Article

A Social Network Analysis of Tourist Movement Patterns in Blogs: Korean Backpackers in Europe

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Abstract: Given recent developments in information and communication technology, the number of individual tourists enjoying free travel without the advice of travel agencies is increasing. Therefore, such tourists can visit more tourist destinations and create more complex movement patterns than mass tourists. These tourist movement patterns are a key factor in understanding tourist behavior and they contain various information that is important for tourism marketers. In this vein, this study aims to investigate tourist movement patterns in Europe. We acquired 122 data points from posts on the NAVER blog, which is the most famous social media platform in Korea. These data were transformed into matrix data for social network analysis and analyzed for centrality. The results suggest that Korean backpackers in Europe tend to enter Europe through London and Paris. Venezia and Firenze are also key cities.

Keywords: smart tourism; tourist movement patterns; social network analysis; sustainable tourism; Korean backpackers; European cities; mobile devices

1. Introduction

The movement of tourists is a key factor in tourism and also represents very important information in terms of understanding tourist behavior and the role of specific tourist destinations [1–3]. Specifically, because the number of individual tourists who do not rely on travel agencies and make their own travel decisions instead is increasing, tourist movement patterns are becoming more and more complicated. The development of the Internet and information and communication technology has made tourists smart and independent. Mobile devices have created an environment in which tourists can create and consume a great deal of information, as well as sharing information in real time [4]. Therefore, the guidebook and tour guide are being replaced by mobile devices. These new information-sharing activities are going on constantly, without any restrictions based on the physical environment. In this context, this study examines such individuals' independent travel behavior in terms of sustainable tourism. Sustainable tourism has mostly been studied in terms of development in an attempt to determine how tourism destinations should be developed in harmony with local residents and the natural environment [5–8]. However, focusing on tourists can provide infinite information without environmental destruction and the accompanying tourism activities can also be viewed in a broader sense. Travelers who enjoy traveling independently using information obtained via the virtual space information are more concerned with maintaining harmony with local residents as compared to group tourists and seek local authenticity [9].

As mentioned above, the development of the Internet has strengthened the information for search among tourists. Because the number of individual tourists who do not rely on travel agencies and

make their own decisions instead is increasing, tourist movement patterns are becoming more and more complicated.

Given this trend, tourists who spend more time at a destination find it worthwhile because it allows them time to seek new experiences, choose destinations based on their cultures and visit more tourist destinations in total [10]. Furthermore, platforms to help tourists who plan their trips alone are emerging. For instance, Fortune Korea 2014 introduced Stubby Planner, an innovative tool. Now, one million people use this platform to plan their trips to Europe annually.

According to Cohen [9], these tourists can be termed 'noninstitutionalized tourists.' They take trips freely and visit multiple tourist destinations. A typical example of a tourist with these characteristic is a backpacker. A backpacker is a young tourist who travels without the advice of a tour guide and is free to plan his or her own schedule [11,12]. Because of this freedom of movement, backpackers generate more complex movement patterns than tourists in large groups, such as mass tourists, who are generally moving on the same itinerary and these movement patterns may contain more useful information for tourism marketers and developers. Many researchers have studied such tourists' movement patterns and suggested various implications [12–16]. However, despite the increasing the number of backpackers in Korea and the popularity of backpacking in Europe, there is still a lack of understanding of their movement patterns. Therefore, the present paper aims to investigate the movement patterns of Korean backpackers in Europe by using Social network analysis. First, we measure the movement patterns of Korean backpackers in Europe in 2015. In doing so, we attempt to identify key tourist cities in Europe from the perspective of Korean tourist and understand the connections between tourist cities. Second, we attempt to analyze the changes in Korean tourists' movement patterns by comparing the 2015 data with the 2012 data. Finally, we suggest ways of developing of more efficient and productive tourist infrastructure.

2. Literature Review

2.1. Tourist Destination

Tourist destinations are a crucial factor in the tourism industry [17]. However, the concept of a tourist destination is vague and broad. For instance, an attraction, such as Disneyland, can be a tourist destination and a city, such as Rome, can also be a tourist destination. Therefore, it is important to clarify the definition of a 'tourist destination' in order to understand tourist movement patterns.

Leiper [2] discusses tourist destinations as one of the geographical elements of tourism. Leiper [2] defines a tourist destination as a location that can attract tourists to visit it. Thus, his definition of a tourist destination is well-characterized but also abstract. Lew and McKercher [18] argue that tourist destinations involve various factors, which can be divided into primary attributes and secondary attributes. Primary attributes are characteristics that are inherent to a tourist destination, such as its ecology and culture. Secondary attributes are characteristics that are created via development, such as hotels. These attributes combine to make a given tourist destination attractive to tourist destination [17]. However, the geographical discussions of tourist destinations remain vague.

The WTO [19] attempted to create a concrete definition of a tourist destination. According to the WTO [19], a local tourist destination can be defined as "a physical space that includes tourism products, such as support services and attractions and tourism resources. It has physical and administrative boundaries defining its management and images and perceptions defining its market competitiveness. Local destinations incorporate various stakeholders, often including a host community and can nest and network to form larger destinations. They are the focal point in the delivery of tourism products and the implementation of tourism policy ([18], p. 405)". The purpose of the present study is to measure tourist movement patterns between various destinations in Europe. Additionally, because Europe is largely urban, many cities are represented among tourist destinations. Thus, the present study defines a tourist destination as a city, including the products and activities in that city that attract tourists.

