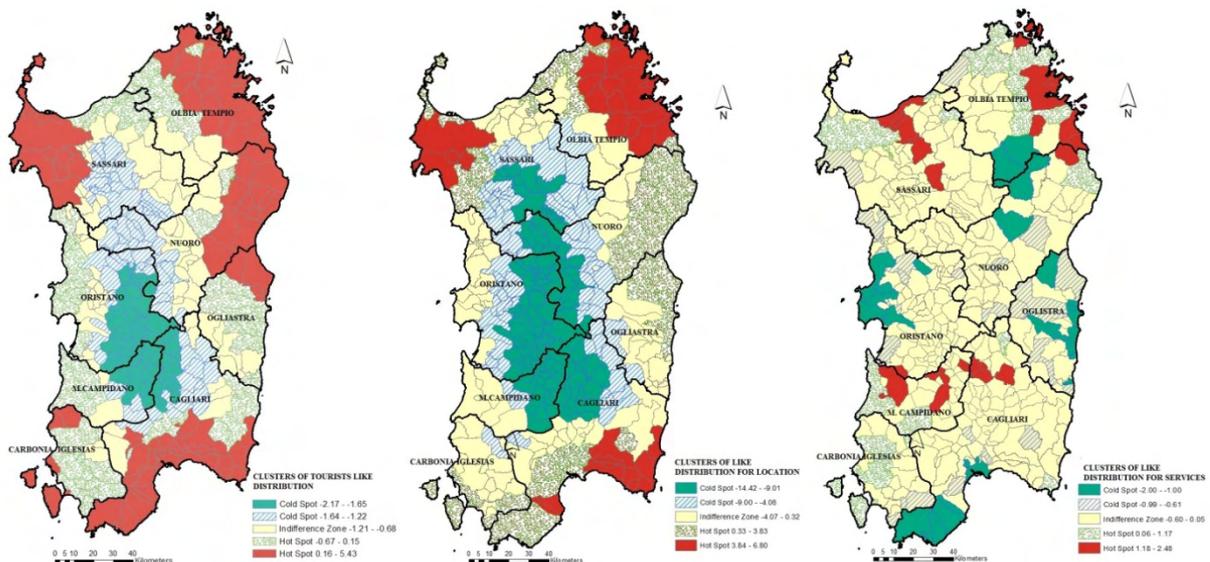


Fig. 3 Areas characterized by positive preferences (TPPI): global (left), location (center), and services (right).

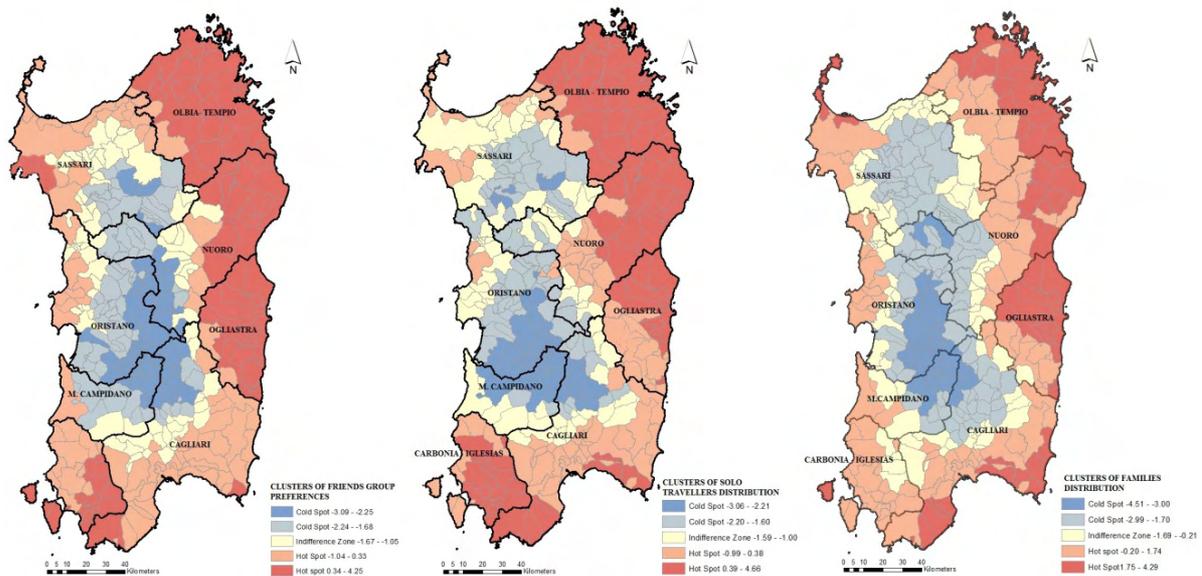


Fig. 4 Different tourist typologies affected surfaces

The analysis of the preferences allows also detecting the areas by typology of users. The maps in Figure 4 shows the results for three tourists categories, namely “Group of friends”, “Solo Travellers”, and “Families with children”. This information may be very helpful in shaping marketing strategies and in tourism planning.

