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A New Trend of Tourism in the Post-COVID-19 Era: Big Data Analysis of Online Tours in Korea

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Abstract: In this study, big data analysis on Korea's "online tour", which emerged as an alternative to satisfy tourism needs after COVID-19, was conducted. After extracting keywords through text mining for 24,073 posts from the top three most frequently visited social media platforms, Naver, Daum, and Google, to gather tour information in Korea, frequency analysis and TF-IDF analysis were run. In addition, network analyses, such as centrality and convergence of iteration correlation (CONCOR) analyses, were performed. The results showed: First, the sense of presence via local live streaming is crucial. It is vital to prepare a suitable video environment where tourists can immerse themselves in the tour. Second, the interaction between travel agencies, local guides, and tourists is important because it can expand tourists' travel experiences. Third, the importance of online tour program content was revealed. It is necessary to increase the demand by designing various programs tailored to the audience. Fourth, new possibilities for local travel that had been neglected were uncovered. Fifth, the importance of online tourism production support was highlighted. The role of the government must be expanded to reinforce the digital capabilities of small- and medium-sized enterprises (SMEs) and to create jobs. Although the scope of this study is limited to Korea, it can definitely be used as a regional strategy.

Keywords: COVID-19; online tours; sense of presence; interaction; online tour content; local travel

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1. Introduction

Since the World Health Organization (WHO) declared a pandemic on 11 March 2020 (WHO 2020), the spread of the virus has become the biggest obstacle to the tourism industry by limiting the physical relocation of tourists. Many scholars have claimed that the widespread nature of COVID-19 would affect the global economy and usher in the era of a New Normal 2.0 (BNN Bloomberg 2020). COVID-19 clearly rushed businesses to transition to contactless and online services, transforming the current society into a digital society (Kim et al. 2020). Due to the advancement of information and communication (IT) technology, and smart tourism, the tourism industry is expanding the use of digital technology to cater to contactless tourism services (Jeong and Lee 2020). The tourism industry in Korea, as well as around the world, must face the need to devise a way to respond to infectious diseases quickly, to understand the needs of potential tourists, and to design more aggressive marketing strategies to alleviate the damage that COVID-19 has caused (Korean Culture and Tourism Institute 2020).

Tourists' awareness and fear of the risk of COVID-19 have had a significant negative impact on their attitudes toward travel (Rather 2021). Because of the spread of COVID-19 and travel restrictions in many countries around the world, "Online Tours", without physical movement, emerged as an alternative form to satisfy tourism needs. (Hori et al. 2022). One notable trend is the introduction of virtual travel experiences that allow people to virtually experience a tourist destination by using web conferencing systems or video sharing services (Medai and Wu 2022). H.I.S. Co., Ltd., a reputable Japanese travel agency, has prepared online tours in more than 60 countries using the Zoom application. (H.I.S. Co. 2022). The number of paying participants has exceeded 100,000 (Hori et al. 2022). As new

content, such as live streams, provides experiences similar to physical tourism, forms of online interaction have been widely accepted in the tour industry and are forging online interactions (Xie et al. 2022). A total of 1.5 billion users in China spent CNY 24 billion in revenue on travel-related products via live streaming services (Deng et al. 2022).

The Korean government employed a digital transformation support program by providing consultation for digital transformation, digital content production, and promotion and capacity building training to revitalize the stagnant tourism industry caused by the pandemic (Ministry of Culture, Sports and Tourism 2022). Tourism business support centers in each region endeavor to strengthen the competitiveness of the Korean tourism industry by fostering tourism venture companies that generate new values and synergies based on creativity, innovation, and technology (Tourism Business Support Center 2022). As the government has been supporting the digitization of tourism and as a result of the travel restrictions due to COVID-19, online tours appeal to more and more travelers in Korea because of their concept of traveling at home. A travel agency called My Real Trip sold prepaid online tour products for the first time in Korea. The agency disclosed that the profit from the online tour contributed significantly to maintaining the operation of the agency during the pandemic. (Chosun Biz 2022). VIG Alternative Credit (VAC), the investment division of VIG Partners Credit, and a management-participating private equity funds (PEFs) operator invested KRW 50 billion into the company, predicting a promising prospect (Edaily NEWS 2022).

Given this background information, this study intends to identify the major issues related to online tours by analyzing online information gathered from Internet users on the evolving tourism industry since the pandemic. To initiate the study, research was conducted into what an online tour is, prior research related to online tours, what the research trends are in tourists' motivations to travel, and big data analysis of tourism research during the pandemic. Then, we turned to the patterns revealed in various tourist segments in Korea. Text mining and semantic network analyses were performed, in order to gather the necessary data. Text mining is a process of extracting statistically significant information from unstructured data, and is a technique that derives patterns for evaluating and interpreting results by structuring text data. We employed a network analysis of the tourism sector, as it has a resilient network industrial structure, and therefore is sufficient for academic research (Scott et al. 2007). Because the online tour is a new form of tourism that emerged during COVID-19, there are not enough accumulated studies. This study has academic significance in that it is a macroscopic study based on extensive online data of 24,073 cases. Moreover, it is not limited to those who have experienced online tours, but it also includes information received from people who will be experiencing online tours in the future, which will become invaluable in understanding the potential tourism needs of tourists.

2. Literature Review

2.1. Online Tours

The tourism industry has been struggling to transform its profit model to contactless models, because social distancing has been prolonged to prevent the spread of COVID-19 (Kim 2020). This new pandemic state has instigated various changes in the behavior of tourists to include non-landing tourism, which provides airport use, airplane boarding, and in-flight meal experiences (Ji 2021); wellness travel for health and healing (Han and Hwan 2016); and online virtual reality-based VR/AR tours (Manchanda and Deb 2022).

