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Assessing the Economic Value of Tourism Attractions Using a Network Approach

Session 5: Typologies of Visitors, Itineraries and Tourism Prodcuts

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1 Introduction

Changes in traveler behavior are leading to dramatic transformations in the ways in which destination value is created, the competitiveness of destinations, and how destinations are managed. The metaphor "traveling-the-network" has been used to describe the tourist behavior of utilizing ubiquitous Internet technology to plan, experience, and share all phases of travel (Fesenmaier & Xiang, in press; Gretzel, 2010; Zach & Gretzel, 2011). In this context, a destination network is comprised of "touch points" (both virtual and physical) that are experienced by the traveler. Examples of these touch points include the websites and mobile apps used to plan a visit, the online booking engines used to pay for hotel stays, the places visited including hotels, restaurants and attractions, and the sharing of vacation photos over social media (Stienmetz & Fesenmaier, 2013). As each visitor travels-the-network in a unique way (i.e. defined by the sequence of destination touch points), it becomes increasingly difficult to understand how (and when) value is created within the destination.

This new travel behavior has also resulted in increasingly complex patterns of tourism product disintermediation (Kracht & Wang, 2010) and potentially threatens the competiveness of destinations as the result of a diminished leadership role of the destination management organization (DMO), lower cohesion between destination firms, fewer partnerships among firms, a decreased knowledge of the visitor profile, and a reduced capacity to satisfy visitors' specific needs (Chathoth, 2007; Ndou & Petti, 2007). Consequently, it is argued that in order to improve destination competitiveness DMOs must take on the role of network managers with the responsibility of designing the collaboration and cooperative efforts of the individual stakeholders

that comprise a destination (Meriläinen & Lemmetyinen, 2011; Wang & Fesenmaier, 2007; Wang & Xiang, 2007; Zach & Gretzel, 2011). This view of strategic destination network management requires that the relationships and interactions among destination stakeholders be well understood. In order to be strategic destination network managers DMOs must understand the structure of the destination network system because "if you can't measure it, you can't manage it" (Kaplan & Norton, 1996). In particular, it is crucial for strategic network managers to recognize the patterns of traveler activities within a destination and how those activity patterns are translated into value (Shih, 2006; Woodside & Dubelaar, 2002; Zach & Gretzel, 2011). Furthermore, if the objectives of the DMO include coordinating the relationships and interactions among destination stakeholders, then the DMO must understand the inter-relationships among the various stakeholders within the destination, especially as seen from the perspective of the visitor (Tax, McCutcheon, & Wilkinson, 2013).

A network analysis approach is proposed to assess the economic value of individual attractions within a tourism destination. It is argued that this approach is a more accurate reflection of actual traveler behavior and can provide valuable information about the interconnectedness of a tourism destination that may otherwise be overlooked when understanding how tourism destination value is created. Furthermore, in order to increase the competiveness of tourism destinations, the aspect of inter-firm relationships must be considered (Chakravorti, 2009). Therefore, it is argued that a network paradigm is appropriate for assessing the economic value of tourism attractions and can be useful for policy makers and practitioners in developing strategies that maximize the economic benefits of tourism development. This study applies a series of network analyses within the context of Baltimore, MD to illustrate how patterns of traveler behavior can be deconstructed to assess the economic value of destination attractions.

2 Destination Value Creation Networks

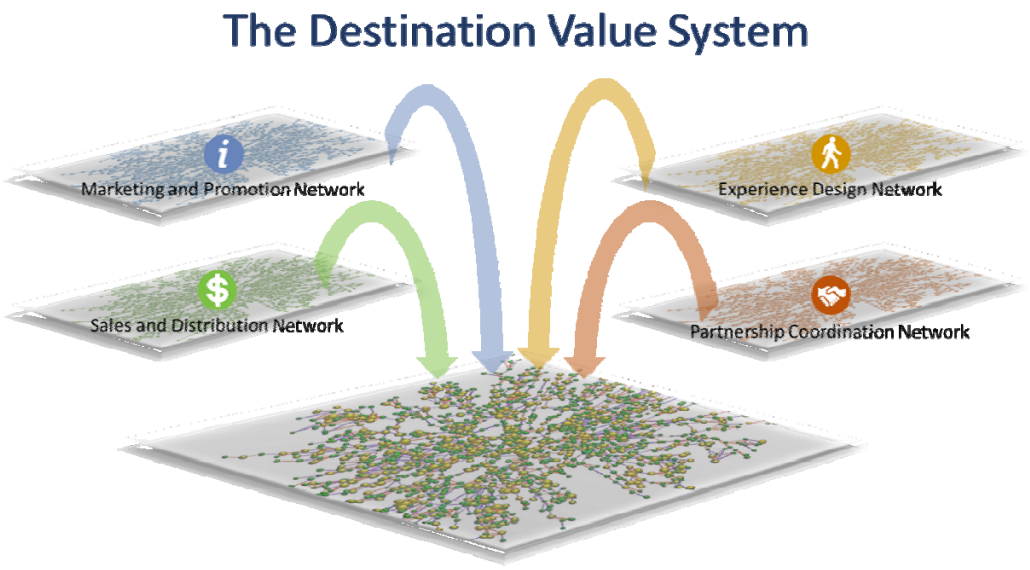
The shift to DMO as network manager implies that the current metrics used to evaluate destination management outcomes may no longer be appropriate. Regardless of management strategy, proper metrics are needed to evaluate the opportunities, performance, and accountability of all organizational activities. Because the use of metrics guides the actions and decisions of organizations (Hauser & Katz, 1998), the selection of metrics that are directly tied to the objectives of the organization are essential to management (Mauboussin, 2012). Unfortunately, most metrics currently employed by destinations are based on a "value added" paradigm (i.e. return on investment based on marketing and sales) following the recommendations of travel industry trade associations (e.g. Destination Marketing Association International, 2011) instead of a "value creation" paradigm. From this perspective, a value added approach to metrics is less appropriate for benchmarking purposes because it "fails to highlight the linkages between firms that can reduce cost or enhance differentiation" (Porter, 1985, p. 39). Therefore, a new approach that considers all value creating processes within a destination is needed.

