Big data in smart tourism: challenges, issues and opportunities

Editorial Special Issue

Current Issues in Tourism

"Big data in smart tourism: challenges, issues and opportunities"

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Abstract

In the era of digital transformation, Big Data have assumed a crucial role in changing the global travel and providing significant challenges and opportunities for established companies, as well as new entrants into the tourism industry. All these companies can get valuable information on Big Data for predicting tourist demand, enabling better decision-making, managing knowledge flows and interaction with customers, and providing the best service in a more efficient and effective way. This can result in improved productivity, increased customer satisfaction, personalized marketing campaigns, and more efficient operations. However, open research issues about the role of Big Data in the tourism industry can be still recognized. With these premises, this Editorial aims to present the articles included in the special issue of Current Issues in Tourism titled "Big data in smart tourism: challenges, issues and opportunities", which has called for research contributing to the recent debates on the implications and challenges of the adoption of Big Data to improve the competitiveness of tourism destinations and companies. Main topics considered by the accepted articles include a literature review proposing a novel theoretical investigative frameworks, metrics and critical dimensions, and empirical investigations of the use of Big Data in different tourism contexts.

Keywords Big Data, Smart tourism, Tourism management, Tourism destination, Digital transformation

Introduction

The embracement of Big Data in tourism has been assumed as a mean to lead the challenges of the smart growth of tourism destinations and companies (Alcántara-Pilar et al., 2017; Gretzel, Sigala et al., 2015; Fuchs et al., 2014; Jackson, 2016), by reshaping the boundaries of the competition and enhancing its configuration as information intensive industry (Law et al., 2014; Vargo et al., 2009).

In this context, the recent debate on smart tourism has attempted to demonstrate the several areas of implications and challenges that Big Data can offer to the competitiveness of tourism destinations and companies (Jackson, 2016). Characterized by advanced services, high degree of innovation and the presence of open, integrated and shared processes for enhancing the quality of life for both residents and tourists (Presenza et al., 2014), the notion of a smart tourist destination is the result of the interconnection of tourism destinations with multiple stakeholders' communities through dynamic platforms and knowledge-intensive flows of communication and enhanced decision support systems (Buhalis and Amaranggana, 2015; Jovicic, 2019). As for the company, the large diffusion of social networks and digital applications makes tourism more and more configurable as an experience (Aarikka-Steroos and Jaakkala, 2012; Lu et al., 2015) resulting from collaboration, co-creation and digitalization (Neuhofer et al., 2013). During their journeys and in their decision-making and communication processes, tourists contribute to the creation of a massive flow of data generated by sensors, micro-devices and cameras distributed on the urban and extra-urban areas of interest for tourists. All these data are a promising basis for making smart destinations as well as for enhancing the tourism firms' capability to personalize their offering of products and services.

However, the real implementation of such innovative models of data-driven value creation in tourism remains more limited to the theory or implemented in a few exemplary cases. Indeed, Smart tourism remains an ill-defined concept and a field of investigation that calls for closer examination and theorization (Gretzel et al., 2015) from a wide range of disciplines and research approaches. Coherently with this perspective, our special issue has intended to provide a contribution at the advancement of the debate on Smart Tourism by focusing on Big Data as an emerging paradigm that is re-shaping the theory and practice of tourism.

Specifically, the objective of the special issue is to explore challenges, issues and opportunities of Big Data in smart tourism through a cross-disciplinary interpretative lens, with theoretical and empirical contributions that could allow deriving a more mature definition of smart tourism and its meaning for companies and destinations. Given the changes that digital transformation is bringing in the tourism sector and in order to support managers that operate in this sector, it is important to investigate several issues included understanding on how big data can support decision making in tourism management, how big data allow the co-creation of digital local experience and support the competitiveness of destinations, which are meaning and implications of knowledge management in smart tourism, how big data impact on business model innovation in tourism, how big data can be assumed as the basis for improving the quality of tourism services by public and private organizations.