Online tourism, in particular, has emerged as an alternative form of tourism to satisfy tourists' needs during COVID-19, but it has not yet been explored as a topic (Medai and Wu 2022). Repo and Pesonen emphasize that tourists are replacing physical holidays with virtual experiences since physical travel became impossible for them, and what differentiates these new types of virtual experiences from the existing ones is that tourists' have been willing to pay for them since COVID-19 began (Repo and Pesonen 2022). Hori et al. states that "online tours" have three forms, defined as follows: video streaming

sites such as YouTube, web conferencing applications such as Zoom, and original websites. This study revealed three advantages of the online tour: no travel costs (time and money); all participants can sightsee from the same point of view; and there are less restrictions on participants. The reviews from a survey on an online tour experience conducted by H.I.S. Co., Ltd., a prominent Japanese travel agency, show that there was a minimum negative correlation between the number of online tours, distances, and time differences, and the tour guide was identified as being an important element of online tours (Hori et al. 2022). Medai and Wu define "online tours" as a way to experience tourist attractions by utilizing web conferencing systems such as Zoom. This study argues that the survey results betray the notion that positive emotions and telepresence have a positive effect on people's intention to participate in online tours.

Using an approach from the field of media theory research, Suzuki K. defines online tours as a tourist destination experience with online content, and tourism with low active participation (Suzuki 2021). Some researchers argue that the positive quality of online tours is due to the ease of two-way communication between tourists, travel agencies, and local tour guides (Mori 2022). This study claims that "interaction" is a factor that makes people feel the tourism experience. Nakano F. emphasizes that online tours need to be categorized as solo trips because the minimum number of participants is one, and the screen on a PC or a smartphone has basically only one screen, without sharing with others (Nakano 2021). Local specialty products were shipped to tour participants in advance, and programs such as traditional musical instrument concerts, cook-alongs, and ecological zoo commentaries were introduced online. This proved the importance of interactive communication.

The preceding studies are consequential in that they examined the responses of online tours through questionnaires sent to those who participated in them. Another notable achievement of the preceding studies is that they explore the meaning of tourism activities through the perspective of communication with tourists in online tours. However, the perception of a wide range of potential tourists is not readily understandable.

The significance of this study is that it analyses a vast amount of big data rather than just a survey, in order to identify the characteristics of online tours.

2.2. COVID-19 and the Traveler's Motivation

Since the beginning of the 21st century, the world has experienced the spread of infectious diseases such as SARS, avian influenza, and H1N1 influenza, which atrophied the tourism industry (Monterrubio 2010). COVID-19 has also caused a global impact, with a decline in tourist arrivals of 71% in 2021 in comparison to 2019 (UNWTO 2022). When a highly contagious epidemic prevails in a specific tourist destination, tourists prefer to switch to other destinations, or cancel or postpone their travel plans, rather than continuing with the plan (Sönmez and Graefe 1998). Potential tourists may feel anxious due to a pandemic, and tourism behavior tends to take a different form to previous behavior. However, a decline in tourist numbers does not translate to a decline in people's desire to travel (Lee 2022).

The psychological driving force for tourism behavior is the desire to tour, and this tourism motivation is the force that encourages tourists to visit tourist attractions (Lundberg 1990). The power to encourage people to travel by using tourism motivation is determined by how much an individual chooses to travel according to motivation variables, and how attracted he or she is to the various properties of the destination (Muzaffer and Hagan 1993; Lin and Zhang 2021). Travel motivation can be stimulated and consequently transformed into travel demand (Lin and Zhang 2021). However, it is imperative to have a thorough understanding of the major impacts, behaviors, and experiences of potential tourists during the pandemic (Sigala 2020).

The most recent study on the motivations of tourists after the pandemic was conducted by Aebli et al. This study carried out a survey in Australia during COVID-19 on tourists' desire to travel, and found that physical and mental wellbeing was the most pressing motivation, which proves that there is an accumulating need for touring (Aebli et al. 2022). Tourists exhibit a great need for rest and deviant behavior, because of suppressed desires

(Madani et al. 2020). The second reason is "social connectedness". Visiting family and friends is the main purpose of travel, and it reflects tourists' yearning to be with them (Aebli et al. 2022). Third and fourth are personal growth and relaxation. Another study, which examined Indonesians' intentions to revisit Bali, revealed that push motivation, pull motivation, and perceived health risk and attitudes heightened the intention to return to Bali (Sukaatmadja et al. 2021). In the same manner, a study on the motivation of pro-flight tourists applying the push and pull model proved that although the flight experience itself can be a selling point, it is not as attractive as expected (Lin and Zhang 2021). Mona Fairuz Ramli et al. reviewed the motivation and intent to revisit Kinabalu Park, and concluded that social contact, adventure, escape, novelty, and destination attraction are factors that outline the motivations of tourists (Ramli et al. 2020). The studies mentioned above are particularly meaningful in examining the travel motives of potential tourists in times of pandemics. Tourism marketers must remember that the tourists' motives to travel still exist, despite the pandemic.

2.3. Big Data Analysis in Tourism

Research to predict social phenomena in the post-COVID-19 era is being conducted in diverse academic fields. Research using big data to analyze the dynamics between social phenomena and changes in related industries is progressing rapidly (Yoon 2021). The term big data describes a data environment in which scalable architectures support the requirements of analytical and other applications, which process high volumes of data at a high velocity, which may include a variety of data formats and high-velocity data acquisition (Emmanuel and Stanier 2016). Jingjing Li. et al. mentioned three main big data sets, to better understand tourist behavior and tourism marketing. The three data sets consists of content data generated by Internet users, spatial–temporal big data due to the development of the Internet of Things (IoT), and transactions data, such as online reservation data (Li et al. 2018). Recent research includes studies which use online texts, such as the analysis of the perceptions of wellness tourism before and after COVID-19 by collecting social big data (Jang and Soo 2022), and the analysis of reviews on hotel reservation websites (Kitsios et al. 2022). Some studies analyse the temporal and spatial mobile density and stay attributes of walking tourists using a smartphone application based on the Global Positioning System (GPS) (Park and Yun 2014), while others explore the relationship between visitor mobility and urban spatial structure through GPS tracking technology (Sugimoto et al. 2019).