The tourism destination is traditionally understood as being comprised of a series of stakeholders (such as transportation, accommodations, and attractions firms) that is often modeled as a value chain, where value is added as visitors prepare for, and then experience and move through the

destination before eventually retuning home (Poon, 1993; UNWTO, 2007). This conceptualization of the tourism value chain is based upon Porter's (1985) deconstruction of a firm into its strategically relevant activities such as designing, producing, marketing, delivering, and supporting its products. Within the tourism destination, there are numerous activities or processes which create value, and thus no single stakeholder controls all the elements of the destination value chain. According to Poon (1993, p. 209) the primary activities of the travel and tourism industry which comprise the destination value chain are transportation, on-site services, wholesale/packaging, marketing and sales, retail distribution, and the customer experience. Similarly, the UNWTO (2007, p. 21) classifies the destination value chain as consisting of the following core activities: product development, destination and product packaging, promotion, distribution and sales, in and outbound logistics, destination operations and services, and aftercare.

While the destination value chain has been a useful model for conceptualizing the tourism system, the value chain paradigm may no longer serve as an appropriate foundation on which to base destination performance metrics. Indeed, traveling-the-network behaviors are cause for the destination value chain model to be reconsidered. For this reason, Stienmetz and Fesenmaier (2013) have proposed the destination value system, which reconceptualized the tourism destination as a constellation of four visitor-centric value creation networks that represent the core processes of marketing and promotion, sales and distribution, traveler activities, and partnership coordination (See Figure 1). Importantly, destination value creation networks exist in both physical and virtual space, are focused on capacity, are constantly evolving, and are occurring simultaneously as part of an integrated system (Stienmetz & Fesenmaier, 2013).

Although some notable studies have been published (e.g. Shih, 2006; Tax et al., 2013; Zach & Gretzel, 2011), little work has been done to understand the destination network as it is experienced by visitors, though it should be acknowledged that as co-creators of value (Pine & Gilmore, 1999) travelers represent a key group of stakeholders within the destination. As such, it is argued that destination management metrics must include how visitors travel-the-network (both physically and virtually) so as to reflect visitors' paths through the system of destination touch points (Zach & Gretzel, 2011). Similar to the destination value chain model, it is recognized that performance evaluation of a destination value network with regard to each separate value creation process is needed in order to maximize traveler value and, in turn, to develop marketing and development strategies that can make the destination more competitive (J. R. B. Ritchie & Crouch, 2003; R. J. B. Ritchie & Ritchie, 2002; WÖber, 2002). It is argued that each separate value creation process has a network structure of its own. Considered individually, each value creation network can be quantified and related to corresponding value creation objectives. However, considered together as an inter-related system, the four value creation networks can provide a more complete understanding of the entire destination as a dynamic system.



3 Methods

A network consists of nodes and ties where the nodes represent distinct actors within a system and ties represent some type of relationship that connects actors (Borgatti & Halgin, 2011). Within each of the destination value networks nodes represent either travelers or destination firms and ties connecting network nodes represent three types of relationships: traveler to traveler exchanges (C2C), firm to firm exchanges (B2B), and firm to traveler/traveler to firm exchanges (C2B). C2C ties represent the sharing of experiences, either virtually or through physical co-presence at destination locations. B2B ties, on the other hand, represent the exchange of tourists between destination touch points and reveal the volume of visitor movement between touch points for each value creation process within the destination. Additionally, the C2B ties reveal the frequency of traveler visits that are made to each touch point and patterns in the paths that are activated as travelers move through the destination (Stienmetz & Fesenmaier, 2013).

In order to assess the economic value of tourism attractions for the City of Baltimore, this study deconstructs Baltimore's C2B activities network as described by Stienmetz and Fesenmaier (2013), where network nodes represent Baltimore's attractions and C2B ties reveal the frequency of traveler visits that are made to each attraction and patterns in the paths that are activated as travelers physically move through the destination. Data used to describe Baltimore's traveler activities network were generated using an online survey of individuals that had requested information from the Baltimore, Maryland tourism office (Visit Baltimore) between January 2007 and July 2013. A list of 58,697 email addresses was obtained from the DMO and after invalid and redundant email addresses were removed, an invitation to complete the online survey was sent to 53,166 email addresses. In order to increase response rate, the following three-step process was followed: (1) an initial invitation was emailed out along with the URL of the survey, (2) four days later a reminder was delivered to those who had not completed the survey, and (3) the final request for participation was sent out to those who had not completed the survey one week later. As an incentive to participate

in the study survey respondents were entered into a random drawing to win Southwest Airlines gift cards, prepaid Visa gift cards, and an iPod. These efforts resulted in 3,479 responses. However, not all respondents consented to participate in the study, leaving 2,855 usable responses, which equates to a 5.4 percent response rate. To identify visitation patterns, the C2B value creation network was created by identifying the "traveler activated" paths taken within the network and regression analysis was conducted in order to understand the marginal impact of all network nodes on value creation. In these analyses total visitor spending while at the destination served as the dependent variable.

4 Results

4.1 Sample Characteristics

Of the 2,855 usable survey responses, this study focuses on a sub-sample of 1,315 travelers that indicated they visited Baltimore since January, 2013. The characteristics of these respondents are summarized in Table 1. As can be seen, the majority (64 percent) of the respondents is female and 51 percent are 45 years old or older. Approximately three fourths (77 percent) of the sample have an annual household income of at least $50,000, and a little over one third (36 percent) have an annual household income of $100,000 or more. About 14 percent of the sample traveled alone, and the most popular reasons for travel were vacations, weekend getaways, and visiting friends and relatives. Importantly, the characteristics of the study sample and the characteristics of U.S. travelers are very similar (U.S. Travel Association 2010, 2012); the one exception being gender whereby the respondent sample is slightly skewed towards females.