This special issue intends to cover these topics and to reflect on the state of Big Data and smart tourism research. The specific goal of the special issue is to make the benefits of Big Data evident for those in the field of tourism management and to understand the dynamics of, and opportunities within, the smart tourism management.

In this special issue, we open up the black box of "data enabled organisations" (Baumgarten and Dickstein, 2013, p. 1), where Big Data are being used to explore innovative challenges and trajectories of sustainable development in tourism management. In response, we received many submissions with original contributions to theory and many with empirical perspectives on how to harness the power of Big Data for tourism and to comprehend opportunities and challenges characterizing smart tourism.

Structure of the Special Issue

This special issue has been structured in a logical order that takes readers from literature reviews exploring the state-of-the-art in leading-edge papers through to novel theoretical investigative frameworks, metrics and critical dimensions, and finally to empirical investigations in different contexts.

The contribution by Centobelli and Ndou (2019) conducts a systematic literature review to analyse the body of knowledge on big data and analytics in the tourism industry using a knowledge management perspective. A citation network analysis methodology is adopted to explore the content of the papers on the topic. This methodology allows the authors to identify three main research areas: the impact of big data analytics on the tourism business, management and innovation practices; the role of big data for customer knowledge management and performance; and the technical, methodological and architectural solutions supporting big data analytics. The main results provide a research agenda including some relevant topics for future research on big data for tourism, as well as some significant implications for academicians and practitioners. Research implications concern the definition of new technological, managerial and competence-based frameworks. Practical implications regard the opportunity to provide significant insights for practitioners to develop new business models and organizational structures to extract customer knowledge from big data.

The paper by Cillo et al. (2019), based on the notion that data-driven online reputation management (ORM) may help to define how a specific tourism product can be tailored to meet the needs of a particular audience/market segment (Tussyadiah, 2014), is one of the first attempts to examine actual challenges, strategies, and impact of the use of big data analytics by niche tourism destinations for ORM. Specifically, on the basis of a multiple case study methodology involving three niche tourism destinations (i.e., Lake Garda, Orvieto and Maratea), the study develops a framework conceptualizing that Big Data analytics capable information systems positively influence the development of niche tourism destinations' ORM strategies and online reputation. In turn, the possibility to have improved ORM strategies and online reputation improves competitiveness in the tourism sector.

The paper by Vu et al. (2018) delves into the security issues (e.g., cyber-attacks) related to the (sensitive) information shared in location-based social media (LBSM). Indeed, despite LSBM provides opportunities to enhance the traveller experience and decision-making, privacy concerns may prevent users from sharing their location data (Beinat, 2001; Narayanan & Shmatikov, 2009), ultimately undermining the impact of such Big data in the tourism sector. With this in mind, the study adds to the conventional discussion about cybersecurity issues by distinguishing security breach (unauthorized access to private data) and privacy breach (in-depth analysis of publicly available data). Indeed, the results of the study warn that sensitive social relationship information among users can be discovered through advanced data mining techniques (social linking mining in

this case). Analysis is conducted on a large-scale venue check-in data set collected from Foursquare and considering information of international visitors and local residents in Singapore. All in all, the authors provide recommendations for tourism researchers and managers to place more attention on implementing mechanisms for protecting privacy breach in the adoption of LBSM.

