



Classifying multi-destination trips in Austria with big data



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ABSTRACT

Multi-destination trips are interesting for research in order to see which destinations are combined into one leisure trip. The aim of this study is to classify multi-destination trips in Austria based on geotagged photos on Flickr. The study sample includes tourists in Austria who visited at least two different cities based on the geolocations of their photos. The results revealed three types of multi-destination trips: (1) single destination trips (57%); (2) base camp trips (30%); and (3) regional tour trips (13%). Furthermore, cluster analysis was conducted to categorize the cities. The first cluster covers the eastern part of the country, which includes larger cities such as Vienna and Graz, and the second cluster refers to the western part of Austria. Practical implications include creating joint marketing campaigns and new tourism products such as hiking trails between cities in the same cluster.

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1. Introduction

Planning a trip involves many decisions such as where to go, how to get there and what to do at the destination. Among all these decisions, destination choice is one of the first to be decided by travellers. According to Crompton (1992), selection of a vacation destination occurs in three stages. The first stage is having an awareness set, which comprises all of the destinations a person knows. In the second stage, a consideration/evoked/relevant set is chosen from the awareness set, and represents the destinations the person is able to visit based on their circumstances. The final stage involves the selection of destinations that are deemed worth visiting and getting information about them, resulting in one destination being selected as the chosen vacation destination (Crompton, 1992). However, previous research has shown that 30% to 50% of all pleasure trips are multi-destination trips (Hanson, 1980; O'Kelly, 1982). These multi-destination trips can take various forms, such as visiting towns that are on the way to the main destination, or visiting nearby regions during the stay at the main destination.

Multi-destination trips are interesting for research in order to see which destinations are combined together in one leisure trip. Some examples of previous research concerning travel patterns and spatial movement of travellers include Lue, Crompton, and Fesenmaier (1993), Stewart and Vogt (1997), Tideswell and Faulkner (1999), and Hwang and Fesenmaier (2003). Knowing which destinations are visited during a trip is invaluable information for destination marketing organizations (DMOs), whether a city tourism organization or a regional tourist office. This knowledge enables the identification of potential marketing synergies, especially for destinations that do not have

enough attractions to draw visitors on their own (Tideswell & Faulkner, 1999). For instance, destinations can pursue joint marketing campaigns by creating hiking trails spanning two or more destinations, or advertise on each other's destination websites.

The purpose of this study is identifying and classifying multi-destination trips in Austria based on data retrieved from Flickr. Surveys are conducted by destinations to collect data from travellers; however, there is no data collected in Austria that shows which combination of destinations tourists visit if they visit multiple destinations in the country during their stay. This data can be retrieved from Flickr by using the geolocations of the photos taken. Using this information, multi-destination trips were identified, multi-destination tourists were categorized, and destinations were clustered according to the trip patterns. This study builds on previous research by Önder, Koerbitz, and Hubbman-Heidvogel (2016) by extending the focus to multi-destination trips.

2. Literature review

2.1. Multi-destination trips

Multi-destination trips are rational for tourists because they are cost and time effective. However, these are not among the five main reasons for engaging in multi-destination trips as identified by Lue et al. (1993). First, multi-destination trips better enable the satisfaction of heterogeneous travel preferences within travel groups even as small as two people. For instance, when one person from a given travelling group wants to climb a mountain while another wants to relax on the beach, a single destination may not be able to fulfil both of these needs. Second, the fact that nearly half of all US tourists stay with friends and relatives during their trip may lead to additional trips around the primary travel destination. Third, considering a multi- rather than a single-destination trip

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may increase the travel needs of potential travellers and encourage them to seek more variety in their travel. Fourth, combining multiple attractions or destinations into a single trip may increase travel satisfaction by diversifying the experiences and thereby reduce the level of risk. Fifth, spatial, temporal, and personal constraints in leisure travel may result in different destinations being part of one trip in order to satisfy the multiple needs of travellers. In sum, the many different needs of individual travellers and the varying forms of travel groups often make multi-destination trips a logical choice.

According to the LCF model by Lue et al. (1993), there are five multi-destination travel patterns: (1) single destination, in which only one destination is visited; (2) en route travel, includes trips on the way to the main destination or on the way back home, excluding side trips; (3) base camp trip, involves side trips around the main destination; (4) regional tour, includes trips in a region with stops in the smaller destinations in the area; and (5) trip chaining pattern, includes multiple destinations in a region and between regions (Lue et al., 1993).

Stewart and Vogt (1997) utilized the multi-destination traveller categorization by Lue et al. (1993) in order to identify multi-destination trip patterns in Branson, USA, and their results indicate a slightly different traveller classification than the LCF model. They differentiated trip chaining from regional tours, in that trip chaining describes more extensive tours which include different regions in North America, whereas regional tours capture multi-destination travel within smaller regions.

Investigating domestic travel patterns in the USA, Hwang and Fesenmaier (2003) find that multi-destination trips can be categorized as en route travels, in which individuals stop over at other destinations on the way to their main destination, rather than taking sub-trips around the main destination. The type of destination, whether en route or base camp, can also influence the length of stay, while prior experience at the main destination can influence the bundling of additional destinations (Hwang & Fesenmaier, 2003).