Table 1: Characteristics of Sample (n=1,315)

		Percent of Sample			Percent of Sample
Gender	Male	35.9	Total Visits in Past 3 Years	Once	44.2
	Female	64.1		Two Times	15.6
Age	18 - 24 years	2.5		Three to Five Times	19.7
	25 - 34 years	12.3		Six to Ten Times	9.8
	35 - 44 years	21.3		11 or more times	10.7
	45 - 54 years	23.8	Trip Length	Day Trip	23.3
	55 - 64 years	27.2		One Night	12.6
	65 years or older	12.9		Two Nights	23.3
Household Income	Less than $20K	3.4		Three to Five Nights	31.0
	$20K - 29K	3.4		Six to Ten Nights	6.8
	$30K - $39K	7.1		11 or more nights	3.1
	$40K- $49K	9.2	Time of Planning	Never planned trip	5.5
	$50K - $74K	21.1		Day of trip	2.5
	$75K - $99K	19.8		1 - 6 days before trip	10.8
	$100K - $149K	22.3		1 - 4 wks before trip	29.8
	$150K - $199K	7.5		5 - 8 wks before trip	22.9

	$200K and over	6.2		9+ wks before trip	28.4
Travel Party Size	One person on trip	13.7	Overnight Accomm.	Hotel	54.6
	2 persons	46.6		Motel	3.5
	3 - 5 persons	32.3		B & B	1.8
	6+ persons	7.5		RV/Campsite	0.6
Trip Purpose	Vacation	38.8		Family/Friends	12.0
	Weekend getaway	24.6		No overnight	30.4
	Spec./sport event	15.6			
	Visit friend/relative	24.9			
	Business	15.8			
	Other	10.5			

Repeat visits to the destinations were common with nearly 56 percent of respondents having visited Baltimore more than once in the previous three years. The most common trip length was three to five nights (31 percent) and the most common time to start planning a trip was between one and four weeks before traveling (30 percent), followed closely by planning more than two months in advance (28 percent). Hotels (55 percent) were the most common form of overnight accommodation used by travelers, and staying with family and friends was a distant second (12 percent).

4.2 C2B Network Structure

In order to specify the C2B traveler activities network, respondents were asked to identify those places visited from a list of the main activities in Baltimore. In total, there were 43 separate Baltimore attractions and activities listed, and each item was coded as 1 if the respondent visited the activity, or coded as 0 if the respondent did not visit the activity. For the C2B traveler activities network, the average number of attractions visited by a traveler was 3.45 (SD=3.24). Table 2 shows the frequency in which each attraction was visited, along with the frequency of the visit being a planned or repeated.

Table 2: Most Visited Attractions within Baltimore's C2B Traveler Activities Network

Baltimore Attraction	Percent travelers visiting	Percent visits planned	Percent first time visits
A1: Basilica of the Assumption	6.9%	50.0%	75.6%
A2: Edgar Allan Poe Gravesite	7.4%	60.9%	70.1%
A3: Fort McHenry National Monument and Historic Shrine	24.8%	72.6%	70.6%
A4: Frederick Douglas – Isaac Myers Maritime Park	3.1%	35.1%	75.7%
A5: Maryland Science Center	9.7%	61.2%	56.9%
A6: Maryland Zoo	5.3%	75.0%	64.1%
A7: National Aquarium	34.1%	79.9%	53.2%
A8: Orioles/Camden Yards	28.2%	79.1%	46.0%
A9: Sports Legends at Camden Yards	8.8%	57.1%	61.0%
A10: Star-Spangled Banner Flag House	6.5%	41.0%	79.5%

A11: USS Constellation/Historic Ships	20.5%	51.8%	61.6%
A12: Washington Monument	12.9%	49.7%	55.5%
A13: Top of the World Observation Level	8.3%	51.0%	68.6%
A14: American Visionary Art Museum	7.1%	52.9%	68.2%
A15: B&O Railroad Museum	5.8%	73.5%	51.5%
A16: Babe Ruth Birthplace & Museum	5.5%	66.7%	65.2%
A17: Baltimore Museum of Art	6.1%	57.5%	60.3%
A18: Baltimore Museum of Industry	2.0%	54.2%	83.3%
A19: Civil War Museum at President Street Station	3.1%	33.3%	75.0%
A20: Geppi's Entertainment Museum	1.9%	43.5%	69.6%
A21: Jewish Museum of Maryland	0.8%	66.7%	66.7%
A22: Maryland Historical Society	1.9%	47.8%	65.2%
A23: National Great Blacks In Wax Museum	2.4%	69.0%	41.4%
A24: Port Discovery Children's Museum	2.7%	68.8%	62.5%
A25: Museum of Maryland African American History & Culture	2.4%	46.4%	71.4%
A26: The Walters Art Museum	5.9%	64.8%	57.7%
A27: Baltimore (First Mariner) Arena	3.4%	61.0%	51.2%
A28: Baltimore Symphony Orchestra	1.1%	61.5%	38.5%
A29: Bromo Seltzer Tower	1.6%	31.6%	78.9%
A30: CenterStage	1.7%	13.6%	9.5%
A31: Everyman Theater	0.5%	71.4%	64.7%
A32: Harborplace	38.1%	64.2%	42.8%
A33: Hippodrome Theater	1.5%	44.4%	72.2%
A34: Power Plant Live	11.8%	41.8%	51.1%
A35: The Gallery Shopping Center	18.9%	43.2%	51.1%
A36: The Lyric	0.9%	54.5%	54.5%
A37: Fell's Point Walking Tour	8.1%	38.1%	70.1%
A38: Heritage Walk Tour	2.7%	40.6%	68.8%
A39: Mount Vernon Walking Tour	2.8%	54.5%	60.6%
A40: Spirit Cruises/Seadog	5.0%	55.0%	61.7%
A41: The Original Fell's Point Ghost Tour	1.4%	61.1%	72.2%
A42: Urban Pirates	1.4%	62.5%	75.0%
A43: Watermark Cruises	4.3%	48.1%	69.2%

The most popular attraction within Baltimore is Harborplace, with 38.1 percent of all travelers visiting, followed by the National Aquarium (34.1 percent), and Camden yards (28.2 percent). The Baltimore attraction visits that were the most pre-planned include the National Aquarium (79.9 percent), Camden Yards (79.1 percent), and the B & O Railroad Museum (73.5 percent). The attractions with the highest percentage of first time visitors were the Baltimore Museum of Industry (83.3 percent), the Star Spangled Banner House (79.5 percent), and the Bromo Seltzer Tower (78.9 percent).