2.2. Tourist Movement Patterns

From a geographical point of view, tourists who visit more than one tourist destination create spatial movement patterns. These tourist patterns can be global, national, or local [20] and can include a variety of information that is useful for tourism marketers [1,3,14]. A concrete understanding of the spatial movements of tourist can provide insights into tourist behavior, including the destination characteristics that are most attractive to tourists [21]. Lue, Crompton and Fesenmaire [11] examined the effect of the spatial patterns of attraction on tourist routes and conceptualized multi-destination trip behavior. Other researchers have focused on tourist movement patterns rather than the locations of tourist destinations. Specifically, Pearce [12] suggested that the direction of transportation development should be based on the analysis of tourist movement patterns in Europe. Shin [22] examined the movement of automotive tourists in Taiwan and found that they engaged in various movement patterns and that 16 tourist destinations all had different roles. Leung et al. [14] investigated the movement patterns of international tourists who visited Beijing, including the effect of 2008 Beijing Olympics on tourist movement patterns. According to his study, these tourists tended to visit famous traditional attractions and their movement patterns were concentrated in the central city area. In addition, tourists who visited during or after the 2008 Beijing Olympics showed extended movement patterns as compared to tourists who visited before the Olympics. On the other hand, the inherent characteristics of tourists can also influence their movement patterns. Lew and MaKercher [18] argue that tourists' movement patterns reflect their consumption styles. Hwang et al. [13] also explored international tourists' travel patterns within cites in the United States. According to his study, these patterns differ with tourists' origins and levels of familiarity with the US. Specifically, Asian tourists tended to visit Los Angeles, Las Vegas and San Francisco, whereas European tourists and New Yorker tended to visit Orlando, Miami and New York, which had low levels of popularity among Asian tourists.

Cohen [9] distinguished between two types of tourist in terms of sociology. First, institutionalized tourists depend on a travel agency or guide. They enjoy passive tourism activities and moving about as ordered. On the other hand, noninstitutionalized tourists attempt to experience the culture of any tourist destinations they visit. They enjoy active tourism activities and novelty. Backpackers are an example of noninstitutionalized tourists: "backpackers (are) predominantly young travelers on extended holidays with a preference for budget accommodation, a flexible and informal travel itinerary and an emphasis on meeting people and participating in a range of activities ([23,24], p. 194)". That is, backpackers are young tourists who do not move according to the travel agency's schedule and are free to plan their own schedules. They have a strong motivation to escape from their daily lives [25], seek out unique sites and interact with the culture of tourist destinations they visit [9,26]. Therefore, backpackers can create their own routes and travel to more complex and remote tourist destinations than mass tourists. The development of information and communication technology has enabled tourists to share information, [4] and thus, a great deal of tourism information has been generated. As a result, tourists are becoming smarter and more able to travel independently by using the real-time personalized information provided at tourist destinations. In this context, the present study examines the movement patterns of backpackers.

2.3. Korean Backpackers

Pizam and Sussmann [16] explored tourist behaviors by nationality and found that Korean tourists preferred familiar places, rather than experiencing other cultures during overseas trips. Recently, however, several researchers have identified the characteristics of Korean tourists, especially backpackers in Korea, that are different characteristic from those mentioned above. Specifically, Park and Santos [27] examined memorable tourism experiences among Korean backpackers in Europe through interviews and found that they chose European backpacking trips to experience different cultures. These tourists reported that a unique experience was most important in terms of having a memorable trip. Bae and Chick [25] explored the characteristics of domestic Korean backpackers and found that Korea backpackers were mostly young

people who wanted to take long trips during their school break and attempt to experience events that they could not experience in daily life. The number of young tourists has gradually increased [28] and this is reflected in the analysis of travel agency product sales. According to GTN [29], the sales volume for individual products, such as airline tickets and hotel products, is increasing rapidly as compared to package product sales. Among the seven biggest travel agencies in Korea, European airline tickets account for most of sales volume. Thus, one can infer that Korean backpackers prefer Europe as a destination for free travel.

3. Research Question

Tourist movement patterns, including spatial and temporal information, are key to understanding tourists [1,3,14]. In particular, backpackers' movement patterns are more informative for understanding tourists' behavior than those of package tourists because backpackers visit more various destinations and take longer trips [9,24,26]. The analysis of the spatial and temporal movement patterns of backpackers can help provide useful information about them. Consequently, this study aims to analyze the travel movement patterns of Korean backpackers in Europe.

Research Question 1. Which city was most central for Korean backpackers in Europe in 2015?

Research Question 2. Were there differences in city centrality for Korean backpackers in European networks between 2012 and 2015?

4. Method

4.1. Sample and Procedure

To analyze the movement patterns of Korean backpackers in Europe in 2015, this study collected secondary data. Specifically, this study was conducted using NAVER, one of the most popular portal and blog service sites, which has an approximate share of 71% in Korea [30]. For the network analyses, postings on the blogs might be useful for comparison with photo-based SNS services because they provide the entire itineraries of each backpacker regarding European tourism sites. The researcher searched for blog postings using the term 'Europe backpacking route'. Posts written during the one-year period from 1 January to 31 December 2015 were included. Of the 717 blog posts that appeared in the search, we excluded postings that contained advertisements or recommendations or did not mention detailed information. This left 122 postings that contained actual routes including specific cities. Thirty-four postings from 2012 were collected in the same way. This study also collected data from 2010 and tried to compare the trend of backpacking trips after five years. However, the number of blog posts in 2010 was too small and those posts provided little information about specific routes. Therefore, this study adopted data from both 2015 and 2012 (Appendix A). From the 2015 data, 162 cities were identified and 129 cities were identified from the 2012 data. This study initially examined the top 20 cities Korean backpackers had the visited and found that Paris (France) was ranked first in 2015 and that London (UK) was ranked first in 2012 (Tables 1 and 2).

Table 1. Frequencies of city in 2015.

Rank	City	Country	Frequency
1	Pairs	France	119
2	Rome	Italy	112
3	Venezia	Italy	106
4	Firenze	Italy	103
5	London	United Kingdom	102
6	Prague	Czech	98
7	Interlaken	Switzerland	96
8	Munich	Germany	70
9	Wien	Austria	70

Table 1. *Cont.*

Rank	City	Country	Frequency
10	Luzern	Switzerland	62
11	Barcelona	Spain	59
12	Brussels	Belgium	54
13	Salzburg	Austria	54
14	Milano	Italy	51
15	Madrid	Spain	43
16	Amsterdam	Netherlands	39
17	Frankfurt	Germany	33
18	Budapest	Hungary	30
19	Cesky Krumlov	Czech	28
20	Hallstatt	Austria	26

Table 2. Frequencies of city in 2012.

