Tourist Activated Networks: Implications for Dynamic Packaging Systems in Tourism

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Abstract

This paper discusses tourist activated networks as a concept to inform technological applications supporting dynamic bundling and en-route recommendations. Empirical data was collected from travellers who visited a regional destination in the US and then analyzed with respect to its network structure. The results indicate that the tourist activated network for the destination is rather sparse and that there are clearly differences in core and peripheral nodes. The findings illustrate the structure of a tourist activated network and provide implications for technology design and tourism marketing.

Keywords: tourist activated networks, network analysis, dynamic packaging, on-the-move traveller, destination management organizations.

1 Introduction

Tourists' experiences within a destination are the result of the interaction of the traveller with the service infrastructure and destination environment. Previous studies have identified travel decisions as complex processes with final choices being interrelated (Dellaert, Ettema, & Lindh, 1998). As such, the tourist consumption system, as proposed by Woodside and Dubelaar (2002), describes a complex and dynamic pattern of tourists' activities which exist within the context of attractions and accommodations, the transportation network as well as other tourists. It is argued that understanding tourists' travel path through this system is essential to developing a coherent destination management strategy. Furthermore, it is argued that information technology (IT), particularly mobile technology and the increasing availability of free wireless Internet, enables tourists to easily retrieve and share information throughout the travel experience. Mobile technology, therefore, allows destination marketing organizations (DMOs) to support dynamic bundling of tourist services to enhance visitors' experiences while *en route*.

This paper reports on a study that examined the movement of tourists through a destination. The underlying network is identified and its structure (i.e., core, periphery, and places immediately adjacent to the core) is discussed. The results of this analysis are then interpreted within the context of mobile computing and the development of systems that can be used to integrate offerings of local firms in support of on-the-move travellers.

2 Tourism Destination Systems – A Network Perspective

Fesenmaier and his colleagues (Kim and Fesenmaier, 1990; Lue, Crompton and Fesenmaier, 1993; Jeng and Fesenmaier, 1998; Hwang and Fesenmaier, 2003; Hwang, Gretzel, and Fesenmaier, 2006) have argued that travel can be conceptualized as a series of experiences that occur in specific patterns depending upon the spatial organization of the attractions and the nature of the travel party (i.e., needs, motivations, etc.). It was found in these studies that travel is largely multi-destination / multi-activity whereby a trip represents a bundle of activities / attractions/places that meet the specific needs (i.e., add value to the experience) of the traveller. In addition, this research indicates that the bundling of activities / destinations/attractions enables travellers to manage the perceived risk/cost of the trip.

More recently, Woodside and Dubelaar (2002) developed a conceptualized understanding of tourism systems arguing that tourists' actions can describe the relationship between places / activities / experiences. Further, Hwang et al. (2006) and Shih (2006) argued that travel patterns can be understood as networks. Indeed, Hwang et al. (2006) and Shih (2006) conducted studies to assess the structural properties of travel within and between different destinations. Specifically, Hwang et al. (2006) examined multi-destination travel in the United States and Shih (2006) focused on travel in Taiwan. In both studies the authors found that travel patterns exhibit specific network properties and that these structures provide substantial insight into the relationship between a traveller and the system that supports travel experiences.

Ritchie and his colleagues argue that tourism destination management organizations represent several components of the tourism system that, together, contribute to create a "seamless" experience for the tourist (Ritchie & Crouch, 2003). This research, along with emerging literature in collaborative destination marketing, suggests that strongly networked tourism organizations are very effective in co-creating tourism products and services (e.g. Palmer and Bejou, 1995) and in participating in a variety of Internet-based marketing activities (Wang and Xiang, 2007). Indeed, Gretzel, Fesenmaier, Formica and O'Leary (2006) and Zach, Xiang, Gretzel and Fesenmaier (2007) concluded that it is essential for destination management organizations to use IT in order to enhance cooperation between organizations, businesses and governmental institutions so that value-added, innovative tourism products can be created.