Semantic network analysis in big data analysis is a method for understanding how concepts in text are arranged, and to interpret the meaning of text by rendering the structural characteristics of such an arrangement (Doerfel 1998). This method is widely used in the field of tourism, since it measures and analyses the relationships between texts by deciphering the hidden context (Oh et al. 2015). One of the indicators that can be found through the network structure derived from network analysis is centrality (Wasserman and Faust 1994). Centrality is an index that measures the degree to which a specific node is located at the center of the network; it is applied to fathom the power of influence, mediation, and proximity by incorporating the concept of location into information exchange (Opsahl et al. 2010). Network analysis uses links that represent relationships between individual nodes that correspond to individual knowledge, group knowledge, and information. The relationship between the nodes reveals the characteristics of the network type and the structural patterns between the nodes and the characteristics of the nodes (Scott et al. 2007). Studies that have contributed to finding the relationship between the correlation structure and influence in tourism using network analysis include a study that revealed the structure of international tourism through social network analysis (Seok et al. 2021), a study that investigated the spatial structure of the tourist attraction cooperation network of the Yangtze River Delta (Wang et al. 2021), a study that examined reviews of hotels in Dubai (Wei and Kim 2022), and a study on tourists' perceived image of tropical forest parks (Li et al. 2022).

3. Methodology

3.1. Data Collection

What turns tourists' desire into action is tourism motivation (Fodness 1994). Tourism motivation has a positive effect on continuous information search and Internet information search (Lee 2006). As it is possible to exchange information equally between information providers and tourists, the involvement of tourists has become an invaluable variable in determining the importance of information (Park et al. 2005). This is the reason we collected big data, generated online, to understand the perception of potential tourists on online tours during the pandemic.

Data were collected from three major social media sites, Naver, Google, and Daum, which occupy a large market share in Korea. According to a survey conducted by InternetTrend from January 2020 to December 2021, 74.92% of the users visited Naver, while 14.98%, and 8.98% visited Google and Daum, respectively (Internettrend 2022). That is, many Koreans search and share tour-related information through these three portals. As social media is a platform where users can deliver and share their opinions on the same topic to construct public opinions, it is considered a perfect medium for big data, because it collects vast amount of data in real time (Han and Hwan 2016).

The data for this study were collected using Textom (http://www.textom.com accessed on 20 March 2022). This program performs text mining and creates and analyses the network matrix to collect massive antiformal and atypical textual data from social media platforms, in order to identify meaningful information. This study included 24,073 URLs published from 1 January 2020 to 31 December 2021. The posts that contained duplicate textural contents in Korean or that were posted for marketing or user attention were manually removed before engaging in data preprocessing. The research process is shown in Figure 1.

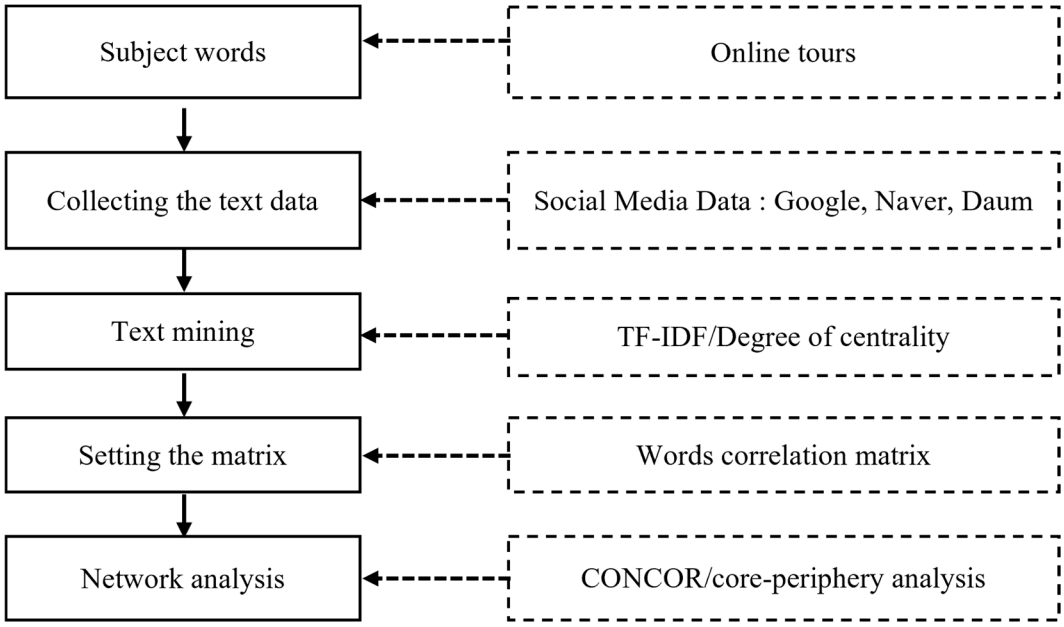

Figure 1. Research Process.

3.2. Data Analysis

In this study, text mining and semantic network analysis were used to analyse the collected social media data.

First, text mining analysis was performed to study the keywords related to the online tourism of Koreans. Text mining refers to a series of processes for extracting useful information from unstructured and large-scale texts based on natural language processing technology and deriving meanings by identifying connections with other information (Chiang et al. 2011). Morphological nouns were filtered among the collected data. The pro-

cess of analysis includes word segmentation and synonym merging. For instance, "corona virus", "COVID-19", and "COVID case" were consolidated into "COVID-19". The top 100 keywords with a frequency of 0.1% and higher were extracted among these refined words. Term frequency-inverse document frequency (TF-IDF) analysis of these 100 words was also conducted. The TF-IDF value for each word was calculated by retrieving the frequency of the word used in each document, and by computing the scaled inverse fraction of the frequency of documents containing the term. The higher the TF-IDF value, the stronger the relationship between the term and the related document (Ramos 2003).

Second, semantic network analysis was conducted on online tout-related keywords. Centrality analysis and CONCOR analysis were performed on the top keywords. Centrality indicates the degree to which a specific entity is located in the center of a network (Freeman 2008). Degree centrality and closeness centrality were analysed to learn the centrality and influence of each node.