C2B connections represent the unique path taken by each traveler through each of the destination's value creation networks. These paths can be analyzed through a triad census by identifying all of the

pairs and triads of touch points visited by travelers. Within a network, a triad is a set of three nodes and the possible ties among them. Triads form the core structure of all high order networks and represent a valuable layer of meaning that can be used to understand value creation networks (Madhavan, Gnyawali, & Jinyu, 2004; Wasserman, 1977). When sequence is not considered, there are 903 (43 choose 2) possible paths that can be taken between pairs of attractions and 12,341 (43 choose 3) possible paths that can be taken between triads of attractions within the traveler activities network. Of these possible paths, 835 (93 percent) of the pair paths were taken and 4,084 (33 percent) of the triad paths were taken.

Table 3 shows the top traveler-activated paths for Baltimore's traveler activities network. The most popular pair of attractions is the National Aquarium + Harborplace (17.3 percent). The most popular triad, taken by 6.7 percent of all Baltimore travelers was Fort McHenry + National Aquarium + Harborplace, followed closely by the combination of the National Aquarium + USS Constellation/Historic Ships + Harborplace (6.4 percent), and National Aquarium + Orioles/Camden Yards + Harborplace (6.3 percent). Importantly, it is argued that the patterns and structures of triads within a network can be useful in identifying competitive and cooperative relationships or reveal popular bundles of attractions that could be marketed as packages (Madhavan et al., 2004).

Table 3: Frequency of Baltimore Attraction Bundles

Top Attraction Pairs	Percent of Visitors	Top Attraction Triads	Percent of Visitors
A7 * A32	17.2%	A3 * A7 * A32	6.7%
A8 * A32	12.9%	A3 * A11 * A32	6.4%
A32 * A35	12.5%	A7 * A8 * A32	6.3%
A3 * A32	12.5%	A7 * A11 * A32	6.1%
A11 * A32	11.5%	A3 * A7 * A11	5.1%
A3 * A7	11.3%	A8 * A11 * A32	4.6%
A7 * A8	10.7%	A5 * A7 * A32	4.4%
A7 * A11	10.7%	A3 * A32 * A35	4.2%
A3 * A11	10.3%	A3 * A8 * A32	4.2%
A7 * A35	9.4%	A8 * A9 * A32	4.2%
A3 * A8	8.1%	A7 * A11 * A35	3.7%
A8 * A11	7.9%	A7 * A13 * A32	3.6%

A32 * A34	7.6%	A3 * A7 * A35	3.6%
A8 * A9	7.5%	A3 * A8 * A11	3.6%
A7 * A34	7.3%	A7 * A8 * A35	3.5%
A8 * A35	7.0%	A3 * A11 * A35	3.3%
A5 * A7	6.6%	A7 * A11 * A34	3.2%
A7 * A12	6.0%	A3 * A7 * A13	3.1%
A5 * A32	5.9%	A7 * A9 * A32	3.1%
A3 * A35	5.8%	A3 * A7 * A12	2.9%
A11 * A35	5.8%	A3 * A10 * A32	2.9%
A7 * A13	5.8%	A3 * A7 * A34	2.8%
A12 * A32	5.5%	A5 * A8 * A32	2.7%
A3 * A12	5.1%	A2 * A3 * A32	2.6%
A9 * A32	5.1%	A3 * A32 * A37	2.6%
A3 * A10	5.0%	A7 * A8 * A16	2.6%
A13 * A32	4.7%	A7 * A12 * A32	2.6%

4.3 Deconstructing C2B Traveller-Activated Paths

While the identification of the most important attractions (nodes) within the network and the most dominant paths that connect attractions both have implications for strategic network management and the design of competitive tourism destinations, it is also useful to understand the marginal contribution of each attraction towards destination value creation. By using the traveling-the-network paradigm to better understand how value is created within a destination, attention may be focused on key network elements that can be manipulated to improve destination competitiveness. Baltimore's C2B network was next deconstructed to estimate total trip expenditure according to the number of places visited.

Total trip expenditure was measured by asking respondents "Approximately how much did you (and members of your immediate travel party) spend while visiting Baltimore?" Respondents were then provided space to enter the amount spent for each of the following categories: activities and attractions, food and beverage, special/sporting events, shopping, overnight accommodations, transportation within the destination, and miscellaneous. Total trip expenditure was calculated as the sum of the spending entered for each category.

A series of analyses were conducted to illustrate the relationship between total spending and attractions visited. Table 4 shows how the spending per attractions increases in a non-linear fashion. The average total trip expenditure was $713 (SD=$777). As can be seen, average spending when no attractions are visited is $296. Notable increases in spending are observed when the number attractions visited increases from one to two, and also from three to four. This is evidence suggesting that two activities per day in Baltimore increases total visitor expenditure because an overnight stay is then required.

Table 4: Average Expenditure based on number of attractions visited

No. of attractions visited	Freq.	Mean Expenditure	Standard Deviation
0	16.7%	$296.25	$518.80
1	16.0%	$387.06	$529.99
2	14.4%	$638.71	$646.21
3	12.8%	$739.80	$687.77
4	10.6%	$903.40	$819.85
5	8.8%	$952.82	$816.21
6	4.8%	$1090.18	$835.33
7+	15.8%	$1161.31	$939.64
Overall	100%	$713.91	$777.77

Next, analyses were conducted to determine the average total expenditure for each individual Baltimore attraction. The results are reported in Table 5. As expected, there is significant variation in the total amount spent while in Baltimore based on the attractions visited. Table 5 shows that the attraction with the lowest mean expenditure is the Everyman Theater, indicating that visitors to this attraction only spent a total of $545 on their entire trip to Baltimore. The attraction with the highest average total spending was the Mount Vernon walking tour, with visitors to this attraction spending on average a total of $1176 while on their Baltimore trip. Among the top three most visited attractions (Harbor Place, the National Aquarium, and Camden Yards) the attraction with the highest average total trip expenditure was the National Aquarium ($985) followed closely by Camden Yards ($984). Harborplace visitors spent significantly less per trip at $886.

Table 6 shows that there is additional variation in spending based on attraction visited and the total number of attractions visited. For example, when Haborplace (A32) is the only place visited, the average total trip expenditure is $569. When one or two additional attractions are visited, total average spending increases to $688, and when a third attraction is visited, average spending jumps to $859. By comparison, when the National Aquarium (A7) is the only attraction visited, average total spending is $295. When a second, third, and fourth attraction are visited in addition to the National Aquarium, total trip spending increases to $757, $819, and $1059 respectively.