3 IT and on-the move Tourist Information Search

The increasing importance of IT has changed the way tourism organizations manage and operate (Poon, 1993). Indeed, the Internet has become the most important channel with which tourism organizations can deliver information to existing and potential visitors (Gretzel and Fesenmaier, 2005; Wang & Fesenmaier, 2006). Specifically, the Internet has become the primary medium which tourists use to search for information in the pre-consumption stage and to share and re-experience their trip in the post-consumption stage (Gretzel et al., 2006). Gretzel et al. (2006), however, argue that whereas the Internet in the pre- and post-consumption phase is accessed mostly through the home computer, mobile technologies enable tourists to connect with friends and make short-term decisions while travelling *en route* (consumption stage). Indeed, a recent study by the Pew Foundation (2006) found that 14.0% of cell phone users access the Internet through their cell phone, while another 16.0% would do so if their phone would support it. This development together with the increasing availability of free wireless Internet enables tourism organizations to provide information for tourists *en route*.

Brown and Chalmers (2003) conducted an ethnographic study to understand how tourists experience places and to provide suggestions for the development of IT that supports the tourist experience at a destination. Other scholars have examined traveller behaviour with the goal of developing specific systems; for example, Schmidt-Belz, Laamanen, Poslad and Zipf (2003) discussed the behavioural foundations for the development of CRUMPET; Schwinger et al (2005), Malaka and Zipf (2000), and Kramer, Modsching, ten Hagen and Gretzel (2006) focused on strategies for, and the impact of, mobile tourist guides; and, Modsching, ten Hagen and Gretzel (2007) examined the use of GPS to track visitors while travelling to/through a city.

Through their choices, tourists create dynamic relationships between organizations providing tourism related products. These relations can be conceptualized as "tourist activated networks" where tourists "activate" the relationships by choosing a combination of attractions, services, etc. Following from Hwang et al. (2006), Becken and Gnoth (2004) and Cardoso et al. (2007), it is argued that the notion of tourist activated networks provides for a powerful and practical relational metaphor that is well understood by tourism organizations in building innovative partnerships to support the dynamic construction of bundles of products (i.e., experiences) based upon travel behaviour. Mobile IT enables DMOs to learn about tourists' bundling of experiences and to simultaneously support tourists in dynamically building their *en route* experience. It is clear that IT can be used to effectively meet the needs of visitors to a destination in a number of ways. Yet, dynamic packaging seems to be currently restricted to pre-trip stages. Examples of dynamic packaging provided by online travel agencies are discussed by Cardodo and Lange (2007). This paper argues that a better understanding of tourist activated networks at destinations is needed to spur innovations in dynamic packaging for *en route* decision-making.

4 Research Method

Based upon the travel behaviour, mobile computing and destination management literatures, it is posited that the network structure of travel through an area can be used to develop systems that support the dynamic bundling of tourist products. Thus, the goal of this study was to identify the network structure of travel within Northern Indiana (USA) with the aim to make recommendations toward the development of IT systems that may be used to support traveller experiences in the area. The research framework is described in the following paragraphs.

4.1 Sampling and Data Collection

Visitors were intercepted at one of nine visitor centres (VCs) located throughout the area (see Figure 1) in the fall of 2005 and the summer of 2006. Those who agreed to participate in the research were sent a follow-up survey a month after their trip. In total, 2177 visitors were contacted. Of those who received a survey (bad addresses excluded), 49% (1009 respondents) completed the survey. As part of the survey, respondents were asked to describe in detail their trip to the region.

4.2 Measures and Data Analysis

The questionnaire invited respondents to list up to seven places they visited before and after (for a total of fourteen places visited) they stopped at the visitor centre. This information on the spatial movement of tourists was used to develop a symmetric matrix representing the spatial network of all the places visited by the tourists. SPSS 15 and UCINet 6.0 were used to analyze this dataset. It is important to note that the results are conditioned by the fact that all respondents stopped at the visitor centre sometime during their trip to/through the area.

Fig. 1. Map of Northern Indiana

5 Research Results

Descriptive statistics were first calculated to describe the visitation behaviour of tourists to the region. Next, characteristics of the places visited by tourists in Northern Indiana were assessed. Last, network analysis was employed to identify the network structure of visitor travel through the area.

5.1 Tourists' visitation behaviour

It was found that the Northern Indiana visitors identified 320 different places at which they stopped including museums, hotels, restaurants, parks and shopping areas. As can be seen in Figure 2, the number of places visited sharply declines whereby essentially every tourist visited at least one place beyond the visitor centre; two thirds

visited two additional places and one third of the travellers visited 4 other places; only 7.6 percent of the tourists visited 7 places additional to the visitor centre.