The paper by Pesce et al. (2019) takes steps toward extending the analysis on the evolution of the cultural heritage sector by means of digital platforms and discusses how digitization and big data are shaping this process by enabling new ways of creating value and of espousing the different types of interest expressed by the different stakeholders. The study combines multiple data sources (interviews, observations, archival data) and is informed by the value-driver model on the sources of value creation in e-business developed by previous researchers (Amit & Zott, 2001). The analysis shows that a platform can overtake a rival one when it is able to offer multiple drivers of value creation that attract members from different industry contexts and that have different objectives in joining the platform. The platform orchestrator's capability of organizing big data and making part of them available to members is the key condition through which their different interests are aligned. This capability is independent of the level of industry-specific knowledge that the platform orchestrator has. Specifically, the findings document how Google Arts & Culture has been more effective than its main rival platform - Europeana - in competing on the variety, customization and experimentation of artworks accessible online and in offering a one-stop-shop logic for all the relevant content and information. Specifically, the empirical evidence shows how Google Arts & Culture has enhanced the four drivers of value creation, namely efficiency, complementarities, lock-in and novelty, as defined by Amit & Zott (2001), more than Europeana. The fact that Google's platform has been able to enact these drivers jointly is at the same time both the reason for and the consequence of having favoured a process of convergence in the interests expressed by different stakeholders through the big data's sociotechnical features of interconnectivity and portability. Overall, the authors contribute to research on value creation from big data and its supporting technologies. They also contribute related to show the role of big data in changing the structure of industries - such as tourism - which are dominated by well-established business logics.

The paper by Amatulli et al. (2019) starts from the evidence that hospitality is one of the sectors more interested by sharing online reviews on dedicated digital platforms with the aim to tackle the issue of what drives the sharing of certain types of online content. Accordingly, authors investigate the sharing of user-generated content characterized by negative emotional valence and study the effect of two factors on the extent to which user-generated content contains negative emotions. One such factor is the reviewer's expertise, while the other is hotel quality. The paper leverages on the psychological antecedents of word-of-mouth behavior suggesting that expert consumers are particularly reluctant to share negative word-of-mouth to avoid projecting a negative image of themselves in social contexts, thus possibly damaging their reputation. The analysis has taken in consideration 1,200 TripAdvisor reviews on Italian hotels located in three major Italian cities. The study highlights as expert reviewers might share reviews containing less intense negative emotional content compared to less expert reviewers especially when the hotel is of high quality.

The paper by Villamediana-Pedrosa et al. (2018) identifies the main variables related to a post´s content on social networks and the possibility to predict positive and negative engagement in the field of tourism destinations. The study classifies the message´s design variables into four main categories: 1) message tools (i.e., presence of text, images, video, labels, applications, interactive games, events calendar), 2) appropriate message structure (length and intelligibility), 3) informative cues (i.e., links to the brand, orientation towards the product or the brand, topics relevant to the

audience, remuneration´s promise), and 4) persuasive and emotional cues (i.e., emotional signals, valence, endorsement and influencer mentions). The unit of analysis is represented by the Brand Spain posts concerning tourist destinations and published on Facebook. The authors conduct a content analysis and a regression analysis with optimal scaling transformations to analyse the data collected by publications, audience reactions to such publications, and audience comments on an official fan page. The main results highlight that the use of message tools and the use of informative cues have the main role of predictive variables in terms of positive/negative engagement.

Conclusions & Future research

The papers published in this special issue offer original contributions that advance knowledge about challenges and opportunities for smart tourism at the light of the Big Data. Each reflects the state-of-the-art research and/or related practice, and each identifies emerging issues and areas for future investigations.
The issues emerged in the papers of this special issue raise some interesting thoughts about research questions and future research:

- How are digitization and Big Data shaping the tourism industry structure and the institutional forces at work?
- What are the technological, organisational, structural, and cultural main challenges related to Big Data implementation and management in the tourism industry?
- What are the skills and capabilities necessary to deal with Big Data in tourism in the next years?
- What are the emerging business practices and models for optimising the performance of Big data in the tourism industry?
- What are the critical success factors affecting the performance of Big Data use in the tourism industry?
- What are the transactional, strategic, transactional and informational opportunities of Big Data for companies of the tourism industry?
- What are the complementary investments that firms of the tourism industry need to sustain for exploiting the potentialities of Big Data?
- What are the mechanisms behind the creation of strategic value from Big Data in the tourism industry?

This special issue is supposed to inspire the future work of scholars and researchers in the field of Smart Tourism and Big Data and in the larger family of business management and engineering. The topics discussed in this special issue should motivate scholars for new contributions for interpretation and synthesis.

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