Table 5: Average Expenditure by Attraction Visited

Baltimore Attraction	Percent travelers visiting	Mean Total Expenditure	Standard Deviation
A31: Everyman Theater	0.5%	$545.33	$402.23
A30: CenterStage	1.7%	$631.75	$693.86
A36: The Lyric	0.9%	$754.27	$738.12
A29: Bromo Seltzer Tower	1.6%	$767.74	$761.79
A27: Baltimore (First Mariner) Arena	3.4%	$780.93	$544.34
A41: The Original Fell's Point Ghost Tour	1.4%	$842.94	$527.13
A22: Maryland Historical Society	1.9%	$855.82	$810.58
A15: B&O Railroad Museum	5.8%	$873.87	$708.62
A32: Harborplace	38.1%	$886.20	$801.27
A28: Baltimore Symphony Orchestra	1.1%	$891.62	$977.38
A24: Port Discovery Children's Museum	2.7%	$917.18	$723.99
A20: Geppi's Entertainment Museum	1.9%	$927.64	$819.30
A3: Fort McHenry National Monument and Historic Shrine	24.8%	$940.64	$837.08
A25: Museum of Maryland African American History & Culture	2.4%	$951.86	$625.90
A9: Sports Legends at Camden Yards	8.8%	$966.12	$767.53
A34: Power Plant Live	11.8%	$971.04	$842.75
A11: USS Constellation/Historic Ships	20.5%	$976.51	$874.50
A23: National Great Blacks In Wax Museum	2.4%	$980.50	$1021.59
A1: Basilica of the Assumption	6.9%	$981.46	$968.58
A8: Orioles/Camden Yards	28.2%	$984.05	$935.55
A7: National Aquarium	34.1%	$985.14	$860.73
A43: Watermark Cruises	4.3%	$985.20	$703.69
A14: American Visionary Art Museum	7.1%	$990.37	$904.27
A2: Edgar Allan Poe Gravesite	7.4%	$996.22	$917.10
A13: Top of the World Observation Level	8.3%	$1017.15	$827.11
A6: Maryland Zoo	5.3%	$1022.41	$785.58
A10: Star-Spangled Banner Flag House	6.5%	$1029.98	$850.53
A12: Washington Monument	12.9%	$1032.00	$975.33
A35: The Gallery Shopping Center	18.9%	$1046.81	$898.95
A37: Fell's Point Walking Tour	8.1%	$1049.06	$934.25
A21: Jewish Museum of Maryland	0.8%	$1052.67	$1127.48
A17: Baltimore Museum of Art	6.1%	$1052.83	$1026.48
A19: Civil War Museum at President Street Station	3.1%	$1065.81	$1008.03
A5: Maryland Science Center	9.7%	$1076.39	$845.56
A26: The Walters Art Museum	5.9%	$1081.56	$1047.32
A4: Frederick Douglas – Isaac Myers Maritime Park	3.1%	$1094.32	$769.61
A33: Hippodrome Theater	1.5%	$1095.39	$1157.28
A18: Baltimore Museum of Industry	2.0%	$1097.38	$1086.64

A42: Urban Pirates	1.4%	$1114.81	$953.96
A16: Babe Ruth Birthplace & Museum	5.5%	$1129.69	$1066.86
A40: Spirit Cruises/Seadog	5.0%	$1148.78	$828.17
A38: Heritage Walk Tour	2.7%	$1165.53	$1121.82
A39: Mount Vernon Walking Tour	2.8%	$1176.33	$1035.90

Table 6: Average Expenditure by Attraction Visited and Number of Attractions Visited

Baltimore Attraction	Number of Attraction Visits 1	2	3	4	5	6	7	Overall
A1	$450.00	$126.67	$605.78	$774.31	$765.27	$979.17	$1277.92	$981.46
A2	$100.00	$785.00	$665.00	$1299.50	$894.67	$757.67	$1086.06	$996.22
A3	$404.85	$509.73	$585.66	$855.78	$899.05	$1099.80	$1241.82	$940.64
A4		$525.00	$1425.00	$679.50	$455.00	$1271.75	$1211.96	$1094.32
A5	$1025.00	$544.17	$797.69	$633.31	$901.07	$1291.25	$1302.88	$1076.39
A6	$890.00	$497.78	$811.40	$995.71	$1454.00	$938.00	$1163.06	$1022.41
A7	$294.76	$757.12	$819.34	$1059.02	$1030.12	$1005.44	$1257.33	$985.14
A8	$379.76	$692.24	$897.56	$947.22	$1163.00	$1139.43	$1254.04	$984.05
A9		$416.83	$680.73	$782.78	$1063.39	$924.75	$1110.39	$966.12
A10	$370.00	$190.00	$673.00	$491.92	$621.64	$1073.00	$1254.77	$1029.98
A11	$231.25	$519.78	$688.16	$828.77	$761.83	$1301.00	$1223.68	$976.51
A12	$473.60	$606.88	$808.88	$862.94	$848.40	$967.38	$1292.59	$1032.00
A13	$270.00	$326.00	$472.50	$858.67	$801.94	$1134.50	$1236.12	$1017.15
A14	$265.75	$276.00	$1129.20	$809.43	$857.34	$1113.36	$1145.74	$990.37
A15	$350.00	$419.50	$610.91	$473.86	$1054.00	$534.00	$1073.45	$873.87
A16	$462.50		$527.50	$1305.40	$1006.64	$799.63	$1325.66	$1129.69
A17	$275.00	$246.25	$650.00	$952.50	$917.50	$806.43	$1328.95	$1052.83
A18		$102.50		$1006.67	$482.50	$50.00	$1381.06	$1097.38
A19	$275.00	$215.00	$734.33	$1672.00	$795.29	$480.00	$1251.67	$1065.81
A20	$45.00	$369.00	$382.50	$1235.50	$1384.67	$645.50	$1113.56	$927.64
A21			$493.50	$1183.33			$1234.25	$1052.67
A22	$43.50			$570.00	$1195.00		$989.75	$855.82
A23	$426.00	$517.50	$332.50	$422.50	$250.00	$1372.50	$1436.08	$980.50
A24	$392.50	$100.00	$412.50	$1048.33	$585.12	$3150.00	$1133.93	$917.18
A25				$1073.64		$988.33	$915.95	$951.86
A26		$55.00	$472.09	$571.25	$1016.13	$1001.67	$1384.15	$1081.56
A27	$511.67	$850.00	$1000.00	$760.00	$1002.50	$701.25	$748.35	$780.93
A28	$0.00		$1400.00	$0.00		$672.00	$1057.67	$891.62
A29	$285.00				$850.50		$787.56	$767.74
A30	$145.00	$200.00	$405.00			$660.00	$902.27	$631.75
A31			$1150.00		$145.00	$325.00	$550.67	$545.33
A32	$568.75	$688.09	$687.64	$859.02	$919.96	$1052.05	$1104.50	$886.20
A33	$240.00	$477.50	$1458.33		$1600.00		$1140.64	$1095.39
A34	$415.83	$784.00	$595.89	$810.73	$965.41	$1208.00	$1077.90	$971.04
A35	$196.67	$852.83	$925.65	$931.33	$1018.04	$1267.14	$1186.05	$1046.81
A36		$387.50		$950.00	$945.00		$803.86	$754.27
A37	$1210.00	$767.00	$819.14	$876.50	$943.67	$1470.75	$1124.55	$1049.06
A38		$375.00	$857.50	$432.50	$788.00	$820.00	$1408.67	$1165.53
A39		$1300.00	$142.50	$905.00	$575.00	$1557.50	$1351.38	$1176.33