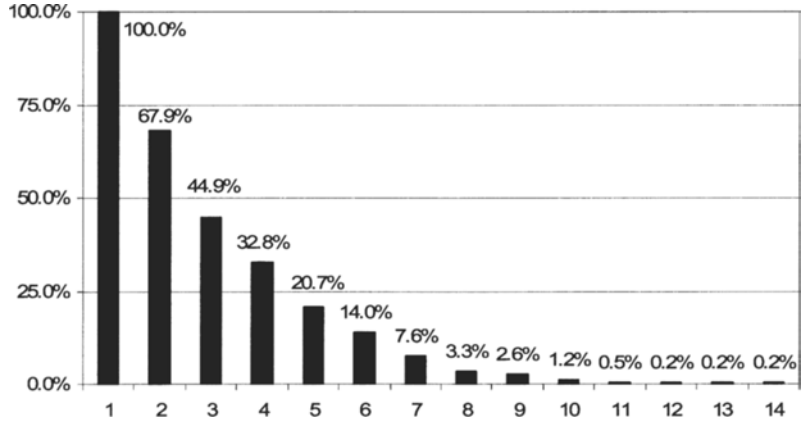

Fig. 2. Number of places visited additional to the visitor center by tourists in Northern Indiana

5.2 Northern Indiana tourist places

The most popular places visited are listed in Table 1. Also shown in the table is the ranking of the popularity of places visited at the beginning and at the end of the visit to Northern Indiana. It can be seen that the first four most visited places are the top four at the start and the end of visits to the area (though in a different order). Several places that ranked high as start or end places for travel through Northern Indiana were not among the top ten most visited places. Some of the top ten visited places such as Nappanee, on the other hand, are not ranked among the top ten start or end places,

indicating that the visitors bundled these places as "drive through" destinations while visiting other places in the area.

Table 2 shows the "long tail" effect of the places visited. As can be seen, nearly two thirds of the places have been visited only once, representing only 13.7% of all visitations in Northern Indiana. This contrasts sharply with those places visited 8 times and more in that they account for less than 10.0% of the places visited, but generate more than two thirds of all the visitations. This finding is consistent with Zipf's power law whereby a small number of core places is responsible for most of the visitation (Barabási & Albert, 1999).

Figure 3 presents the overall network of the 320 places visited in Northern Indiana. The figure shows that the visitor centre (VC) is in the middle of the network (again, it is important to note that this finding is an artefact of the sampling methodology) and that there are a small number of core attractions that are highly connected with other places in the network. Last, the outer rim of the network identifies those places that have been visited only once.

Table 1. Top visited places in Northern Indiana

Top places in Northern Indiana	Visitation ranking	Top 10 start place ranking	Top 10 end place ranking
VC	1	1	1
Shipshewana	2	3	2
Notre Dame	3	4	3
Indiana Dunes	4	2	4
Nappanee	5	n/a	n/a
Elkhart	6	6	n/a
Light house mall	7	n/a	5
Amish Acres	8	5	10
Shipshewana Flea Market	9	8	n/a
Goshen	10	n/a	n/a
Amish Country	12	n/a	7
Restaurant	14	n/a	6
Studebaker Museum	15	9	n/a
Gas station	16	7	8
RV Museum	19	n/a	9
Pokagon State Park	24	10	n/a

Table 2. Visitation pattern

Total number of times a place was mentioned	Percent of Places	Percent of Total Visitation
Mentioned once	65.9	13.7
- " - twice	11.8	4.9
- " - 3 times	5.2	3.2
- " - 4 times	2.3	1.9
- " - 5 times	1.7	1.9
- " - 6 times	2.0	2.5
- " - 7 times	1.2	1.6
- " - 8 times and more often	9.9	70.3
Total	100.0	100.0