Rank	City	Country	Frequency
1	London	United Kingdom	37
2	Pairs	France	33
3	Munich	Germany	32
4	Rome	Italy	32
5	Firenze	Italy	28
6	Venezia	Italy	26
7	Prague	Czech	23
8	Interlaken	Switzerland	22
9	Wien	Austria	20
10	Salzburg	Austria	19
11	Amsterdam	Netherlands	15
12	Brussels	Belgium	15
13	Milano	Italy	14
14	Napoli	Italy	13
15	Frankfurt	Germany	12
16	Barcelona	Spain	10
17	Luzern	Switzerland	10
18	Füssen	Germany	9
19	Madrid	Spain	9
20	Nice	France	7

4.2. Network Analysis

Tourists' movement patterns can be examined through network analysis. Network analysis is a set of research procedures for identifying structures in systems based on the relationships among components [31] Network analysis can be used to describe the global level of structure because it examines system indicators such as centrality, connectedness, integrativeness and system density, as well as the potential clustering of the network into subgroups.

The basic network dataset is an $n \times n$ matrix S, where n equals the number of nodes in the network. A node might be an individual or a higher-level component, such as an organization or a nation, of which the system is composed. Each cell sij indicates the strength of the relationship between nodes i and j. In communication research, this relationship is generally defined by the frequency of communication between nodes [32–35]. To examine global corporate communications regarding the movement routes of tourists, this study used a 162 (cities) $\times$ 162 (cities) matrix for the 2015 network and a 129 (cities) $\times$ 129 (cities) matrix for the 2012 network. Each cell was weighted according to the frequency of moving from the city in the column to the city in the row. Therefore, nodes indicate European cities and links indicate the movements of Korean backpackers.

Next, using UCINET 6, degree centrality was calculated in order to determine which cities play significant roles in determining the movements of Korean backpackers in the European network. The key benefit of normalizing degree centrality in this way is that we can assess the relative centrality of two cities.

Degree centrality, in this study, indicates the number of co-visitors between two cities. Because centrality is a structural attribute of each node in the network, centrality identifies the central point based on many direct contacts with other points [34,36]. This study adopts the Freeman approach to calculating the degree centrality of each node, as well as the overall network degree centralization, because backpackers' networks are significantly asymmetric. For non-symmetric data, the in-degree of a node u is the number of ties received by u, while the out-degree is the number of ties initiated by u [34,37]. As defined above, degree centrality is simply the number of nodes that a given node is connected to. In this case, out-degree centrality is the number of backpackers that have left from a given city. In-degree centrality is the number of backpackers that have traveled to a given city. A higher number of visitors does not simply increase the degree centrality score. Rather, to obtain a higher degree centrality score, a city must be linked with certain other cities. In other words, the way in which cities build relationships with other core cities is crucial in positioning them at the center of the network of Korean backpacker routes in Europe.

Eigenvector centrality is an ideal measure for those networks in which the tie strength between actors, rather than simply the presence or absence of a tie, is known [32,33,38]. It considers the strength of ties, including indirect social ties, among nodes. Thus, more central destinations can boost their centrality due to the inherent circularity involved in the calculation of the eigenvector centrality measure. This has the effect of making actors with strong ties to more central actors appear to be more central [32,33,38,39]. Betweenness centrality refers to the "share" of the shortest paths in a network that pass through a certain node [40]. Thus, betweenness centrality can be affected by the number of cities that are specifically co-linked specifically with two other cities. Finally, in this study, a high closeness value indicates that travelers leaving a city require the minimum steps to reach all other nodes. The lowest possible score occurs when the node has ties to every other node. Therefore, if a city is the most central in terms of closeness, it should allow travelers to quickly reach all other cities in Europe. Table 3 shows a summary of measurement methods mentioned above.

Table 3. Conceptual and operationalization definition of measurement.

The Name of Measurement	Conceptual Definition	Operationalization Definition	References
Degree centrality	the central point based on many direct contacts with other points	the number of co-visitors between two cities	Nam & Barnett [34], Scott [36]
Eigenvector centrality	an ideal measure for those networks in which the tie strength between actors	the number of cities that are specifically linked specifically with the central cities	Barnett et al. [32], Nam [33], Nam et al. [38]
Betweenness centrality	to the "share" of the shortest paths in a network that pass through a certain node	the number of cities that are specifically co-linked specifically with two other cities	Borgatti [40]
Closeness centrality	The lowest possible score occurs when the node has ties to every other node	Travelers leaving a city require the minimum steps to reach all other nodes	Nam et al. [38]

5. Results

The results reveal the structure of the network of Korean backpackers in Europe. Overall, Italian cities, such as Firenze, Venezia and Rome, are continually ranked in the top 20 in the list, regardless of year. Therefore, these cities play a key role for Korean backpackers in Europe. In addition, Paris (France), London (UK), Prague (the Czech Republic) and Interlaken (Switzerland) are also considered key cities. The specific results are described below.

5.1. Networks Structure of Korean Backpackers in Europe: Degree Centrality

Table 4 shows the centrality scores for the top 20 out of 162 cities in 2015. In this case, degree centrality indicates the total number of co-hyperlinked cities that one city shares with other cities. When the degree centrality analysis results for 2015 is compared with the results for 2012, differences emerge (Table 4). Specifically, in 2015, Firenze (109, 2nd in 2012) had the highest out-degree centrality, followed by Venezia (107, 4th in 2012), London (100, 1st in 2012), Paris (94, 7th in 2012) and Interlaken (92, 9th in 2012). The in-degree centrality rankings are significantly different from the out-degree centrality rankings. In 2015, Rome (112, 2nd in 2012) had the highest in-degree centrality, followed Paris (110, 1st in 2012), Venezia (108, 4th in 2012), Firenze (107, 3rd in 2012) and Prague (94, 7th in 2012). The interesting result here is the difference between London's in-degree and out-degree centrality. London's the out-degree score was quite high, while the in-degree score was low in both 2012 and 2015 (Table 5). Both the out-degree and in-degree centrality results show that Italian cities (i.e., Firenze, Venezia and Rome) rank at the top of the list in 2012 and 2015.

Table 4. In-degree and out-degree centrality in the Korean backpackers' network in 2015.

