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Smart Tourism Design: Launching the annals of tourism research curated collection on designing tourism places

Zheng Xiang [a], Jason Stienmetz [b], Daniel R. Fesenmaier [b,*]

[a] Virginia Tech, United States of America
[b] Modul University Vienna, Austria

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ABSTRACT

Design is now considered a crucial activity in contributing to the success of tourism enterprises as well as destinations. This article builds upon the ideas first introduced in the two edited books, namely *Design Science in Tourism* and *Analytics in Smart Tourism Design*, which brought the conceptual and methodological foundations for designing tourism places to the forefront of tourism literature. Specifically, this article first introduces the intellectual background that dates back to Clare Gunn's seminal work on Vacationscape, which has evolved into a systematic approach that incorporates tools developed in psychology, behavioral economics, marketing, management and more recently data sciences. It then describes the tourism design system as a general framework, followed by a discussion on the nature and role of smart tourism in enhancing this framework. The article then introduces the Curated Series on Tourism Design by identifying a group of articles published in the Journal which address many essential issues shaping the future of the tourism industry.

Introduction

Society is recognizing how quickly change can occur as we are on a precipice requiring an immediate, thoughtful and committed response to global climate change, the impact of the coronavirus pandemic, the need to fulfill social justice and equality as well as challenges posed by new technology. Indeed, an increasingly diverse literature has documented the huge and unrelenting changes taking place in technological, socio-economic, environmental and political domains now threatening to destabilize the old world without adequate foundations for envisioning and preparing for a 'new world.' Under these circumstances, it is imperative to develop tools, both conceptual and methodological, to support institutions and agents (i.e., local, regional, and national tourism agencies as well as private tourism enterprises) who seek to provide stewardship to resources and programs potentially leading to a more responsible, sustainable and resilient future for tourism.

This introductory article builds upon the ideas first introduced in the two edited books, *Design Science in Tourism* (Fesenmaier & Xiang, 2017) and *Analytics in Smart Tourism Design* (Xiang & Fesenmaier, 2017), which brought the conceptual and methodological foundations for designing tourism places to the forefront of the tourism literature. It first provides a brief discussion of the emerging concepts related to tourism design and design science in tourism, which we believe provides a useful framework for understanding and developing effective strategies and pathways to envision and fulfill the promises of tourism for society. Then, it introduces the series of articles which have been accepted to be published in the Annals as part of the Curated Series on Smart Tourism Design.

* Corresponding author.
E-mail addresses: philxz@vt.edu, (Z. Xiang), jason.stienmetz@modul.ac.at, (J. Stienmetz), Daniel.fesenmaier@modul.ac.at. (D.R. Fesenmaier).

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Conceptual background

In 1972, Clare Gunn published a book titled *Vacationscape: Designing Tourist Areas* wherein he discussed a new perspective for tourism planning with the focus on the whole experience of the tourist. With a planned approach, the notion of Vacationscape argues for fulfilling the complete, interrelated requirements of the traveler by means of the entire landscape of travel, rather than the patchwork of fragmented and oftentimes conflicting approaches made by a variety of business entities in the industry. According to Gunn, "an overriding principle of tourism development today must be a greater sensitivity to feelings and attitudes of individuals as entire persons…he is an individual, who at one particular site or location, at a particular time during his travel, may wish to see and do a certain thing." (p. 146). Vacationscape represented a major advance in tourist planning with much emphasis on place design, destination as a system, the holistic tourist experience as well as the analytical approach to understanding the tourist's needs and behavior.

Since then, much has been written regarding the tourism system with the goal of understanding its essential components and the underlying processes shaping each of its components (Morrison et al., 2018). As initially discussed in Fesenmaier and Xiang (2017), this research along with other advances in science and technology aims to provide the foundations to realize Gunn's vision. First, there has been considerable development in our understanding of the touristic experience and the factors influencing these experiences (e.g., Lin et al., 2019; Sterchele, 2020; Wearing & Foley, 2017). Second, the coalescence of knowledge about the importance and role of design in the service context argues that design is not simply a *property* of the artefact (e.g., event or place which supports the traveler experience), but rather it is a way of *thinking*. As such, *design thinking* is now considered a basic process supporting the creation of customer value (Brown, 2008; Kolko, 2015). Third, the development of the Internet and related technologies (i.e., smartphones, social media, wearables combined with various sensors, Internet of Things and so on) has made it possible to collect and analyze highly detailed traveler-related data in real time; this new capability affords new opportunities to understand how travelers respond to their environment while in situ, thereby overcoming a number of important limitations of previous methods (Gretzel, Sigala, et al., 2015; Kim & Fesenmaier, 2015). Finally, with the vastly abundant data and computational capabilities, new and highly sophisticated systems, which generally can be described as artificial intelligence (AI), have created new ways of making inferences about the reality as well as new modalities of interaction, enabling tourism enterprises to manage the visitor experience in much more personal and innovative ways (Iansiti & Lakhani, 2020; Tussyadiah, 2020).