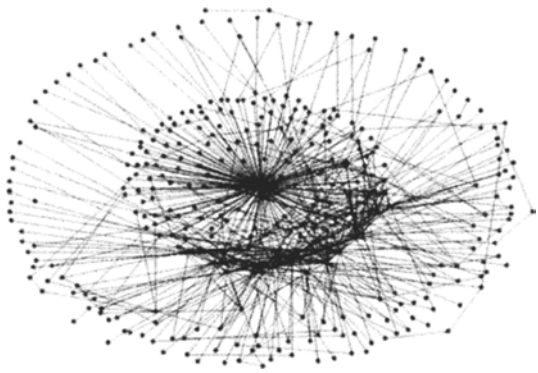

Fig. 3. The overall network of places visited in Northern Indiana

5.3 Characteristics of the tourist network in Northern Indiana

A core/periphery analysis of the network data was conducted to identify the core places of the Northern Indiana tourism network. A continuous approach was applied and resulted in eight core places (see Table 3). As proposed by Borgatti and Everett (1999) coreness measures can be accepted as a good measure of fit indicating that the place can clearly be distinguished from the other places. A measure of fit of 0.74 for the Northern Indiana tourism network can be considered as good.

As indicated previously, the VC was visited by every visitor to Northern Indiana. The other core places, however, were visited by a maximum of 23.8 % of the visitors. It can be seen in Table 3 that the top three core places to the network have been a start or an end place for a trip for about 25% of the visitors. Also shown is the mean number of places visited by tourists that visited one of the core places. Interestingly,

Nappanee had the highest number of places and simultaneously has a low percent rating of being a start (8.8%) or an end point (11.8%) as compared to the other core places.

Table 3. Core place pattern

Core places in Northern Indiana	Coreness	Percent of visits to core place	Percent of Core Place visits as trip start	Percent of Core Place visits as trip end	Mean number of places visited by tourists to Core Place
VC	0.648	100.0	42.2	28.0	4.0
Shipshewana	0.348	23.8	21.0	27.0	5.0
Notre Dame	0.289	14.7	30.6	27.4	4.6
Indiana Dunes	0.251	14.0	35.6	25.4	4.9
Elkhart	0.204	7.6	25.0	9.4	5.8
Light house mall	0.188	7.6	12.5	34.4	4.6
Nappanee	0.174	8.1	8.8	11.8	6.6
Amish Country	0.165	5.9	16.0	32.0	5.0

Fig. 4. Core network with adjunct places

The core network and places adjunct to them are graphically represented in Figure 4. As can be seen, there are strong relationships between the eight core places. However, there is no direct linkage between all of the core places. That is, it can be seen that many of the core places are the only connection points for many of the pendants surrounding the core network. The Light house mall, for example, is connected only with Indiana Dunes and the VC. This indicates that the density of the network is

extremely low; indeed, the overall network of 320 places includes just 1.0% of all possible linkages within the network. This shows visitors' boundless choice in bundling any of the experiences visitors seek to encounter when *en route*.

6 Conclusions and Implications

The results of this study indicate that travel through Northern Indiana is highly structured in that it is served through a small number of key attractions/communities; these core places function as important hubs routing travellers throughout the destination. It was also found that the visitors to the area "bundled" together a number of different experiences as they navigated through the area. Furthermore, none of the core places (except the VC) are attractions for tourists only. Last, a large majority of the places were mentioned only once or twice, implying a high diversity in tourist activated networks for the destination.

It is argued here that the network structure provides a strong and practical basis for dynamically bundling products that create value for tourists and the destination. Incorporating knowledge about visitors' combination of *en route* experiences enables DMOs to develop knowledge-based recommender systems with tailored choices for subsequent experiences (Schmeing, Cardoso and Fernandes, 2006). In the case of Northern Indiana, recommendation systems might suggest smaller, less known places along the route that the travellers are currently following. Or, given the fact that a visitor has started out at a core attraction, the system might suggest a unique itinerary comprised of a series of attractions, restaurants and rest areas which are seemingly unrelated but follow a more interesting path through the area. Following the notion of tourist activated networks, tourist firms "activated" through the recommendation system can be informed to include the new bundles in their products/services offered.

It is, however, important to recognize that information on tourists' travel paths alone is not sufficient for truly personalized recommendations. Thus, further research should focus on the integration of spatial movements with personality and preference based recommendation systems in order to better enhance the tourist experience while enabling tourism firms to develop innovative partnerships. In addition, studies are needed to examine the extent to which tourist firms can actually use IT to better support the development of dynamic bundling systems as well as other barriers to the development of dynamic packaging systems.

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