UCINET 6 is used as a data analysis tool. UCINET 6 is the most routinely used program in social network analysis, and is primarily used to analyse social survey data that measures social relationships (Borgatti et al. 2014). UCINET is packaged with the visualization tool Netdraw. Netdraw is an illustration program that expresses how frequently words are related and makes an impact on certain interactions.

CONCOR analysis was performed to comprehend the structural equivalence, which is considered to be the most common concept in network analysis. CONCOR is a method of finding a group of similarities by repeatedly executing the process until the correlation converges. That is, it is a generally sought out method for finding a cluster in an entangled network system.

4. Results

4.1. Frequency Analysis and TF-IDF

The keywords extracted from the collected data are shown in Table 1.

Table 1. Top 100 frequent words from "Online Tours".

Rank	Word	Freq	%	Rank	Word	Freq	%	Rank	Word	Freq	%
1	Online tour	34703	7.93%	35	Theme	1033	0.24%	69	Information	686	0.16%
2	Travel	22321	5.10%	36	Broadcasting	1006	0.23%	70	Italy	671	0.15%
3	COVID-19	5772	1.32%	37	Time	992	0.23%	71	Storytelling	662	0.15%
4	Online	4481	1.02%	38	Japan	970	0.22%	72	Ministry of Tourism	662	0.15%
5	Video	3841	0.88%	39	Participation	969	0.22%	73	Movie	661	0.15%
6	Live streaming	3327	0.76%	40	Host	925	0.21%	74	Using	654	0.15%
7	Overseas	2909	0.66%	41	Planning	911	0.21%	75	Hotel	643	0.15%
8	Korea	2632	0.60%	42	café	898	0.21%	76	Target	642	0.15%
9	Sightseeing	2580	0.59%	43	Recommendation	892	0.20%	77	Society	633	0.14%
10	Photo	2551	0.58%	44	Manage	886	0.20%	78	Park	614	0.14%
11	Seoul	2203	0.50%	45	MyRealTrip.co	882	0.20%	79	France	611	0.14%
12	Product	2064	0.47%	46	NEWS	859	0.20%	80	Paris	598	0.14%
13	Guide	2015	0.46%	47	Healing	855	0.20%	81	Platform	582	0.13%
14	Introduction	1884	0.43%	48	Europe	854	0.20%	82	Nation	580	0.13%
15	Boracay	1843	0.42%	49	Market	853	0.19%	83	Daily life	577	0.13%
16	Program	1738	0.40%	50	Attraction	844	0.19%	84	Possibility	571	0.13%
17	Experience	1705	0.39%	51	Contest	834	0.19%	85	Spain	569	0.13%
18	Event	1669	0.38%	52	Promotion	834	0.19%	86	Communication	566	0.13%
19	Local	1632	0.37%	53	Museum	829	0.19%	87	Filming	563	0.13%
20	Content	1619	0.37%	54	People	791	0.18%	88	Living	563	0.13%
21	Travel destination	1606	0.37%	55	Education	771	0.18%	89	Art Museum	554	0.13%
22	Room	1521	0.35%	56	Posting	764	0.17%	90	Famous	552	0.13%
23	YouTube	1401	0.32%	57	Production	761	0.17%	91	Course	547	0.13%
24	City	1353	0.31%	58	Daegu	755	0.17%	92	Virtuality	532	0.12%
25	Jeju Island	1330	0.30%	59	History	749	0.17%	93	Sea	531	0.12%
26	Culture	1330	0.30%	60	Ceremony	740	0.17%	94	Review	519	0.12%
27	World	1176	0.27%	61	Mind	740	0.17%	95	Family	519	0.12%
28	Festival	1175	0.27%	62	Representative	728	0.17%	96	Special	518	0.12%
29	Release	1127	0.26%	63	Untact	726	0.17%	97	Summer	494	0.11%
30	Region	1112	0.25%	64	Popularity	715	0.16%	98	Show	494	0.11%
31	Busan	1079	0.25%	65	Freedom	705	0.16%	99	Sharing	489	0.11%
32	Supply	1069	0.24%	66	Gyeong-buk	698	0.16%	100	Street	485	0.11%
33	Preparation	1035	0.24%	67	Channel	693	0.16%				
34	Hong Kong	1035	0.24%	68	Service	692	0.16%				

First, "online tour" was the most frequently searched keyword, and other keywords such as "video", "live streaming", "guide", "YouTube", "channel", and "posting" also ranked highly. As these highly ranked keywords reflected online tourism terms, we could deduce the extent to which Koreans are relishing online tourism through them. Specifically, in the case of YouTube, its users are prone to searching for destinations that they have already visited, in that YouTube functions as the medium that delivers information on the destination and the information source (Femaacute et al. 2011). YouTube is quickly becoming an effective marketing means for promoting the glamor of tourist destinations to potential tourists (Reino and Hay 2016). Tourism consumers spend a large amount of time watching video clips to obtain information on their tour destination, and Korean consumers are particularly fascinated by live streams for a realistic experience.

Second, keywords such as "COVID-19", "online", "untact", "platform", "virtuality", "daily life", and "at room" were extracted from the data. Since the start of COVID-19, researchers have anticipated the widespread nature of proximity tourism. Unlike the traditional idea of traveling, which involves the physical relocation of the self to a remote destination, proximity tourism can be experienced within the comfort of one's home or daily living space to experience the destination (Diaz-Soria 2017). The keywords clearly illustrated Koreans' desires to continue traveling during the pandemic, and it could be deduced that their desire was funneled toward online tourism.