These developments in theory, methodology, and practice have culminated in a new paradigm which can be best characterized as *Smart Tourism Design*. Smart Tourism Design is not simply about developing an event or place to support the tourism experience; rather, it provides a basic logic and a vocabulary for designing and managing tourism places. Building on the foundation of the so-called "smart tourism" (Gretzel, Werthner, et al., 2015), Smart Tourism Design is explicitly focused on the development of digital artifacts that support new and innovative processes, systems and experiences which can then be used to reshape tourism. This logic is developed based on the understanding of the linkages between various components in the tourism system required to support the creative process for place design. As such, a general framework called the "tourism design system" has emerged to serve as the basis for assessing the essential components and fundamental processes for designing tourism places.

The tourism design system

One of the important advances supporting tourism design is the extent to which science has contributed to our understanding of the tourism system, especially with respect to how travelers decide where and when to visit and the nature of the experiences during the trip (Pearce, 2019). Fig. 1 provides a basic framework organizing the progress made over this time. As can be seen, the framework places the tourist at the center, within three levels of processes constituting the tourism design system that aims to understand and shape the tourist experience.

At the first level of the framework is understanding a tourist's response to an experience, which consists of several stages (Craig, 2009; Volo, 2009). The tourism experience is manifested through several "mini" processes involving sensation, cognition, emotion, and then memory, fantasy and eventually meaning. While the touristic experience is largely the result of subconscious sensations and conscious perceptions during the trip, outcomes of these experience processes vary based on the nature of the individual and the situation. Basic socio-psychological and trip-related elements such as goals, prior experiences, culture, or travel companions shape perceptions as they cause variation in individual response towards environmental stimuli. Importantly, this level of the tourism design framework is multi-faceted (emphasizing sensation, perception, emotion, cognition, and memory) and embraces the mechanisms responsible for translating the objective (i.e., sensation) into the subjective (i.e., fantasy and meaning).

The second level of the framework identifies the principal physical and social factors employed in the design of tourism experiences. In particular, Fesenmaier and Xiang (2017) proposed an experience production system which is comprised of six key components, namely Themes, Stories, Atmospherics, Technology, Co-creation, and Affordances. Each of these components represents a specific aspect of the tourism design system which influences the elements of the first level where sensations are received, incorporated and interpreted so as to create memorable visitor experiences. **Themes** guide the entire perceptual process from affecting how tourists unconsciously access information to shaping how tourists find meaning in the overall experience. Pine and Gilmore (1999) contend that strong themes are essential in designing tourism experiences that are compelling, captivating and therefore, memorable. They further propose a set of principles for theming a place: the theme must alter visitors' sense of reality

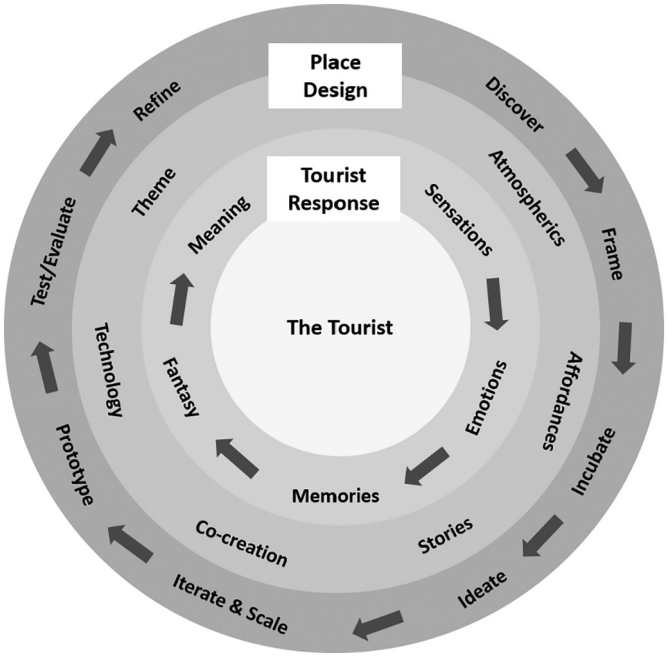

Fig. 1. The tourism design system.

by manipulating space, time and matter into a cohesive and realistic whole which includes multiple 'places within the place,' and which generally fit within the overall character of the place.