4.2 SMGI ANALYTICS AT THE LOCAL LEVEL

After the analysis of tourism dynamics at the regional level, identifying clusters and spots of successful destinations through the preference patterns, the methodology adopted for this study has shifted to the local scale for further analyses aiming at finding explanatory answers for the phenomena under observation. The shift from the regional to the local scale is also conducted relying on spatial analysis and spatial statistics techniques on an integrated SMGI / A-GI (Authoritative- Geographic Information) data database. As an example case study for the sake of illustrating the methodology steps, the tourist destination of Alghero have been chosen as the regional analyses demonstrated its highly successful performance. The analyses at the local scale are intended to investigate the success factors within the single destination in order to extract useful hints to be used for further planning in the same or other destinations.

Alghero has been recognized as a best-selling destination from different tourists typologies. Thus, the following questions one should answer were “*Why tourists interest concentrates in Alghero?*” and “*What exactly in the destination does attract the tourists attention?*” In order to answer these questions, summarising the review by neighbourhoods, the map in Figure 5 shows the spatial clusters of preferences: the historic city centre of Alghero attracted the main attention of the visitors, while the modern residential districts in the outskirts, in this case, represents a cold spot. However the most interesting question arising from this analysis may be why certain coastal areas are not considered by the visitors and the answer may give useful suggestions to planners and decision-makers for further analysis. This kind of research can be supported by the integration of SMGI data with other A-GI on demographic, land use, transport facilities or socio-economic data coming from the regional SDI. In this sense, one interesting research question is whether spatial statistic methods such as regression analysis can be used to understand whether the spatial interest of the participant is influenced by environmental or socio-cultural variables. This represents the next future step in the extension of the study.