A40	$580.00	$642.50	$807.86	$1537.50	$1323.13	$948.00	$1220.71	$1148.78
A41		$515.00		$855.00	$1057.50	$672.00	$880.30	$842.94
A42		$210.00		$1668.33	$450.00	$2292.50	$922.13	$1114.81
A43	$65.00	$1025.00	$576.00	$867.20	$922.40	$1033.50	$1149.52	$985.20

4.4 Regression Analysis

The final analysis of this study used multiple regression analysis to estimate the impact of traveler activated paths on created destination value. The independent variables represented the activated paths of the traveler activities network and the dependent variable was total trip expenditure. The regression model was constructed following Fesenmaier and Lieber (1988) and Lieber and Fesenmaier (1988) where each network touch point and each activated path between two touch points was dummy coded (0/1). In total, 946 network elements (nodes and ties) are used to construct Baltimore's activated C2B traveler activities network. However, the inclusion of too many independent variables relative to the number of observations will often result in over-fitting the regression model and may lead to unreliable coefficients that are not useful for prediction purposes. Therefore, following Peduzzi, Concato, Kemper, Holford, and Feinstein (1996), those dummy coded network variables that did not have at least ten observations in the sample were eliminated from the model in order to avoid biased regression coefficients. Thus, 41 of the 43 attractions and 286 of the 835 activated paths between attractions were entered into the activated C2B network regression model.

The results of the regression analysis are presented in Table 7 as a matrix where 47.2 percent of the variation in total trip expenditure (R^2=.472, Adjusted R^2=.269, F=2.324, p>.000), and the intercept is $282.42. The diagonal elements of the matrix are the regression coefficients for each Baltimore attraction and can be interpreted as the main effects that visiting each destination attraction has on total spending. The off diagonal elements within Table 7 are the interaction effects and represent the marginal change in total expenditure caused by taking the path between two particular destination attractions. Statistically significant regression coefficients are highlighted in green (see Fesenmaier and Lieber, 1988 and Lieber and Fesenmaier, 1988 for a more in-depth interpretation of the respective regression coefficients).

It is noteworthy that not all of the activated network elements are found to be statistically significant in either value creation model. This does not suggest, however, that activated network elements not found in the final models do not contribute to destination value. Rather, it implies that most of the activated network elements simply do not significantly increase or decrease the average value created by destination visitors. Instead, regression analysis only identifies those network elements that are causing significant deviation from the average value created. Once these key network elements are recognized DMOs should adjust their strategies to manipulate the value creation networks in order to maximize destination competitiveness.

As can be seen in Tables 7, the paths have both positive and negative impact on destination value. For example, the single attraction touchpoint with the highest statistically significant impact on total visitor expenditure is the Museum of Maryland African American History & Culture (b=$1178, p=.044) but other combinations of touch points are even more profitable, such as the path connecting the National Aquarium and the Baltimore Museum of Industry (b=$3878, p=.021). Other paths within the activities network, such as the path connecting Sports Legends at Camden Yards and the Spirit Cruises/Seadog (b=-$1026, p=.011) actually have a significant negative effect on the average value created within the destination. This matrix in Table 7 can also be used to predict total

visitor expenditure. For example, if a travel party visited the National Aquarium (A7) and Camden Yards (A8), the expected total trip expenditure predicted by the regression model would be $282 (intercept) + $167 (A7) + $190 (A8) + $126 (A7*A8) = $765.

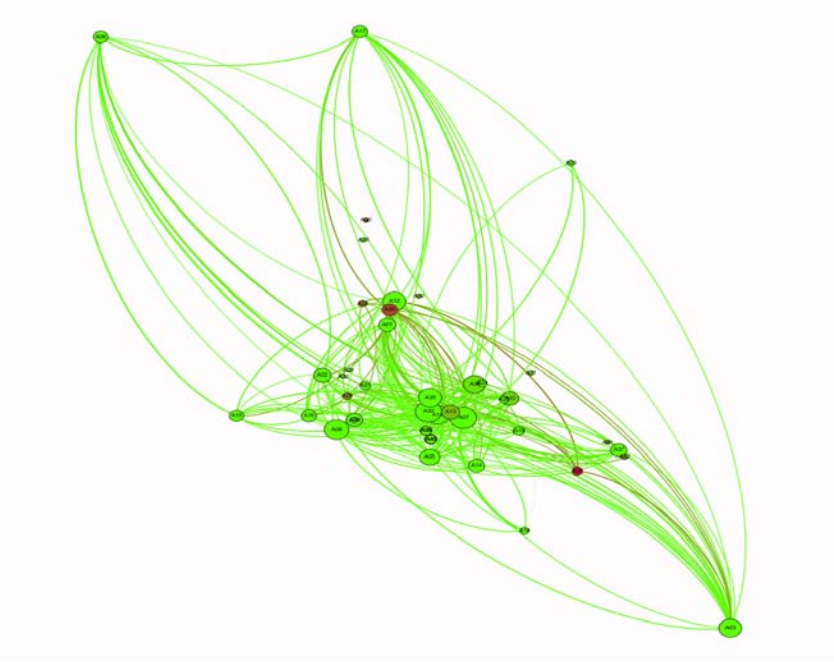
The marginal impact that each destination attraction and path has on total visitor expenditure can be represented graphically using networks. The matrix in Table 7 was entered into Gephi 0.8.2 (Bastian, Heymann, & Jacomy, 2009) in order to visualize total visitor expenditures within Baltimore's C2B attractions network. As can be seen in Figure 2, attractions with positive main effects on spending are represented with green coloring, while attractions with negative main effects are depicted in red. Likewise, paths with positive effects on total spending are depicted in green and paths between attractions with negative effects on spending are shown in red. Finally, the size of network nodes and the thickness of network ties shown in Figure 2 represent the magnitude of the effects, with larger effects represented by larger node sizes and thicker network ties.