Third, the keywords that online tourists searched were attractions such as countries or regions. The most frequently searched keywords were Boracay, Hong Kong, Japan, Europe, Italy, France, and Spain. Boracay is a popular tourist destination for Koreans, due to a digital campaign conducted by Philippines' Ministry of Tourism, called "Wake Up in the Philippines". This digital campaign introduces 16 regions of the Philippines through alluring visual content such as 360-degree virtual tours in water, and cooking classes taught by famous chefs (Jeong 2020). It seems to have attracted Korean tourists' attention. In 2021, Interpark, a reputable tour company, launched a live Europe cultural tour program, which introduced France and Spain, led by an expert tour guide who lives in Europe, and it was an instant hit in Korea (ET NEWS 2021). The French Tourism Board launched a website called "Explore France", which presents 10 popular landmarks online (Official Site of the French Tourism Board 2022), while the Hong Kong Tourism Board hosted "Hong Kong Online Tour, This Stop is West Kowloon" in 2021 for people who work in the tourism sectors in Seoul (NEWSIS NEWS 2021). These types of aggressive online marketing attracted Korean tourists' attention.

Fourth, "culture", "experience", "local", "content", "healing", "participation", "storytelling", "communication", and "sharing" were the keywords that showed what online tourists were looking for, and how they wanted to experience online tours. Although the experience is online, tourists expect to have the same level of participation and communication as with physical tourism. Because of the unique characteristics of social media platforms, users can actively exchange their experiences and opinions through the vast network system.

The TF-IDF additive value degree model is designed to assess the relative weight of words within a document for information retrieval and text mining in a form of documentation. TF-IDF is appropriate for evaluating the significance of words that exist in a document, rather than those having a high frequency (Robertson 2004). The results of TF-IDF are shown in Table 2.

TF-IDF shows that COVID-19 has had a significant impact on online tours. Online tours appear to have become an alternative form for fulfilling tourism needs during the pandemic. Keywords such as "real-time video", "YouTube", "broadcasting", and "online community (cafe)" were found to have a significant influence as a method of online touring. As many paid tour products of online tours hire tour guides who navigate the local area, factors such as product guides, content, programs, and storytelling are crucial. Koreans seem to use videos that have been shared on YouTube channels or online communities, though YouTube is not a paid product.

Table 2. Top 50 TF-IDF words from "online tours".

Rank	Word	TF-IDF	Rank	Word	TF-IDF
1	Travel	12,938.53	26	YouTube	4086.38
2	COVID-19	8811.80	27	Hong Kong	4084.50
3	Online	8426.16	28	Festival	4031.75
4	Video	8019.43	29	World	3799.50
5	Boracay	8007.33	30	Release	3591.14
6	Livestreaming	7786.11	31	Region	3514.02
7	Korea	6673.15	32	Japan	3485.25
8	Overseas	6631.27	33	Broadcasting	3407.08
9	Sightseeing	6408.45	34	Café	3399.94
10	Seoul	6342.89	35	Theme	3279.04
11	Photo	6060.62	36	Supply	3276.46
12	Product	5711.07	37	Museum	3216.20
13	Guide	5467.78	38	Preparation	3210.72
14	Event	5090.93	39	Time	3169.85
15	Experience	4795.61	40	Contest	3162.72
16	Introduction	4787.65	41	MyRealTrip.co	3116.11
17	Program	4760.10	42	Participation	3112.82
18	Jeju Island	4659.69	43	Education	3111.75
19	Local	4558.09	44	Europe	3100.47
20	Content	4540.13	45	Host	3039.46
21	Room	4520.14	46	Daegu	3039.35
22	Travel Destination	4449.68	47	Market	3031.30
23	City	4258.10	48	Recommendation	3029.53
24	Culture	4117.71	49	Planning	3019.60
25	Busan	4105.11	50	Manage	2958.31

Boracay and Jeju Island, tourist destinations with excellent natural environments, earned high scores. It can be interpreted that nature-based tourism has been gaining popularity since COVID-19 (Craig and Karabas 2021). Another interesting point is that domestic tourism is not an exception to the tour-at-room experience either. Busan and Daegu, the two cities that actively promoted online tourism, also exhibited high figures as overseas tourist destinations.

4.2. Centrality Analysis

Semantic network analysis can visualize the semantic system and patterns of the communication process by extracting structured information from unstructured data. Semantic network analysis assesses meanings through the structural relationships of words that are components of the message, rather than each individual actor (Lu et al. 2022). That is to say, this method makes it possible to structurally analyse which words are used and arranged in a specific subject and in what manner.

Degree centrality measures the number of connections made by an individual network node (Lee 2012). It is defined by the number of node connections that an individual node receives within the entire network.

The average degree centrality score was 13,737.600 (SD = 27,361.480). The network centralization was equal to 5.804%. In total, 19 nodes had higher than average degree scores. Nodes such as "COVID-19", "livestreaming", "overseas", "video", "product", "culture", and "participation" were top-ranked. This confirms that the pandemic diverted tourists' attentions to online tour content and live tour content on social media platforms, as it was impossible to travel in a traditional way. Other words with a high degree centrality were "untact", "service", "platform", "communication", and "virtuality". These words validate the idea that COVID-19 initiated a strong correlation between a contactless lifestyle and tourism-related IT technology.

Closeness Centrality measures the nearness of a node to all other nodes within a network. As a node with the shortest connection takes a position in convenient places

in order to reach other nodes promptly, a node with a higher closeness centrality usually situates itself in the middle of the network system (Lee 2012).

The average farness score was 101.200 (SD = 5.426), and the average closeness score was 98.032 (SD = 3.874). The network centralization equaled 4.07%. As shown in Table 3, the closeness centrality presents a rather different result below the 11th rank. Keywords with high closeness centrality, such as "experience", "local, "at room", "world", "participation", "healing", "storytelling", "daily life", and "course" are located in the center of the network, although they scored low in frequency. "Healing" came in 46th place in frequency, while it came in 22nd in closeness centrality. Because "healing" is closely related to health promotion (Gesler 2003), the result shows that Koreans need a break to relieve their psychological stress caused by the pandemic. The closeness centrality of "culture", "storytelling", "program", and "content" reveals that it is important to include a gratifying story when creating online tour content, and when deciding how the program is laid out. For instance, in Korea, an audio tour without visual content is available for learning about the history and culture of Korea (Myrealtrip Co., Ltd. 2022). This audio content offers the background history of the tour sights, and provides a commentary on major tour attractions. In such a case, "storytelling" can influence which tour products online tourists will choose.