Stories provide the underlying structure and animate the theme by building the connections between the actors (i.e., the visitors and their hosts) and actions (i.e., the various activities within the designed environment) based upon the plot and the emotions raised through actions and reactions (Gretzel et al., 2011). Recently, Moscardo (2017, p. 99) argued that a story is a "description of an event or set of connected events, the reactions of characters to that event, their decisions and the consequences of these reactions and decisions" and through these stories, places (and events) as well as the actions and experiences of visitors. As such, stories are used by designers to enable visitors to organize and to interpret their experiences so as to create meaning (Gretzel et al., 2006; Pine & Gilmore, 1999; Rose, 2014).

Whereas themes and stories are conceptual, **atmospherics** comprise physical (and service related) elements of a place which support the touristic experience. Mattila and Gao (2017, p. 152) argue that atmospherics, which create visual, aural, olfactory and tactile stimuli, "have a tremendous impact on the flow of the tourism experience, the meaning tourists attach to the experience, their emotional bonding with the service provider, and their social interactions with other customers." Further, others such as Berridge (2007), Rossman and Duerden (2019), and Rose (2014) demonstrate that the physical design of tourism places, which appeal to all five senses, are much more likely to evoke emotional responses so as to create memorable experiences.

Co-creation involves the visitor interacting with and within the tourism place. Gnoth (2017) indicated that the tourist processes the value proposition offered by the destination by combining the design features of the destination together with the tourist's motives. An important outcome of co-creation is that the visitor would treat the place as a 'stage' within which he/she performs so as to create a sense of value (e.g., Pine & Gilmore, 1999; Prebensen et al., 2014).

While in a general sense, **technology** includes many types of machines and equipment used to support the touristic enterprises, information technology in recent decades has taken the fore in shaping tourism (Benckendorff et al., 2019). Technology can play multiple roles in staging and co-creating touristic experiences, from enabling or facilitating, to creating, attracting, and enhancing (Neuhofer et al., 2012). Examples of enhanced experiences include the Star Wars Theme Park at Disneyland, which represent what Rose (2014) describes as 'enchanted objects' - that is, those ordinary things made extraordinary. Thus, technology can enhance the capability of the place to establish, improve or enhance the degree to which a place enacts a desired theme through stories by redefining the atmospherics and enabling visitors to shape experiences.

Finally, **affordance**, describes the property and extent to which an object, both tangible (e.g., a chair) and intangible (e.g., a service), is understood by visitors so that they can take actions in order to create desired outcome(s) (Gibson, 1977). Norman (2013) argued that the notion of affordance is dependent not only on the physical capabilities of a user, but also on his/her goals, beliefs, and past experiences. For example, if a traveler visits a park, he/she may want to use the park to walk, fly a kite, relax on a bench, eat lunch or discuss work with a colleague. Thus, this notion of affordance reflects the likelihood that the visitor can experience the park in many different ways, depending upon how the park is designed and the capability and desired experiences of the visitor (Tomej & Xiang, 2020).

The third level of the tourism design system encompasses design thinking, which is conceptualized as a way of thinking about how a tourism place might be designed/created to enable visitors to realize the experiential value of the destination (Brown, 2008; Stickdorn et al., 2011). Design thinking enables the designer to consider the basic values of the community (i.e., boundary conditions such as sustainability, resilience, and so on) within which the place exists, either real or virtual. The basic process of design thinking begins with understanding and discovery, progresses to proposing solutions (i.e., developing a prototype) and finally evaluating and redesigning. Design thinking also emphasizes on-going evaluation so as to improve and even replace initial products. The basic principles of design thinking in tourism are applicable at any scale; that is, these processes can be used to design very small places such as a park bench or they can be used to guide the planning of a city or region. While design thinking emphasizes the cognitive, strategic and practical processes involved in place design and has many applications not limited to tourism, it can be seen as a contemporary version of the philosophy captured in the notion of Vacationscape first proposed by Gunn. Indeed, many studies show that the "best" places are those which mix art and science in ways which seek to improve well-being and "refresh" the human spirit (Berridge, 2007; Fesenmaier & Xiang, 2017; Rossman & Duerden, 2019).