Table 6: Regression Results for Baltimore's C2B Attractions Network Impact on Total Visitor Spending

	A01	A02	A03	A04	A05	A06	A07	A08	A09	A10	A11	A12	A13	A14	A15	A16	A17	A18	A19	A20	A21	A22	A23	A24	A25	A26	A27	A28	A29	A30	A31	A32	A33	A34	A35	A36	A37	A38	A39	A40	A41	A42	A43
A01	253	-520	-186		-77		-302	302	-725	873	-378	-391	-379	47		985	124									681						-202		492	130		898		-698				
A02		150	424		280	579	360	227	-276	-445	49	-300	-178	-585	-678	-631	-470									247						-369		54	-375		189						
A03			43	686	-32	-701	68	290	-181	47	33	-164	251	146	207	-20	-523		-61			337				-10	-240					221		-317	-175		-565	-150	38	-519			130
A04				-586	-161		259	-924			-94	1089																				965			194								
A05					136	-199	-28	145	-366	-266	-425	388	96	-4	282	882	237							553	1075	-797	-155					-281		-158	324					200			
A06						367	-260	-429		1378	-3	-818	287	-1009	1126		613															51		-738	-113								
A07							167	126	608	-41	149	70	190	-234	-535	-407	171	3878	1176	583		-731	378	-405	-620	238	177		55			-5		148	140		-36	833	-286	-132		716	-262
A08								190	-334	-182	99	-109	763	535	-757	-219	236	277	177	271		-99	423		-276	-499			-542			-169		-152	-58		-31	107	-819	714			-93
A09									376	479	558	-514	-332	-308	23	-75															193		-331	-67		-532			-1027			
A10										-79	46	704	10	208		-491			-89												-397		-211	-258			898					330
A11											92	-394	-192	885	63	-464	77		-174					407		1730	-236		-696			-85		-13	-256		-105	-431	150	209			-364
A12												278	-350	357	543	1070	-154	-355	-752			649				283	-28		-629			-19		543	103		-133	-900	-329	28			
A13													-143	26		-565	-9									-571						-374		327	-240		765						1018
A14														81			-276									-196						-262		82	-751		618						
A15															144	411										118						-89		-560	-444								
A16																290										-122						-44		509	207								
A17																	100									768						-459		-158	489		484						
A18																		40														5		-2984									
A19																			25													-1123		221	405								
A20																				25												-1018											
A21																																											
A22																						-311										-188											
A23																							141									-489											
A24																								-3								-69		472	254								
A25																									1178							-1124			-277								
A26																										-431						-2		-898	258								
A27																											281					-112		-74	-435								
A28																												19															
A29																													-256			1531											
A30																														-116													
A31																																											
A32																																276		45	-172		-480	-195	296	-79			471
A33																																	561										
A34																																		-48	54		-150	315		-184			570
A35																																			431		244	340	-636	-363			-283
A36																																				-390							
A37																																					553	-682	-129	-43			
A38																																						-32					
A39																																							577				
A40																																								429			
A41																																									-192		
A42																																										-195	
A43																																											-16

Note Constant = $282.42, R^2=.472, Adjusted R^2=.269, F=2.324, p>.000
Coefficients highlighted in green are statistically significant at p<.05.

Figure 2: The Baltimore's C2B Attractions Network Structure in terms of Total Visitor Spending



5 Implications

Using Baltimore tourism as a case study, this paper illustrates the use of destination performance metrics based upon networks within the destination value system. In particular, the analysis of the C2B ties within the traveler activities network provide valuable insights that can be used for the strategic destination network management of Baltimore. By performing a triad census, the most frequent traveler-activated paths can be identified for Baltimore's attractions network. These metrics, in addition to identifying the most frequently visited attractions, can also be used in a strategic destination network management context to develop new product bundles and communication techniques that increase Baltimore's competitiveness. Finally, the deconstruction of Baltimore's attractions network reveals the marginal impact each network path has on destination value creation. Indeed, the regression results suggest that understanding the structure of the value creation networks increases the understanding of how value is created in the destination. Knowing which combinations of destination touchpoints have the most significant impact on destination expenditures allows the DMO to develop appropriate strategies. Therefore, in order to improve competitiveness, the DMO may consider ways in which to design the destination in order to increase visitation to the activities with strong positive impact on expenditure. The can also design marketing and promotion strategies that can encourage the use of the information search strategies associated with higher spending. Likewise, activities or search strategies that have a negative effect on destination spending should be further investigated so as to reduce negative effects on overall destination expenditures. Thus, these findings identify key

visitor-activated paths that significantly increase or decrease destination value and which enable the Baltimore DMO to invest efficiently in partnership development.

In addition to adequately demonstrating the power of the proposed destination value system, this case study has also provides a good foundation for future research. Of particular interest are the ways in which new sources of data can be utilized to metricize the destination value system. Data mining techniques should be developed in order to describe the digital paths of travelers as they use Internet technology before, during, and after their destination visits (Gonzalez, Lopez, & de la Rosa, 2003). In the case of destination value creation networks, travelers engage in numerous forms of social media, some of the most popular being Twitter, Flickr, YouTube, Facebook, and TripAdvisor (U.S. Travel Association, 2012). Many of these data created through social media use are publicly accessible, thereby providing an opportunity to analyze destination level data without requiring the sharing of proprietary traveler data held by the individual destination firms. Importantly, because much of these data are geocoded, travelers' movement through both physical and virtual space can be better understood. Finally, these social media and other forms of digital trace data offer the potential to monitor destination network metrics in real time, which in turn would enable DMOs to design destination management programs that response to the need of current (and "real") visitors than those "imagined" by out-of-date surveys.