Table 3. Centrality Analysis of "online tours".

	Frequency		Degree		Closeness			Frequency		Degree		Closeness	
	Freq.	**Rank**	**Coef.**	**Rank**	**Coef.**	**Rank**		**Freq.**	**Rank**	**Coef.**	**Rank**	**Coef.**	**Rank**
Online Tour	34,703	1	220,826	1	100	1	Culture	1330	26	12,899	20	99	35
Travel	22,321	2	168,487	2	100	2	World	1176	27	10,141	29	100	24
COVID-19	5772	3	50,318	3	100	3	Festival	1175	28	9281	33	98.02	68
Online	4481	4	42,912	4	100	4	Release	1127	29	8930	37	96.117	90
Video	3841	5	33,449	6	100	5	Region	1112	30	10,435	28	99	38
Live streaming	3327	6	36,052	5	100	6	Busan	1079	31	8996	36	97.059	83
Overseas	2909	7	30,770	7	100	7	Supply	1069	32	10,892	26	99	37
Korea	2632	8	23,126	10	100	8	Preparation	1035	33	8050	43	100	27
Sightseeing	2580	9	25,634	8	100	9	Hong Kong	1035	34	8399	40	97.059	82
Photo	2551	10	17,165	14	100	10	Theme	1033	35	9997	30	99	53
Seoul	2203	11	17,762	12	99	58	Broadcasting	1006	36	7913	44	100	18
Product	2064	12	23,580	9	99	61	Time	992	37	6691	58	100	31
Guide	2015	13	22,945	11	100	13	Japan	970	38	7683	46	97.059	78
Introduction	1884	14	16,287	17	100	14	Participation	969	39	9546	31	100	30
Boracay	1843	15	11,967	23	66	100	Host	925	40	9350	32	98.02	71
Program	1738	16	16,639	16	99	41	Planning	911	41	9123	34	99	54
Experience	1705	17	16,865	15	100	17	Cafe	898	42	5456	73	98.02	74
Event	1669	18	12,751	21	99	36	Recommendation	892	43	7127	53	99	46
Local	1632	19	17,354	13	100	19	Manage	886	44	9070	35	99	44
Content	1619	20	15,495	18	99	45	MyRealTrip.co	882	45	10,520	27	97.059	76
Travel destination	1606	21	14,827	19	100	21	NEWS	859	46	7649	47	99	60
Room	1521	22	11,680	24	100	22	Healing	855	47	6481	62	100	23
YouTube	1401	23	12,283	22	99	47	Europe	854	48	7607	49	97.059	77
City	1353	24	11,246	25	99	40	Market	853	49	7278	51	99	49
Jeju Island	1330	25	8823	38	96.117	87	Attraction	844	50	7704	45	99	50

4.3. CONCOR Analysis

The visualization of the nodes is shown in Figure 2.

The result of the CONCOR analysis produced a total of four clusters, as shown in Figure 3. Nodes are indicated by squares, and the size indicates the frequency. Nodes that are constantly mentioned in pairs are marked with bolder connecting lines for visualization. Cluster A consists of 33 nodes, and it formed the largest cluster in comparison with the other clusters. Looking at the sizes of the nodes, keywords such as "COVID-19", "daily life", "room", "storytelling", "healing", "information", "review", and "recommendation" are included. These keywords suggest that people chose online tourism to cope with the long-lasting pandemic, and to cater to the need for rest. Thus, these can be defined as the "Online Tour Selection Attribute" cluster. Considering the size, thickness, and distance of the nodes, clusters A and D formed a close relationship, exerting a powerful influence on the entire network.