Smart Tourism Design

While the framework of the tourism design system describes various components, processes and actions in designing the touristic place, Smart Tourism Design adds an extra layer to prescribe the desired outcomes of tourism design (see Fig. 2). Generally, smart tourism refers to the convergence of information technologies, business ecosystems, and tourism experiences (Gretzel, Werthner, et al., 2015). Over the past few years, smart tourism has become a vision and a general "blueprint" that allows many countries and cities to develop programs for building new technological infrastructures, developing smart end-user applications, and focusing on innovation in order to enrich tourism experiences and to increase the competitiveness and attractiveness of their destinations (Hwang et al., 2015).

Smart Tourism Design framework

In general, the concept of smart tourism is an extension of 'smart city' initiatives, but with specific applications focusing on the tourism destination or industry. It emphasizes three important characteristics, namely instrumented, interconnected, and intelligent, in terms of using technology. The combination of instrumented infrastructure (e.g., sensors' ability to measure use and conditions of the environment and other tourism assets enabled by technologies such as smartphones, cloud computing, Internet of Things, and RFID networks) and interconnected systems (e.g., platforms for collecting, combining, and sharing of data and information among tourism stakeholders) effectively enables cities (tourism destinations) to integrate, analyze, and ultimately support optimized decisions based on collective knowledge, which in turn, enhances the tourist experience, offers new business opportunities, and improves destination governance in an intelligent way. In this sense, smart tourism development requires destinations and companies to integrate personalization, context-awareness, and real-time monitoring through information collection,

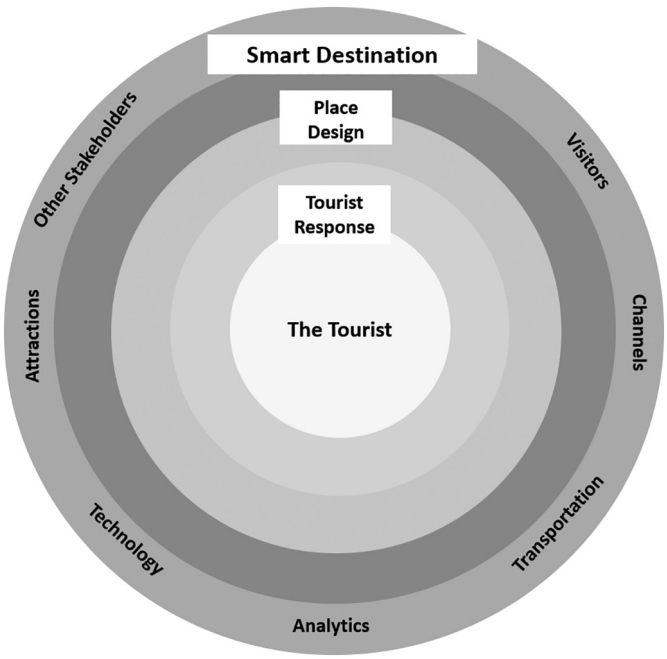

Fig. 2. Smart Tourism Design framework.

ubiquitous connectedness, and real-time synchronization into their management efforts (Gretzel, Werthner, et al., 2015; Neuhofer et al., 2015).

The objectives of making a destination 'smart' include developing tourism systems to create a better environment for tourists, residents, and businesses within the destination and its ecosystem. Clearly, the concept of smart tourism is far from being limited to the simple applications of technology at a tourism destination (Cohen, 2015). Indeed, the 'smart' concept embraces and sets the context for design in terms of the basic requirement that tourism places integrate physical, social, and technological infrastructures so as to improve experiences for both visitors and host communities and to adapt to the changing needs of destination stakeholders (Marsa-Maestre et al., 2008). With this in mind, smart tourism ultimately affects many components of tourism within a destination including tourists, tourism/hospitality businesses, marketing and distribution channels and their governance. The inter-relationships among destination stakeholders are often nuanced and complex, which necessitates a "big picture" or system-level approach to destination management that is consistent with the wholistic view advocated by Gunn (1972).