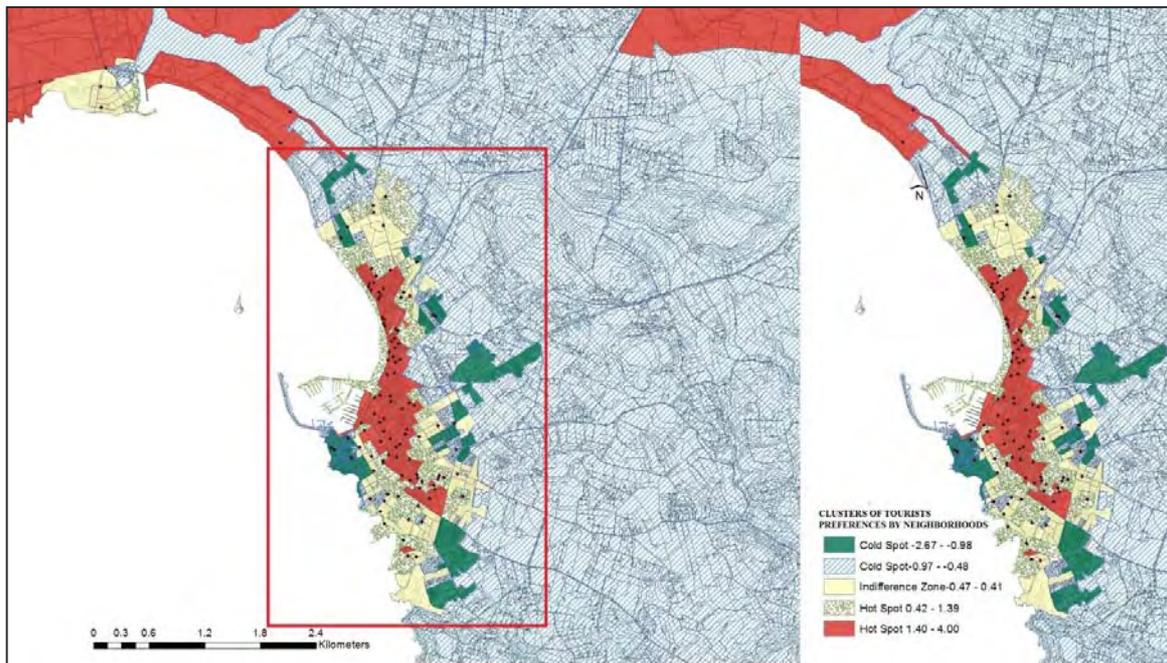


Fig. 5 Significant patterns in Alghero municipality

Another effective way to investigate the why tourists demonstrate to prefer certain areas or destinations rather than other may be given by the STTx analysis on their reviews. We want understand not only where but also what people think, analysing the reviews content. The analysis was carried out using the tourist comment database, which collected data regarding tourist user origin, language used, time comment and the textual judgment (positive and negative). For the overall Sardinia more than 880.000 reviews were extracted in five different languages (Italian, Spanish, English, French and Portuguese), of which 1050 in English relate to Alghero. The chart in Figure 6 shows the tag cloud of the latter comments dataset spatially constrained by the preference hot-spots in Alghero.



Fig. 6 Tag Cloud for hot-spot affected areas of Alghero

The textual analysis using Tag Cloud led to discover knowledge enclosed into this huge amount of text comments. The Tag cloud is essentially a visual representation of labels (tag) or keywords contained in

different word strings. Generally, this representation is presented with a weighted word list in alphabetical order, where the larger font is attributed to the most repeated words (Kaser, 2007). Text analytics techniques allow visualising on the map relevant posts (Berry and Kogan, 2010) not only by keyword but also by time, for knowledge discovery exporting data, especially when the amount of information rapidly grows. In the present example, the most popular 20 words were extracted. The figure shows how the majority of the words in the posts refer to spatial or physical aspects of Alghero, such as *location*, *beach*, *town*, *old city* and *city centre*. Other frequent words are related to tourism structures, such as *hotel*, *stuff*, *room* and *pool*. Outcomes of the textual analysis also indicate higher levels of satisfaction with location, facilities and services. According to the results, the main reason for tourists to visit Alghero seems to be related to both its natural attractions, which include natural sites, such as beaches, and the presence of a unique cultural heritage. These facts generate a positive tourism location image, which is the most influential psychological factor at play when tourists decide where to travel. People with doubts regarding of travel destination, will probably choose a destination with a good image. Textual analysis results also indicate a high level of satisfaction with the destination leisure sites, such as typical *restaurants* and typical *food*. In addition, results expressed a high level of satisfaction with the supply of accommodation, the cleanliness of structures and the kindness of the employed staff.

5 DISCUSSION AND CONCLUSIONS

The results presented in this paper rely on the first outcome of an exploratory study to get insight on what kind of analysis may be carried on in order to extract from Social Media and Geographic Information meaningful knowledge relevant for planning and decision-making. The case study falls in the domain of tourist planning which is closely related to urban and regional planning. In fact, as the results of this study demonstrate, the success of tourist destination is closely dependent not only by the quality of the tourist industry offer but also by the territorial setting of the destinations, including the natural, cultural and the physical character of the places, as well as infrastructure and services. Further analyses are currently ongoing to extend this early framework and to earn deeper insights on the one hand on the functioning of tourism preference dynamics, and on the other hand, from the methodology perspective, on the formalization of a novel and robust integrated A-GI/SMGI analytics.

Still, this study gives empirical contributions to the evaluation of social media data using spatial analysis tools in tourism literature. The first one is related to the use of exploratory spatial analysis as a method to visualize and interpret visitors perception based scores. The literature on tourism services distribution highlights several issues and debates, but often the spatial dimensions of visitors subjective perception was omitted so far. In addition, the measure of this spatial dimension and its representation may open new opportunities for planners as well as new research challenges, in order to use authoritative and social media GI for a pluralist and customer-oriented policy-making in tourism planning. Many of the assumptions and findings can be anyway applied to the more general field of urban and regional analysis, design and planning.

Additional analyses are currently under development aiming at understating the possible integrations of SMGI with a more complex territorial model relying on further official spatial data resources on demographic, land use, transport facilities or socio-economic data coming from regional SDI. In this sense, one interesting research question which will be tested is whether spatial statistic methods such as spatial regression analysis can be used to investigate quantitatively how the spatial interest of the participant is influenced by environmental or socio-cultural variables.

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IMAGES SOURCES

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