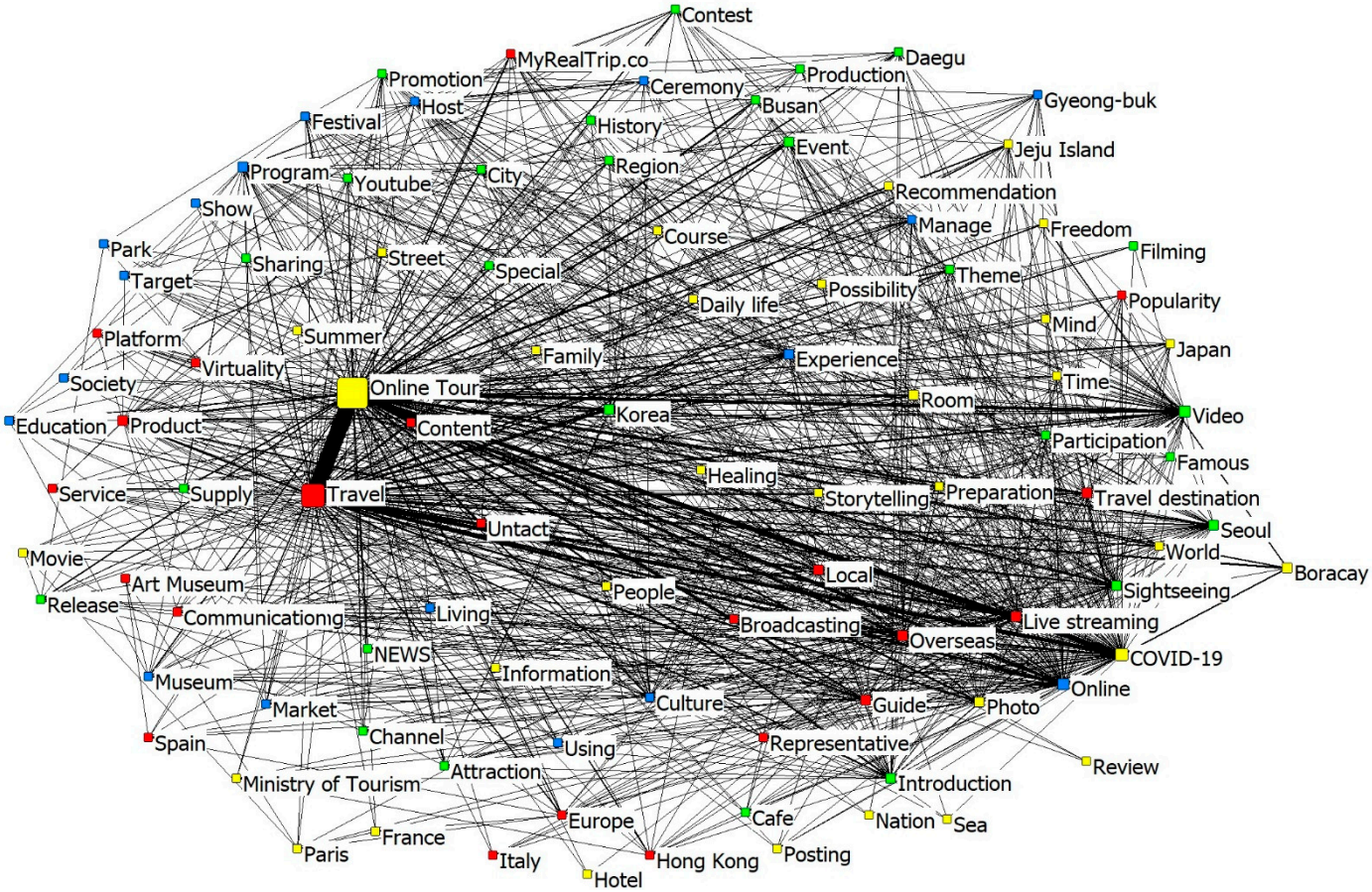

Figure 2. Visualization of the keyword "Online Tours".

Cluster B consists of 27 nodes and this "Domestic Online tour Attribute" cluster includes "Korea", "Seoul", "Busan", "Daegu", "attractions", and "introduction". Although a domestic tour is more accessible compared with overseas tours, online tourism was mentioned relatively often. The link suggests that the COVID-19 node in cluster A is connected to others, and reveals the impact that COVID-19 has on domestic tours. This cluster also includes keywords such as "YouTube", "video", "filming", "production", and "contest", suggesting that various districts have encouraged the general public to produce films or clips to engage people in online tours and activities. Many local governments aggressively support online content development, and the Seoul Tourism Organization has launched a virtual online platform for people to experience Seoul virtual tour content from the comfort of their home (Visit Seoul Net 2022).

Cluster C comprises nodes such as "online", "host", "festival", 'event", "experience", "culture", "program", and "Gyeongsangbuk-do" (hereinafter, "Gyeongbuk") representing the "Online Tour Content Attribute" cluster. Gyeongbuk is about 175 km from the capital city of Seoul (based on the provincial government). While cluster A is focused on "COVID-19" and "healing", Cluster C evolves around cultural festivals or events that emphasize one's experience. Gyungbuk is not a traditional tourist destination, but it has a high frequency in online tours. It can be inferred that program-based experiences are critical in online tourism, unlike the tours that offer sightseeing only. In 2021, the Gyeongbuk KTO advertised an "online tour without passport" on various online media platforms, and it successfully allured 437 paid-for tourists from 37 countries such as Mexico (SHINA NEWSPAPER 2021). The keyword "Gyeongbuk" seems to have ranked highly because its success became known in Korea. The location of "Gyeongbuk" is shown in Figure 4.

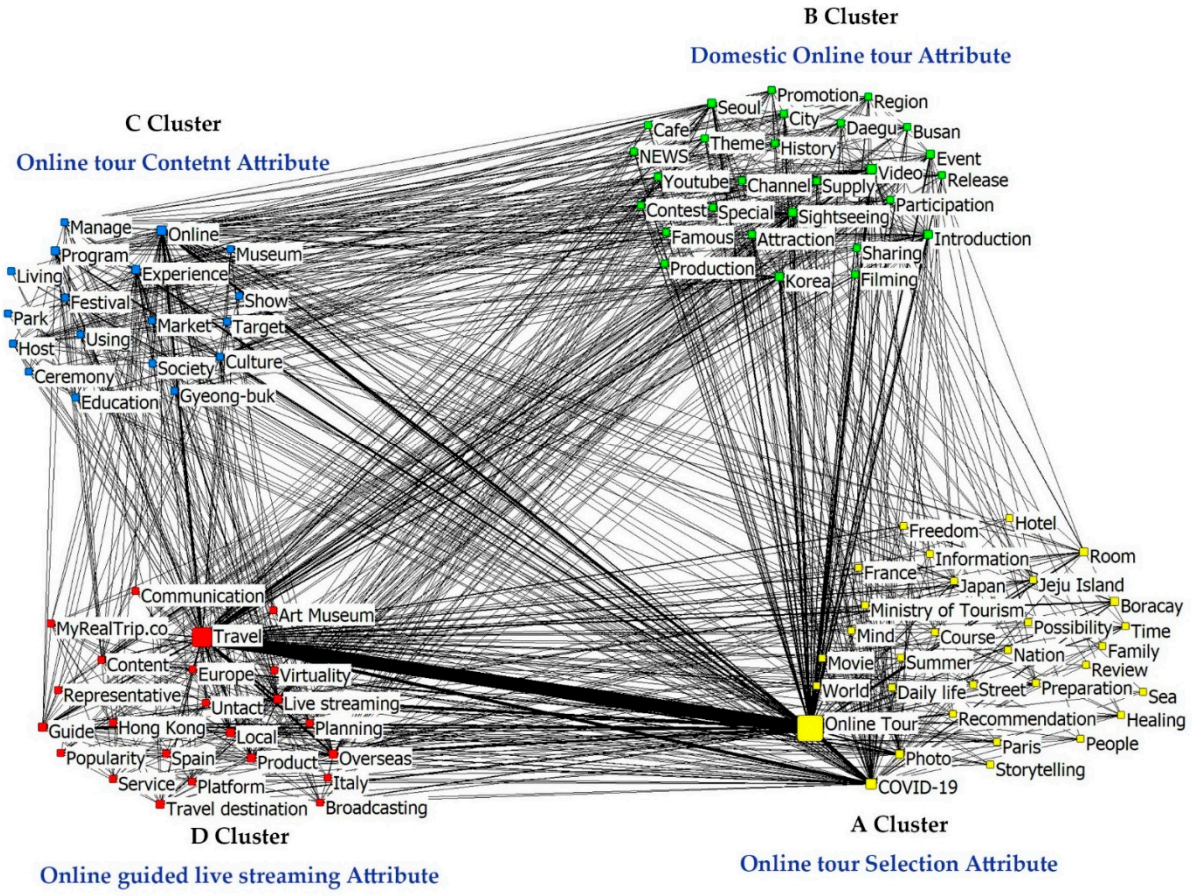

Figure 3. CONCOR Analysis of "Online Tours".