With the emphasis on the tourist experience, the essence of Smart Tourism Design can be illustrated with the concept of quantified self, which emphasizes the individual but can be easily extended well beyond the scope of individuals to social groups (Choe & Fesenmaier, 2016; Swan, 2013). Through sensors embedded in our environment and applications used in everyday life, an enormous amount of data is being generated and shared regarding one's physical location and physiological and psychological condition, which provides the basis for understanding an individual within a social setting. Building upon the notion of quantified self, Choe and Fesenmaier (2016) proposed a general framework of the quantified traveler by integrating individual travelers' previous behaviors and stored sensor data in their ordinary life into system development during travel. This framework consists of components that systematically incorporate heterogeneous personal historical data, i.e., individual-level big data, into place-specific and travel-specific domains for hospitality, transportation, communications, and also place design for supporting and enhancing the tourist experience (Fig. 3).

A framework of quantified traveler for Smart Tourism Design

Smart Tourism Design focuses not only on how to enhance tourism experiences, but also on how to effectively support and integrate tourism resources (i.e., attractions, restaurants, parks, etc.). In this regard, recent advances in information technologies and big data analytics play an important role in developing new measurement tools for effective destination management. Specifically, these tools enable destination managers to understand their products/services more closely by monitoring tourist behaviors and/or services/experiences in both offline and online environments. Within this context, Stienmetz and Fesenmaier (2013) suggested that there is a paradigm shift in destination management in terms of understanding and measuring a destinations' performance and competitiveness (see Fig. 4). Smart destinations empowered by information technology are a dynamic collective of interrelated actors, each affording visitors the opportunity to co-create unique and meaningful experiences within the context of place. At a systems level, destination managers, using the tools and frameworks discussed, can now understand, and therefore design, value by considering the connection of experiences (i.e., the customer journey) within a destination, recognizing that increasingly touristic experiences are created simultaneously in both physical and virtual places.

Introducing the curated series on tourism design

This very brief overview of tourism design and the evolution of smart places highlights the significant growth in our understanding of human behavior and intelligent systems (including tools) over the past fifty years. This research has led to an emerging area of tourism that might be generally described as *Design Science in Tourism* (DST) and which appears to offer a new and

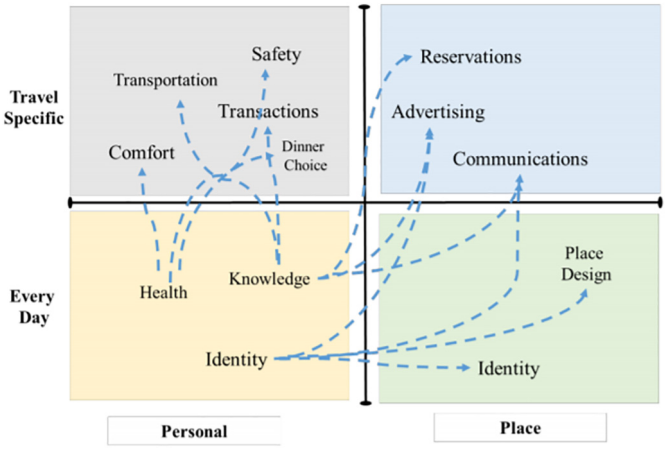

Fig. 3. A framework of quantified traveler for Smart Tourism Design. (Adapted from Choe and Fesenmaier (2016).)

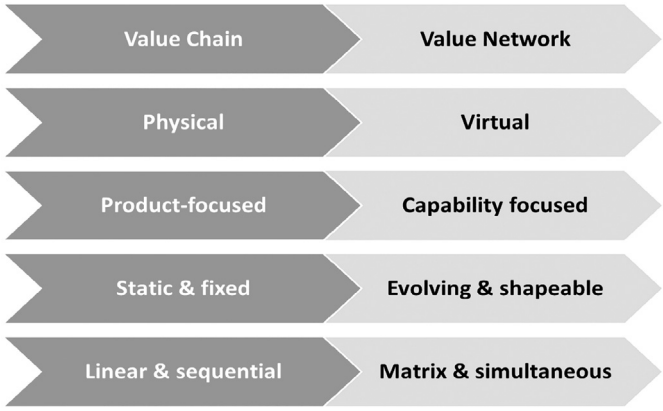

Fig. 4. The shifting paradigm for Smart Tourism Design.
(Adapted from Stienmetz and Fesenmaier (2013).)