Overall, multi-destination trips are driven by cumulative attraction, which states that “a given number of attractions whose primary target is tourists will do more business if they are located en route, in proximity, or in a logical sequence to each other than if they are widely scattered” (Lue et al., 1993, p. 297). In the same line, if one destination can identify the other destinations that are close by and have something to offer to tourists, these two destinations can be combined in a multi-destination trip. Such synergies can result in economic benefits for both locations and may also increase the duration of stay in the area. Moreover, cumulative attraction indicates that tourism business is shared. According to Lue et al. (1993, p. 297) “an attraction secures its visitation not only as a result of its own generative power, but also as a result of the generative power of other attractions”. Thus, it is crucial for especially smaller or rural destinations to determine which other destinations they can partner with to increase demand for both destinations.

It is also important to know about multi-destination trips for the following reasons: (1) most destinations are not stand-alone cases, but form part of a product which includes the surrounding destinations; (2) identifying the destinations that are combined into single trips and learning the motives behind visitation of each destination enhance understanding of the destination and the surrounding destinations; (3) a good understanding of multi-destination trips improves the accuracy of tourism demand forecasts; (4) understanding the linkages between destinations can help inform joint marketing efforts by the destinations; (5) multi-destination models can help us to better understand the economic impact of tourism in the region or country (Lue et al., 1993).

Surveys are the most common method used to identify the destinations included in a multi-destination trip, despite being both time consuming and expensive. On the other hand, big data such as the traces individuals leave on the internet in the form of geotagged photos can show where individuals have been, which can be used to identify the destinations that individuals bundle during multi-destination trips.

2.2. Big data

Big data is described as “data sets and analytical techniques in applications that are so large (from terabytes to exabytes) and complex (from sensor to social media data) that they require advanced and unique data storage, management, analysis, and visualization technologies” (Chen, Chiang, & Storey, 2012, p. 1166). In order to call data big data, it needs to satisfy these three categories (McAfee & Brynjolfsson, 2012): volume, velocity, and variety. Volume refers to the quantity of data, velocity refers to the speed of information retrieval, and variety refers to different types of data such as text messages, photos on social networks, and GPS signals from mobile phones. Some examples of big data are credit card transactions, search engine trends (e.g. Google Trends), social media data from Facebook messages to twitter posts, and photos shared on social media such as on Flickr. As a data-driven methodology, big data is used to gain an understanding from the data which can then be used to enhance business intelligence. According to Dolnicar and Ring (2014), big data has the potential to change knowledge generation in terms of speed and quantity. Thus, big data and data-driven approaches have been applied in previous research across a variety of fields such as retail (Brown, Chui, & Manyika, 2011; Lee, Lee, & Sohn, 2013), healthcare (Brinkmann, Bower, Stengel, Worrell, & Stead, 2009), security and safety (Chen et al., 2012), education (Siemens & Long, 2011), government (Mervis, 2012), services (Acker, Gröne, Blockus, & Bange, 2011; Demirkan & Delen, 2013; Kauffman, Srivastava, & Vayghan, 2012), technology (Bradbury, 2011), and fraud detection (Abbasi, Albrecht, Vance, & Hansen, 2012).

Tourism research utilizes big data as well: for instance in research streams focused on forecasting tourism demand. Some examples include predicting hotel demand based on website traffic data (Yang, Pan, & Song, 2014); predicting tourism demand to Caribbean islands using Google Trends data (Bangwayo-Skeete & Skeete, 2015); and predicting actual tourist arrivals to Vienna by using Google Analytics website traffic indicators from the Viennese DMO website (Gunter & Önder, 2016). In all of the aforementioned studies, the use of big data is demonstrated to enhance forecasts. Another research stream focuses on the use of big data for recommendation systems. For instance, Fuchs, Hoepken, and Lexhagen (2014) propose a framework for a destination management information system which combines big data with other traditional tourism data. Each of these studies utilizes a different form of big data, another manifestation of which – geotagged photos on the internet – has been the subject of tourism research in the past years.

2.3. Geotagged photos

Geotagged photos such as the ones uploaded on Flickr (www.flickr.com), are a type of big data which can be used to identify travel patterns. According to Lo, McKercher, Lo, Cheung, and Law (2011), 89% of Hong Kong residents who take leisure trips take photographs and 41% of those post them online. Moreover, 40% of these travellers use Flickr and other similar types of photo sharing websites (Lo et al., 2011). Flickr data can be used to identify the exact locations where tourists have been, including points of interests, and can reveal new trends among tourists such as visiting lesser known attractions. Analyzing Flickr data that covers a bigger region, such as a country, also gives the opportunity to see the domestic multi-destination travel patterns. For instance, Koerbitz and Önder (2014) show how geotagged photos can be used for destination benchmarking, and Vu, Leung, Rong, and Miao (2016) investigate park visitor behavior in Hong Kong based on geotagged photos.

Previous research has used Flickr to identify user movements for purposes such as creating a recommendation system which suggest places to visit for first time visitors to a destination based on their previous behavior (Mamei, Rosi, & Zambonelli, 2010); creating automated travel itineraries (De Choudhury et al., 2010), identifying places visited, duration of stay and panoramic spots of the destination (Popescu,

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