Figure 4. The location of "Gyeongbuk".

Cluster D consists of 22 nodes and is tightly connected to cluster A. It appears as the "Online Guided Live Streaming Attribute" cluster consisting of nodes such as "livestreaming", "content", "platform", "untact", "virtuality", and "local". People who enjoy online tours seek online platforms for tours that they can connect to anytime and anywhere. This study shows that online tourists relish live tours led by local guides, which also allow them to communicate with the guides in real time, or they seek out virtual tours, photos, or other visual content provided by Ministries of Tourism around the world.

5. Conclusions

This study utilized a big data analysis on Korea's "online tour" that emerged after COVID-19. The results of this study demonstrate what is important in online tours, and provide implications for the potential needs of tourists. The results offer essential data for understanding online tours in the early stages of the COVID-19 pandemic.

The results of this study can be narrowed down to five categories. First, a sense of presence was identified as a crucial factor for online tours. Keywords such as "video", "live streaming", "local", "YouTube", and "guide" had strong influences and high centrality within the text. Live streaming in a local tourist destination helps to intensify the sense of presence for tourists. It will also evoke memories if the tourist has already visited the destination. Mueser and Vlachos alleges that live streaming is a tool that creates an immersive environment with real-time video and sound to offer viewers a feeling of "almost being there". The state of "almost being there" magnifies the immersion of tourists and encourages them to be involved in their surroundings (Mueser and Vlachos 2018). According to Toyota et al., the demand for viewing the image of the subject increased when the guide explained the subject, while the demand for the image of the surrounding scenery was high when the guide was having a conversation with the tour participants (Toyota et al. 2021). Based on the results of this research, it is imperative that the tourism industry invent creative and comprehensive ways to establish a better accommodating media platform to enhance this sense of presence in the future.

The second most important factor was interaction. In the CONCOR analysis, guides, communication, and online tours were linked with bold links. The actual Korean participants said that they enjoyed communicating in the live chat room during the online tour (My Real Trip Online Tour Review 2021). COVID-19 has had a significant impact on two key factors that differentiate tourism: physical travel and social interaction (Corbisiero and Monaco 2021). One study suggests that, when the intimacy between a guide and a tour participant is high, there is a higher demand for a video that captures the tour guide's facial expression. Utilizing multimedia to enable interactions between tour companies, local guides, and tourists is a process of advancing the travel experiences of tourists. Synchronous interaction promotes tourists' trust in their tour destination and inspires them to visit (Jiménez-Barreto et al. 2020).

Third is the importance of the program content. "Culture", "introduction", "festival", "theme", "history", and "storytelling" are elements constituting the online tour program. The cultural landscape contributes more in terms of the educational level than tourism, which solely focuses on the natural landscape. Storytelling about places is recognized as a tool to enhance the reputation of regions as they compete for tourism, and economic development and spending in the digital age (Bassano et al. 2019). It is critical to establish a differentiated strategy for the sustainability of online tours, and to plan and produce creative content pertinent to it. If the tour program becomes more diversified to include the public who have difficulty traveling, such as the elderly and the disabled, it will increase demand and the profit derived from it will create a virtuous cycle structure of investing in content development again.

Fourth, new possibilities for local traveling became visible. The Gyeongsang-do region of Korea appeared as a major keyword, and its success in enticing paid online tour tourists from 37 countries around the world through active promotion of the region is noteworthy. All local resources have the potential to be used as tourism resources. Although the long

history and traditions of the region may seem familiar to locals as being attractive, they may feel unique and fresh to tourists, depending on how they are presented. Online tours can be a tool for effectively promoting unfamiliar tourist attractions of the local area without incurring a large advertising cost.

Fifth is how important it is to support online tourism content production. Keywords such as "contest", "production", "promotion", and "planning" exhibit Koreans' interest in online tourism production. However, when providing a high-quality tour, there is a high threshold for small-scale tour operators to initiate the online tour, because it requires the possession of professional equipment and the knowledge to operate it. The copyright of various materials that are indispensable for online tour production can be problematic. It is imperative to aggressively consider supporting the production of online tour content to provide new experience services to tourists, and to promote the recovery of the tourism industry. The government must expand its role in order to strengthen the digital capabilities of SMEs (small- and medium-sized enterprises) so that they can secure a chance to enter the digital tourism ecosystem, and to create more jobs.

Online tours have numerous advantages: the convenience of being able to enjoy tourism anywhere as long as the Internet is available, the ease of participation, low price, short travel time, and the possible participation of the elderly and people with disabilities. This study discovered that a sense of presence is a very important aspect of the online tour and this supports the results of previous studies. Additionally, this study presents new results that have not been introduced in previous studies, such as linking online tours with education, new possibilities for local tours, developing content suitable for target viewers, and supporting the government's online tour content production and job creation.

Nevertheless, this study contains the following limitations. The scope of the data included may be limited as the analysis target of this study might be problematic. The documents analyzed in this study were extracted from Naver, Google, and Daum in Korea, which may not represent Korea as a whole. Although these are considered to be the top three portals with the largest number of users in Korea, the contents of Instagram, Facebook, or Twitter were not included. There is more to be learned from future studies.

The results of this study are limited to Korea, and they cannot be generalized, because each country may have a different Internet environment and information and communication technologies for online tourism. However, the data gathered through this study offer a reference for regional strategies.

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