6 References

Bastian, M., Heymann, S., & Jacomy, M. (2009). *Gephi: An Open Source Software for Exploring and Manipulating Networks.* Paper presented at the ICWSM.

Borgatti, S. P., & Halgin, D. S. (2011). On Network Theory. *Organization Science, 22*(5), 1168-1181.

Chakravorti, S. (2009). Extending Customer Relationship Management to Value Chain Partners for Competitive Advantage. *Journal of Relationship Marketing, 8*(4), 299-312. doi: 10.1080/15332660903344636

Chathoth, P. K. (2007). The Impact of Information Technology on Hotel Operations, Service Management and Transaction Costs: A Conceptual Framework for Full-Service Hotel Firms. *International Journal of Hospitality Management, 26*(2), 395-408.

Destination Marketing Association International. (2011). Standard Dmo Performance Reporting: A Handbook for Dmos (pp. 43). Washington, DC: Destination Marketing Association International.

Fesenmaier, D. R., & Xiang, Z. (in press). Tourism Marketing from 1990 - 2010: Two Decades and a New Paradigm. In S. McCabe (Ed.), *The Handbook of Tourism Marketing*: Routledge.

Gonzalez, G., Lopez, B., & de la Rosa, J. (2003). Smart User Models for Tourism: A Holistic Approach for Personaliaed Tourism Services. *Information Technology & Tourism, 6*(4), 273-286.

Gretzel, U. (2010). Travel in the Network: Redirected Gazes, Ubiquitous Connections and New Frontiers. In M. Levina & G. Kien (Eds.), *Post-Global Network and Everyday Life* (pp. 41-58).

Hauser, J., & Katz, G. (1998). Metrics: You Are What You Measure! *European Management Journal, 16*(5), 517-528.

Kaplan, R. S., & Norton, D. P. (1996). *The Balanced Scorecard: Translating Strategy into Action*: Harvard Business Press.

Kracht, J., & Wang, Y. (2010). Examining the Tourism Distribution Channel: Evolution and Transformation. *International Journal of Contemporary Hospitality Management, 22*(5), 736-757.

Madhavan, R., Gnyawali, D. R., & Jinyu, H. (2004). Two's Company, Three's a Crowd? Triads in Cooperative-Competitive Networks. [Article]. *Academy of Management Journal, 47*(6), 918-927. doi: 10.2307/20159631

Mauboussin, M. J. (2012). The True Measures of Success. *Harvard business review, 90*(10), 46-56.

Meriläinen, K., & Lemmetyinen, A. (2011). Destination Network Management: A Conceptual Analysis. *Tourism Review, 66*(3), 25-31.

Ndou, V., & Petti, C. (2007). Dms Business Models Design and Destination Configurations: Choice and Implementation Issues. *Information Technology & Tourism, 9*(1), 3-14.

Peduzzi, P., Concato, J., Kemper, E., Holford, T. R., & Feinstein, A. R. (1996). A Simulation Study of the Number of Events Per Variable in Logistic Regression Analysis. *Journal of Clinical Epidemiology, 49*(12), 1373-1379. doi: http://dx.doi.org/10.1016/S0895-4356(96)00236-3

Pine, B. J., & Gilmore, J. H. (1999). *The Experience Economy: Work Is Theatre & Every Business a Stage*: Harvard Business Press.

Poon, A. (1993). *Tourism, Technology, and Competitive Strategies*. Oxon, UK: CAB Publishing.

Porter, M. E. (1985). *Competitive Advantage: Creating and Sustaining Superior Performance*. New York: The Free Press.

Ritchie, J. R. B., & Crouch, G. I. (2003). *The Competitive Destination: A Sustainable Tourism Perspective*: Cabi.

Ritchie, R. J. B., & Ritchie, J. R. B. (2002). A Framework for an Industry Supported Destination Marketing Information System. *Tourism Management, 23*(5), 439-454.

Shih, H. Y. (2006). Network Characteristics of Drive Tourism Destinations: An Application of Network Analysis in Tourism. *Tourism Management, 27*(5), 1029-1039.

Stienmetz, J. L., & Fesenmaier, D. R. (2013). Traveling the Network: A Proposal for Destination Performance Metrics. *International Journal of Tourism Sciences, 13*(2), 57-75.

Tax, S. S., McCutcheon, D., & Wilkinson, I. F. (2013). The Service Delivery Network (Sdn): A Customer-Centric Perspective of the Customer Journey. *Journal of Service Research*. doi: 10.1177/1094670513481108

U.S. Travel Association. (2012). Travelers' Use of the Internet, 2011 Edition. Washington, DC: U.S. Travel Association.

UNWTO. (2007). *A Practical Guide to Tourism Destination Management*. Madrid, Spain: World Tourism Organization.

Wang, Y., & Fesenmaier, D. R. (2007). Collaborative Destination Marketing: A Case Study of Elkhart County, Indiana. *Tourism Management, 28*(3), 863-875. doi: 10.1016/j.tourman.2006.02.007

Wang, Y., & Xiang, Z. (2007). Toward a Theoretical Framework of Collaborative Destination Marketing. *Journal of Travel Research, 46*(1), 75-85.

Wasserman, S. S. (1977). Random Directed Graph Distributions and the Triad Census in Social Networks†. *The Journal of Mathematical Sociology, 5*(1), 61-86. doi: 10.1080/0022250x.1977.9989865

WÖber, K. W. (2002). *Benchmarking in Tourism and Hospitality Industries: The Selection of Benchmarking Partners*: CABI.

Woodside, A. G., & Dubelaar, C. (2002). A General Theory of Tourism Consumption Systems: A Conceptual Framework and an Empirical Exploration. *Journal of Travel Research, 41*(2), 120-132. doi: 10.1177/004728702237412

Zach, F., & Gretzel, U. (2011). Tourist-Activated Networks: Implications for Dynamic Bundling and En Route Recommendations. *Information Technology & Tourism, 13*(3), 229-238.