Rank	City	Country	Out-Degree	In-Degree
1	Firenze	Italy	109	107
2	Venezia	Italy	107	108
3	London	United Kingdom	100	32
4	Paris	France	94	110
5	Interlaken	Switzerland	92	92
6	Prague	Czech	91	94
7	Rome	Italy	85	112
8	Wien	Austria	72	71
9	Munich	Germany	70	68
10	Luzern	Switzerland	64	64
11	Salzburg	Austria	56	55
12	Barcelona	Spain	55	63
13	Brussels	Belgium	54	57
14	Milano	Italy	52	50
15	Amsterdam	Netherlands	40	40
16	Madrid	Spain	36	44
17	Frankfurt	Germany	32	28
18	Budapest	Hungary	29	30
19	Hallstatt	Austria	27	26
20	Cesky Krumlov	Czech	26	27

Table 5. Out-degree and in-degree in Korean backpackers' network in 2012.

Rank	City	Country	Out-Degree	In-Degree
1	London	United Kingdom	35	10
2	Firenze	Italy	28	28
3	Munich	Germany	27	30
4	Venezia	Italy	26	22
5	Rome	Italy	25	30
6	Wien	Austria	25	20
7	Pairs	France	24	31
8	Prague	Czech	23	21
9	Interlaken	Switzerland	21	22
10	Salzburg	Austria	19	22
11	Amsterdam	Netherlands	14	10
12	Milano	Italy	14	14
13	Napoli	Italy	13	13
14	Brussels	Belgium	12	15
15	Barcelona	Spain	10	9
16	Luzern	Switzerland	10	10
17	Füssen	Germany	9	9
18	Madrid	Spain	9	9
19	Frankfurt	Germany	8	10
20	Nice	France	7	7

5.2. Networks Structure of Korean Backpackers in Europe: Eigenve Centrality

For 2015, the eigenvector centrality results were similar to those for degree centrality. Firenze had the highest eigenvector centrality (75.473), followed by Venezia (70.474), Rome (55.151), Interlaken (33.249) and Milano (31.685). However, the Italian cities (e.g., Milano and Pisa) moved up in the rankings as compared with Paris and London, which moved down in the rankings (Table 6). Additionally, comparing 2012 and 2015, the eigenvector centrality results are similar and in 2012 (Table 7), Firenze (1st in 2015) had the highest eigenvector score (67.063) in the rankings. However, there is a slight difference in the order in that in 2012, Firenze was followed by Rome (3rd in 2015), Venezia (2nd in 2015), Wien (7th in 2015) and Munich (13th in 2015).

Table 6. Eigenvectors in Korean backpackers' network in 2015.

Rank	City	Country	nEigenvector
1	Firenze	Italy	75.473
2	Venezia	Italy	70.474
3	Rome	Italy	55.151
4	Interlaken	Switzerland	33.249
5	Milano	Italy	31.685
6	Luzern	Switzerland	23.368
7	Wien	Austria	21.983
8	Pisa	Italy	20.692
9	Prague	Czech	20.110
10	Barcelona	Spain	19.824
11	Pairs	France	17.378
12	Salzburg	Austria	14.936
13	Munich	Germany	14.634
14	Napoli	Italy	12.426
15	London	United Kingdom	12.012
16	Assisi	Italy	10.448
17	Madrid	Spain	9.494
18	Brussels	Belgium	8.639
19	Cesky Krumlov	Czech	8.379
20	Bern	Switzerland	7.910

Table 7. Eigenvectors in Korean backpackers' network in 2012.

Rank	City	Country	nEigenvector
1	Firenze	Italy	69.063
2	Rome	Italy	58.175
3	Venezia	Italy	57.271
4	Wien	Austria	40.816
5	Munich	Germany	29.878
6	Prague	Czech	29.387
7	Milano	Italy	27.127
8	Salzburg	Austria	25.916
9	Napoli	Italy	24.076
10	Interlaken	Switzerland	23.484
11	Pairs	France	21.449
12	Pisa	Italy	19.571
13	Zurich	Switzerland	18.210
14	Luzern	Switzerland	14.861
15	Füssen	Germany	13.929
16	Vatican City	Vatican City	13.277
17	London	United Kingdom	12.660
18	Barcelona	Spain	10.643
19	Brussels	Belgium	10.638
20	Cinque Terre	Italy	9.812

5.3. Networks Structure of Korean Backpackers in Europe: Betweenness

Table 8 shows the results of the betweenness analysis for 2015. These results are somewhat different from those for the 2012 network (Table 9). Specifically, in 2015, Paris had the highest betweenness score (28.702, 1st in 2012), followed by Rome (18.345, 4th in 2012), Venezia (14.113, 5th in 2012), Prague (13.573, 3rd in 2012) and Interlaken (12.699, 10th in 2012). Norwegian cities that had not been identified in 2012 entered the top 20 and Budapest (25th in 2012) moved up 14 steps in the rankings.

Table 8. Betweenness in Korean backpackers' network in 2015.

Rank	City	Country	nBetweenness
1	Paris	France	28.702
2	Rome	Italy	18.345
3	Venezia	Italy	14.113
4	Prague	Czech	13.573
5	Interlaken	Switzerland	12.699
6	Munich	Germany	11.130
7	London	United Kingdom	9.362
8	Barcelona	Spain	9.206
9	Wien	Austria	6.871
10	Spiez	Switzerland	6.231
11	Budapest	Hungary	6.110
12	Madrid	Spain	5.730
13	Oslo	Norway	5.450
14	Bodrum	Turkey	4.944
15	Santorini	Greece	4.838
16	Stockholm	Sweden	4.829
17	Bergen	Norway	4.821
18	Flam	Norway	4.821
19	Gudvangen	Norway	4.821
20	Myrdal	Norway	4.821

Table 9. Betweenness in Korean backpackers' network in 2012.

Rank	City	Country	nBetweenness
1	Pairs	France	32.139
2	London	United Kingdom	16.015
3	Prague	Czech	14.742
4	Rome	Italy	14.429
5	Venezia	Italy	14.073
6	Brussels	Belgium	13.142
7	Munich	Germany	12.887
8	Barcelona	Spain	11.357
9	Amsterdam	Netherlands	10.955
10	Interlaken	Switzerland	9.584
11	Madrid	Spain	9.096
12	Athens	Greece	8.686
13	Frankfurt	Germany	7.815
14	Dublin	Ireland	6.920
15	Lisbon	Portugal	6.234
16	Nice	France	5.737
17	Firenze	Italy	5.518
18	Napoli	Italy	5.421
19	Dubrovnik	Croatia	5.180
20	Wien	Austria	5.070

5.4. Networks Structure of Korean Backpackers in Europe: Closeness Centrality

High closeness centrality indicates that when leaving from a node, a traveler must take only the minimum number of steps to reach all other nodes. The results showed that Paris had the highest closeness centrality (29.87), followed by Munich (29.22), Interlaken (29.16), Prague (29.06) and Rome (28.95). These results are similar to those for betweenness in that four (e.g., Paris, Interlaken, Prague and Rome) of the top five cities are the same (Table 10) and quite different from the results in 2012 (Table 11).