substantive framework for addressing many of the challenges facing society in general, and tourism specifically, as it is experience focused, science based, systems oriented, scalable from small to large settings, action-constructive oriented, and employs new tools and metrics. However, it is clear that much work is needed both in terms of developing our understanding of the basic forces shaping the trip journey as well how this information may be used to design and implement smart places which are more human oriented, sustainable and resilient. It is also clear that this knowledge will lead to many future innovations which will continue to (re)shape travel behavior and tourism enterprises and, in turn, society as a whole. As such, this work truly represents simply a 'starting point' wherein tourism scholars and practitioners continue the 'journey' towards building a better world.

In recognition of this goal, the *Annals of Tourism Research* has introduced a Curated Collection (CC) focusing on Smart Tourism Design and Analytics. The goal of this CC is to create a track within the journal which attracts vital contributions from the larger academic community for the foreseeable future. In response to the initial call for papers, 21 articles have been accepted for publication in the *Annals* and are formally published in this volume. These papers are organized in four general areas.

The first four papers discuss and illustrate some of the essential goals for tourism design and development: improving quality of life of travelers and residents of the community and improving the sustainability of tourism places. These papers argue that change in how we understand the world, the role that tourism plays and how we measure tourism is necessary for us to address many of the challenges currently facing society. Pauline Sheldon goes further arguing the first step to successful change requires that we as researchers and members of society need to adopt values which prioritize sustainability and resilience; importantly she argues that travel offers a very powerful foundation for facilitating this change. It is hoped that readers will consider the essential ideas of these four papers as they point towards ways to better design tourism places.

The second set of papers focuses on various aspects of traveler behavior as a foundation for tourism design. These papers include interesting as discussion on how travelers perceive time as part of the journey and how our senses and emotions shape our perceptions of human decision making; further, Gianna Moscardo (2020) extends her groundbreaking work on the nature and role of stories in tourism while Tomej and Xiang (2020) introduce the affordances concept in tourism design.

The third series of papers examine a number of issues related to designing and managing tourism systems. The topics included here range from a critical discussion of smart tourism and innovation, the nature, role and impact of power within smart tourism ecosystems, and the use context mapping for designing tourism places.

The fourth and last section deals with various methodological issues in tourism design, smart places and big data where the goal is to challenge the reader to think differently about how one defines, and therefore measures and manages, a destination. And indeed, the ideas presented in these are quite challenging starting with Beritelli et al.'s (2020) paper on deconstructing visitor travel as 'trajectories' and 'corridors.' Three other articles summarize research wherein they used various forms of big data including that obtained from social media to understand the relationships (i.e., described as spatial structures) between types of tourism places. Last, Josef Mazanec provides a very thoughtful paper arguing that all studies including those using big data are explicitly or implicitly based upon theory. And, indeed, he (Mazanec, 2020, p. 5) concludes: "…studying tourism artifacts and constructing design rules rest on behavioral assumptions" and in this discussion he 'explodes' the myth that big data has some 'mystic power' and concludes that 'explicitness' makes our assumptions underlying design scientific, and is one important element of which all of us can agree.

We hope that you will find these articles stimulating. Of course, you may agree or disagree about the importance of specific topics, but we are hopeful that all can agree that the goal of this work is to help us learn about the underlying theory and the tools which we can use to better design, create, and manage tourism places. We started by discussing the forces of change that are shaping our society including tourism. Many of these forces now pose existential threats to our current way of living and they challenge us to change what we are now doing and to imagine a world which is more humane and able to improve the quality of life of future generations. And with this goal, we invite you to contribute your ideas, your research, your actions to this Series on Smart Tourism Design.

CRediT authorship contribution statement

The authors have contributed equally in terms of conceptual ideas, constructing and writing the manuscript as well as proof reading, etc.

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Zheng Xiang teaches and conducts research in the areas of information and communication technology in tourism (ICT), social media and tourism analytics.
Jason Stienmetz teaches and conducts research in the areas of destination marketing and management, tourism analytics and information technology and tourism.
Daniel R Fesenmaier works in the areas of tourism design, information technology and tourism analytics.