Table 10. Closeness centrality in Korean backpackers' network in 2015.

Rank	City	Country	inCloseness	outCloseness
1	Paris	France	29.870	28.445
2	Munich	Germany	29.220	26.524
3	Interlaken	Switzerland	29.167	26.833
4	Prague	Czech	29.061	27.059
5	Rome	Italy	28.957	28.000
6	Venezia	Italy	28.750	27.196
7	Luzern	Switzerland	28.445	26.094
8	Barcelona	Spain	28.049	26.393
9	Milano	Italy	27.903	25.156
10	London	United Kingdom	27.013	26.264
11	Nice	France	26.833	25.394
12	Madrid	Spain	26.789	25.801
13	Athens	Greece	26.264	21.611
14	Frankfurt	Germany	26.264	24.284
15	Budapest	Hungary	26.179	25.926
16	Amsterdam	Netherlands	25.843	25.196
17	Brussels	Belgium	25.760	25.556
18	Wien	Austria	25.678	25.843
19	Strasbourg	France	25.515	25.156
20	Firenze	Italy	25.394	25.394

Table 11. Closeness centrality in Korean backpackers' network in 2012.

Rank	City	Country	inCloseness	outCloseness
1	Aix-en-Provence	France	-	11.563
2	Amsterdam	Netherlands	-	15.293
3	Antwerpen	Belgium	-	13.734
4	Augsburg	Germany	-	13.704
5	Budapest	Hungary	-	13.502
6	Cesky Krumlov	Czech	-	14.334
7	Cordoba	Spain	-	12.32
8	Etretat	France	-	12.774
9	Ljubljana	Slovenia	-	0.775
10	Luxembourg	Luxembourg	-	0.040
11	Kalabaka	Greece	-	0.051
12	Ronda	Spain	-	0.058
13	Rotterdam	Netherlands	-	0.060
14	Selcuk	Turkey	-	0.048
15	Zurich	Switzerland	-	0.058
16	Cappadocia	Turkey	16.474	0.787
17	Pamukkale	Turkey	14.035	0.039
18	Frankfurt	Germany	11.863	14.936
19	Brussels	Belgium	11.852	16.264
20	Barcelona	Spain	11.722	16.060

6. Discussion

This study explored the movement patterns of Korean backpackers in Europe through network analysis. The main contribution of network analysis is to offer broad pictures of recent dynamic relationships, which are critical in terms of understanding tourist behavior among European tourism sites. Furthermore, this study attempted to identify cities that are characteristic of the 2015 network as compared with the 2012 network. Network analysis provides various methods with which to investigate and compare movement patterns. Overall, Italian cities played a key role in 2015 when Korean backpackers travelled to Europe as compared to 2012.

The out-degree centrality values in the 2015 network indicate that certain core cities—Firenze (Italy), Venezia (Italy), London (UK), Paris (France) and Interlaken (Switzerland)—played a key role in the movement patterns of Korean backpackers in Europe. However, the order was slightly different than that for in-degree centrality. In particular, London (UK) had a significantly lower score for in-degree centrality than for out-degree centrality. This means that more tourists move from London to other cities than form other cities to London. In other words, Korean backpackers tend to choose London (UK) as their first city when they travel to Europe. In contrast, Rome (Italy) had an in-degree score that was higher than its out-degree score. This means that Korean backpackers tend to choose Rome (Italy) as their final city. Furthermore, as compared to 2012, in 2015, Italian cities were ranked more highly. Thus, Italian cities are playing a key role for Korean backpackers traveling in Europe. Among flights from Korea to Europe, there are 14 flights to Paris and 13 flights to either Rome or Milan. On the other hand, there are four flights to London, where Korean tourists have chosen to start their European trips [41]. Because the United Kingdom is geographically distant from other European countries in terms of location, backpackers may feel that travel there is relatively difficult.

The eigenvector centrality results for the 2015 network show that Firenze (Italy) had the highest score, followed by Venezia (Italy) and Rome (Italy). Unlike degree centrality, eigenvector centrality does not simply represent being connected to many other cities. Rather, it identifies cities that are connected to core cities. Firenze is linked to key cities such as Munich (Germany) and Salzburg (Austria). Therefore, Firenze (Italy) is the most influential city in that it is connected to the core cities. Moreover, the top three cities were all Italian cities (i.e., Firenze, Venezia and Rome). The results are the same for the 2012 network. In 2012, although the order is slightly different, the top three cities are all Italian (i.e., Firenze, Rome and Venezia). Thus, most Korean backpackers travelling to core cities tend to visit Italy and Italy is the most important tourist destination for Korean backpackers.

On the other hand, the betweenness results show that Paris (France) had the highest scores in both 2012 and 2015. Betweenness indicates the extent to which cities are not directly connected. For example, Paris (France) plays a role in connecting the overall cities in the network. That is, Korean backpackers are the most dependent on Paris (France) when traveling to other cities. In the case of Paris, the frequency of visits is high and the distance to London, which is the typical starting city for European travel, is also short. In addition, unlike UK cities that require air travel, Paris can be reached via a rail option called Eurostar. Eurostar's London-Paris section has the highest number of sales and the top ranking in Korea [42]. Thus, Korean backpackers who have flown into Europe through London can be found traveling through Paris to other European cities. On the other hand, as compared to the 2012 network, in 2015, the role of Italian cities became more important. Specifically, Rome (4th, Italy) and Venezia (5th, Italy) moved up in the rankings. Paris (France) plays a central role for Korean backpackers in Europe and serves as a link between cities that are not directly connected.

7. Conclusions

This study investigated the routes of backpackers in Europe. In particular, it examined specific movement patterns between European cities. Tourists' movement patterns are very important in understanding tourists because they contain a great deal of information [1–3]. This study identified the cities (e.g., Venezia, Paris, London, etc.) that are preferred by Korean backpackers, as well as the cities (e.g., Paris) that play a major role in tourists' movement.

This study also has practical implications. First, this study identified the key cities for Korean backpackers in Europe. More specifically, Korean backpackers have traveled to Europe, mainly via London and have confirmed that they typically enter Continental Europe via Paris. Because backpackers in Korea likely prefer convenient transportation within Europe, destination marketers should design marketing that emphasizes convenient transportation in Europe. Second, a number of backpackers start from London, but London flights are fewer in number than those to Rome and Paris. Thus, it is suggested that Korean airline managers may be able to increase airline revenue by increasing the number of flights. In addition, Korean backpackers have been shown to move through Paris when traveling from London to continental Europe. This seems to be influenced by Eurostar and travel agency managers should be able to draw the attention of backpackers who do not typically rely on agencies by concentrating on those who purchase London-Paris Eurostar tickets. Lastly, as the era of smart tourism evolves, tourists' movement patterns are becoming salient information. More specifically, as tourists' accessibility to information increases, a variety of start-up companies are emerging that provide information on travel routes for tourists. It is suggested that, for businesses, this data on travel patterns can be useful.

Notably, this study has certain limitations, including that it inferred the factors that affect tourists' movement patterns yet did not verify them empirically. Therefore, future studies can provide richer implications if they address the factors that influence travel routes and empirically verify the relationships between them. Moreover, this study collected information via specific blogs (i.e., NAVER blogs). Although NAVER has the highest share of Korean blogs, using their data cannot be generalized. Therefore, future research needs to collect information through multiple channels.

Author Contributions: All of the authors have contributed to the idea of this paper. Hee Chung Chung contributed to initiating and conceiving the topic of this paper and Yoonjae Nam contributed significantly to the methods, social network analysis, results and discussion sections. Namho Chung provided constructive advice to improve the manuscript.

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Appendix A

Table A1. The list of cities in 2015.

Code	City	County	Code	City	County
1	Adelboden	Switzerland	82	Ljubljana	Slovenia
2	Amalfi	Italy	83	London	United Kingdom
3	Amsterdam	Netherlands	84	Luxembourg	Luxembourg
4	Annecy	France	85	Luzern	Switzerland
5	Antibes	France	86	Lyon	France
6	Antwerpen	Belgium	87	Madrid	Spain
7	Arles	France	88	Malaga	Spain
8	Assisi	Italy	89	Manchester	United Kingdom
9	Athens	Greece	90	Mannheim	Germany
10	Avignon	France	91	Marseille	France
11	Bad Ischl	Austria	92	Melk	Austria
12	Bamberg	Germany	93	Meteora (Kalabaka)	Greece
13	Barcelona	Spain	94	Milano	Italy
14	Bari	Italy	95	Monaco	Monaco
15	Basel	Switzerland	96	Mont Saint Michel	France
16	Bath	United Kingdom	97	Montpellier	France
17	Bergen	Norway	98	Montreux	Switzerland
18	Berlin	Germany	99	Moskva	Russia
19	Bern	Switzerland	100	Munich	Germany
20	Bled	Slovenia	101	Murano	Italy
21	Bodrum	Turkey	102	Mykonos	Greece

Table A1. *Cont.*

Code	City	County	Code	City	County
22	Bonn	Germany	103	Myrdal	Norway
23	Bordeaux	France	104	Napoli	Italy
24	Bratislava	Slovakia	105	Nice	France
25	Brienz	Switzerland	106	Nuremberg	Germany
26	Brighton	United Kingdom	107	Oslo	Norway
27	Bruge	Belgium	108	Oxford	United Kingdom
28	Brussels	Belgium	109	Pairs	France
29	Budapest	Hungary	110	Pamplona	Spain
30	Burano	Italy	111	Pamukkale	Turkey
31	Cambridge	United Kingdom	112	Pisa	Italy
32	Cannes	France	113	Plitvice	Croatia
33	Cappadocia	Turkey	114	Pompeii	Italy
34	Capri	Italy	115	Porto	Portugal
35	Cascais	Portugal	116	Positano	Italy
36	Cesky Krumlov	Czech	117	Prague	Czech
37	Cingue Terre	Italy	118	Rastoke	Croatia
38	Colmar	France	119	Rhodes	Greece
39	Cordoba	Spain	120	Rome	Italy
40	Cork	Ireland	121	Ronda	Spain
41	Cotswold	United Kingdom	122	Rothenburg	Germany
42	Dresden	Germany	123	Saarbrücken	Germany
43	Dublin	Ireland	124	Safranbolu	Turkey
44	Dubrovnik	Croatia	125	Salerno	Italy
45	Düsseldorf	Germany	126	Salzburg	Austria
46	Edinburgh	United Kingdom	127	Santorini	Greece
47	Etretat	France	128	Schwangau	Germany
48	Feldkirch	Austria	129	Segovia	Spain
49	Fethiye	Turkey	130	Selcuk	Turkey
50	Firenze	Italy	131	Sevilla	Spain
51	Flam	Norway	132	Siena	Italy
52	Fontainebleau	France	133	Sintra	Portugal
53	Frankfurt	Germany	134	Sliema	Malta
54	Füssen	Germany	135	Sorento	Italy
55	Geneva	Switzerland	136	Spiez	Switzerland
56	Giverny	France	137	Split	Croatia
57	Gmunden	Austria	138	St. Gilgen	Austria
58	Gosau	Austria	139	Stavanger	Norway
59	Granada	Spain	140	Stockholm	Sweden
60	Grindelwald	Switzerland	141	Strasbourg	France
61	Gudvangen	Norway	142	Stuttgart	Germany
62	Haag (Hague)	Netherlands	143	Szentendre	Hungary
63	Hallstatt	Austria	144	Telc	Czech
64	Hamburg	Germany	145	Tivoli	Italy
65	Heidelberg	Germany	146	Toledo	Spain
66	Helsinki	Finland	147	Toulouse	France
67	Honfleur	France	148	Trogir	Croatia
68	Hvar	Croatia	149	Valencia	Spain
69	Ibiza	Spain	150	Vatican City	State della citta del vaticano
70	Innsbruck	Austria	151	Venezia	Italy
71	Interlaken	Switzerland	152	Verona	Italy
72	Istanbul	Turkey	153	Versailles (Yvelines)	France
73	København (Copenhagen)	Denmark	154	Voss	Norway
74	Köln (Cologne)	Germany	155	Warszawa (Warsaw)	Poland
75	Kraków (Krakow)	Poland	156	Wien	Austria
76	Kutná Hora	Czech	157	Wurzburg	Germany
77	Lausanne	Switzerland	158	Zaanse Schans	Netherlands
78	Lienz	Austria	159	Zadar	Croatia
79	Lille	France	160	Zagreb	Croatia
80	Lisbon	Portugal	161	Zermatt	Switzerland
81	Liverpool	United Kingdom	162	Zurich	Switzerland

Table A2. The list of cities in 2012.

Code	City	County	Code	City	County
1	Aix-en-Provence	France	66	London	United Kingdom
2	Amalfi	Italy	67	Luxembourg	Luxembourg
3	Amsterdam	Netherlands	68	Luzern	Switzerland
4	Antalya	Turkey	69	Madrid	Spain
5	Antwerpen	Belgium	70	Manchester	United Kingdom
6	Aran	Ireland	71	Marrakesh	Morocco
7	Assisi	Italy	72	Marseille	France
8	Athens	Greece	73	Meteora (Kalabaka)	Greece
9	Augsbrug	Germany	74	Milano	Italy
10	Avignon	France	75	Monaco	Monaco
11	Bamberg	Germany	76	Mont Saint Michel	France
12	Barcelona	Spain	77	Munich	Germany
13	Bari	Italy	78	Murano	Italy
14	Basel	Switzerland	79	Napoli	Italy
15	Berchtesgaden	Germany	80	Nice	France
16	Bergen	Norway	81	Nuremberg	Germany
17	Berlin	Germany	82	Odense	Denmark
18	Bern	Switzerland	83	Oslo	Norway
19	Bled	Slovenia	84	Oxford	United Kingdom
20	Bodrum	Turkey	85	Pairs	France
21	Bordeaux	France	86	Pamukkale	Turkey
22	Bratislava	Slovakia	87	Pisa	Italy
23	Bruge	Belgium	88	Plitvice	Croatia
24	Brussels	Belgium	89	Pompeii	Italy
25	Budapest	Hungary	90	Porto	Portugal
26	Burano	Italy	91	Positano	Italy
27	Cannes	France	92	Postoina	Slovenia
28	Cappadocia	Turkey	93	Prague	Czech
29	Capri	Italy	94	Pula	Croatia
30	Casablanca	Morocco	95	Rhodes	Greece
31	Cascais	Portugal	96	Rome	Italy
32	Cassis	France	97	Ronda	Spain
33	Cesky Krumlov	Czech	98	Rothenburg	Germany
34	Cingue Terre	Italy	99	Rotterdam	Netherlands
35	Cordoba	Spain	100	Safranbolu	Turkey
36	Cotswold	United Kingdom	101	Salisbury	United Kingdom
37	Dresden	Germany	102	Salzburg	Austria
38	Dublin	Ireland	103	Santorini	Greece
39	Dubrovnik	Croatia	104	Segovia	Spain
40	Edinburgh	United Kingdom	105	Selcuk	Turkey
41	Etretat	France	106	Sevilla	Spain
42	Fethiye	Turkey	107	Sintra	Portugal
43	Firenze	Italy	108	Sofia	Bulgaria
44	Frankfurt	Germany	109	Sorento	Italy
45	Füssen	Germany	110	Split	Croatia
46	Galway	Ireland	111	Stockholm	Sweden
47	Geneva	Switzerland	112	Strasbourg	France
48	Gent	Belgium	113	Stuttgart	Germany
49	Glasgow	United Kingdom	114	Syros	Turkey
50	Granada	Spain	115	Szentendre	Hungary
51	Haag (Hague)	Netherlands	116	Toledo	Spain
52	Hallstatt	Austria	117	Utrecht	Netherlands
53	Hamburg	Germany	118	Valencia	Spain
54	Heidelberg	Germany	119	Vatican City	State della citta del vaticano
55	Honfleur	France	120	Venezia	Italy
56	Howth	Ireland	121	Verona	Italy
57	Interlaken	Switzerland	122	Wien	Austria
58	Istanbul	Turkey	123	Wiltshire (Stonehenge)	United Kingdom
59	København	Denmark	124	Windsor	United Kingdom
60	Köln	Germany	125	Wurzburg	Germany
61	Kos	Greece	126	Zaanse Schans	Netherlands
62	Lausanne	Switzerland	127	Zagreb	Croatia
63	Le havre	France	128	Zermatt	Switzerland
64	Lisbon	Portugal	129	Zurich	Switzerland
65	Ljubljana	Slovenia			

Table A3. The list of cities by country in 2015.

County	City	Code	N	County	City	Code	N
Austria	Bad Ischl	11	11	Italy	Amalfi	2	20
	Feldkirch	48			Assisi	8	
	Gmunden	57			Bari	14	
	Gosau	58			Burano	30	
	Hallstatt	63			Capri	34	
	Innsbruck	70			Cinque Terre	37	
	Lienz	78			Firenze	50	
	Melk	92			Milano	94	
	Salzburg	126			Murano	101	
	St. Gilgen	138			Napoli	104	
	Wien	156			Pisa	112	
Belgium	Antwerpen	6	3		Pompeii	114	
	Bruge	27			Positano	116	
	Brussels	28			Rome	120	
Croatia	Dubrovnik	44	8		Salerno	125	
	Hvar	68			Siena	132	
	Plitvice	113			Sorento	135	
	Rastoke	118			Tivoli	145	
	Split	137			Venezia	151	
	Trogir	148			Verona	152	
	Zadar	159		Luxembourg	Luxembourg	84	1
	Zagreb	160		Malta	Sliema	134	1
Czech	Cesky Krumlov	36	4	Monaco	Monaco	95	1
	Kutná Hora	76		Netherlands	Amsterdam	3	3
	Prague	117			Haag	62	
	Telc	144			Zaanse Schans	158	
Denmark	København	73	1	Norway	Bergen	17	7
Finland	Helsinki	66	1		Flam	51	
France	Annecy	4	21		Gudvangen	61	
	Antibes	5			Myrdal	103	
	Arles	7			Oslo	107	
	Avignon	10			Stavanger	139	
	Bordeaux	23			Voss	154	
	Cannes	32		Poland	Kraków (Krakow)	75	2
	Colmar	38			Warszawa (Warsaw)	155	
	Etretat	47		Portugal	Cascais	35	4
	Fontainebleau	52			Lisbon	80	
	Giverny	56			Porto (Pôrto)	115	
	Honfleur	67			Sintra	133	
	Lille	79		Russia	Moskva (Moscow)	99	1
	Lyon	86		Slovakia	Bratislava	24	1
	Marseille	91		Slovenia	Bled	20	2
	Mont Saint Michel	96			Ljubljana	82	
	Montpellier	97		Spain	Barcelona	13	12
	Nice	105			Cordoba	39	
	Pairs	109			Granada	59	
	Strasbourg	141			Ibiza	69	
	Toulouse	147			Madrid	87	
	Versailles	153			Malaga	88	
Germany	Bamberg	12	18		Pamplona	110	
	Berlin	18			Ronda	121	
	Bonn	22			Segovia	129	
	Dresden	42			Sevilla	131	
	Düsseldorf	45			Toledo	146	
	Frankfurt	53			Valencia	149	
	Füssen	54		State della citta del vaticano	Vatican City	150	1
	Hamburg	64		Sweden	Stockholm	140	1
	Heidelberg	65		Switzerland	Adelboden	1	13
	Köln	74			Basel	15	
	Mannheim	90			Bern	19	
	Munich	100			Brienz	25	
	Nuremberg	106			Geneva	55	
	Rothenburg	122			Grindelwald	60	
	Saarbrücken	123			Interlaken	71	
	Schwangau	128			Lausanne	77	
	Stuttgart	142			Luzern	85	
	Wurzburg	157			Montreux	98	

Table A3. *Cont.*

County	City	Code	N	County	City	Code	N
Greece	Athens	9	5	Turkey	Spiez	136	7
	Meteora (Kalabaka)	93			Zermatt	161	
	Mykonos	102			Zurich	162	
	Rhodes	119			Bodrum	21	
	Santorini	127			Cappadocia	33	
Hungary	Budapest	29	2		Fethiye	49	
	Szentendre	143			Istanbul	72	
Ireland	Cork	40	2		Pamukkale	111	
	Dublin	43			Safranbolu	124	
					Selcuk	130	
United Kingdom	Bath	16	9				
	Brighton	26					
	Cambridge	31					
	Cotswold	41					
	Edinburgh	46					
	Liverpool	81					
	London	83					
	Manchester	89					
	Oxford	108					

Table A4. The list of cities by country in 2012.

County	City	Code	N	County	City	Code	N
Austria	Hallstatt	52	3	Luxembourg	Luxembourg	67	1
	Salzburg	102		Monaco	Monaco	75	1
	Wien	122		Morocco	Casablanca	30	2
Belgium	Antwerpen	5	4		Marrakesh	71	
	Bruge	23		Netherlands	Amsterdam	3	5
	Brussels	24			Haag	51	
	Gent	48			Rotterdam	99	
Bulgaria	Sofia	108	1		Utrecht	117	
Croatia	Dubrovnik	39	5		Zaanse Schans	126	
	Plitvice	88		Norway	Bergen	16	2
	Pula	94			Oslo	83	
	Split	110		Portugal	Cascais	31	4
	Zagreb	127			Lisbon	64	
Czech	Cesky Krumlov	33	2		Porto (Pôrto)	90	
	Prague	93			Sintra	107	
Denmark	København	59	2	Slovakia	Bratislava	22	1
	Odense	82		Slovenia	Bled	19	3
France	Aix-en-Provence	1	13		Ljubljana	65	
	Avignon	10			Postoina	92	
	Bordeaux	21		Spain	Barcelona	12	9
	Cannes	27			Cordoba	35	
	Cassis	32			Granada	50	
	Etretat	41			Madrid	69	
	Honfleur	55			Ronda	97	
	Le havre	63			Segovia	104	
	Marseille	72			Sevilla	106	
	Mont Saint Michel	76			Toledo	116	
	Nice	80			Valencia	118	
	Pairs	85		State della citta del vaticano	Vatican City	119	1
	Strasbourg	112		Sweden	Stockholm	111	1

Table A4. *Cont.*

County	City	Code	N	County	City	Code	N
Germany	Augsbrug	9	15	Switzerland	Basel	14	8
	Bamberg	11			Bern	18	
	Berchtesgaden	15			Geneva	47	
	Berlin	17			Interlaken	57	
	Dresden	37			Lausanne	62	
	Frankfurt	44			Luzern	68	
	Füssen	45			Zermatt	128	
	Hamburg	53			Zurich	129	
	Heidelberg	54		Turkey	Antalya	4	9
	Köln (Cologne)	60			Bodrum	20	
	Munich	77			Cappadocia	28	
	Nuremberg	81			Fethiye	42	
	Rothenburg	98			Istanbul	58	
	Stuttgart	113			Pamukkale	86	
	Wurzburg	125			Safranbolu	100	
Greece	Athens	8	5		Selcuk	105	
	Kos	61			Syros	114	
	Meteora(Kalabaka)	73		United Kingdom	Cotswold	36	9
	Rhodes	95			Edinburgh	40	
	Santorini	103			Glasgow	49	
Hungary	Budapest	25	2		London	66	
	Szentendre	115			Manchester	70	
Ireland	Aran	6	4		Oxford	84	
	Dublin	38			Salisbury	101	
	Galway	46			Wiltshire (Stonehenge)	123	
	Howth	56			Windsor	124	
Italy	Amalfi	2	17				
	Assisi	7					
	Bari	13					
	Burano	26					
	Capri	29					
	Cingue Terre	34					
	Firenze (Florence)	43					
	Milano	74					
	Murano	78					
	Napoli (Naples)	79					
	Pisa	87					
	pompeii	89					
	Positano	91					
	Rome	96					
	Sorento	109					
	Venice	120					
	Verona	121					

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