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Text Mining with Network Analysis of Online Reviews and Consumers' Satisfaction: A Case Study in Busan Wine Bars

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Abstract: With the growth of internet technology, customers are sharing up their experiences. Hence, these types of customer experiences are spreading rapidly as a source of online reviews. For this reason, online reviews have become a critical source of information that influences customers' purchase intentions and behavior. Thus, businesses should monitor online reviews to understand the customer experience and increase customer satisfaction and loyalty. This study attempts to identify essential characteristics for positive online reviews of wine bars and examine the structural relationships of these attributes. To accomplish this purpose, a total of 1,337 online reviews were collected from Google Travel and analyzed. The frequency analysis was performed using text mining to determine the most frequently referred to attributes, and the semantic network analysis, factor analysis, and regression analysis were conducted to understand customer experience and satisfaction of wine bars located in Busan, South Korea. The results show that the top 50 keywords identified from the online reviews were categorized as four groups—'Atmosphere', 'Service', 'Date and Location', and 'Menu'. The results of the factor analysis reduced the original dimension of 48 keywords to 16 keywords and classified them into six factors, namely, 'Service', 'Staff', 'Menu', 'Environment', 'Recommendation' and 'Atmosphere'. Based on these results, implications for sustainable wine bar marketing strategies were suggested.

Keywords: Busan wine bar; customer satisfaction; customer experience; online review; semantic network analysis; eWOM; wine bar marketing; service quality

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1. Introduction

With the trends of the alcoholic beverage market, there has been an increase in preferring less alcoholic beverages. At the same time, there has been a rise in the consumption of, and interest in, wine. The growth has also led to an increase in wine sales and revitalization in the wine industry [1]. The wine bar is where the sommelier serves wine, simple snacks, and gives a premium cultural experience; socializing also takes place here. It has been recognized as a unique and luxurious business space [2]. In particular, wine consumption is increasing because studies have shown whether wine, which is usually low in alcohol and consumed in small amounts daily, has a positive effect on atherosclerosis, heart disease, anti-aging, and the prevention of adult diseases [3]. As for where they drink, according to a survey of 500 wine lovers, 53.6% of respondents drink at home or in private, while 32.2% drink in restaurants or bars. At this point, wine culture has spread from the wine consumption patterns of a specific group of 40–50-year-olds to housewives and 20–30-year-olds, which has caused a high-end and diversification of wine consumption and a significant change in drinking opportunities and venues [4]. Not only has this increased the number of wine bars and wine stores, but competition between businesses has become more intense and the image of the bar has a significant impact on customer revisit [5]. The image of a

wine bar is an element that facilitates service communication. Intangible service combines environmental factors, such as interior design and ambiance, physical factors, including food and wine, and human factors, such as sommelier service, to positively influence customer attitudes and buying behavior [3].

When customers select places, transportation, accommodations, and things to enjoy, 74.1% of the respondents said that they collect review information from the internet [6]. Nowadays, it is common for customers to view products and services online before they purchase. In the online review platforms, customers leave reviews and digital ratings to indicate their assessment of a certain product or service [7]. The review is referred to as word of mouth (WOM). The word-of-mouth effect is further amplified in the internet age through electronic word of mouth (eWOM), which has made considerable progress [8]. The eWOM is a novel way to determine the main attributes of service quality from the customer's point of view. The eWOM is the consequence of the customer's experience summary, which is generally written voluntarily and at no expense of external stimulus [9]. Customers who have experienced specific services produce this eWOM to help other customers make the right decision. Thus, the service experience mentioned in the eWOM means the major attributes and quality levels of the product or service that the customer considers [10,11]. So, online review research is actively being carried out to identify customer information required to develop new products or enhance existing products [12].

Previous studies on wine bars have focused on identifying the key attributes influencing customer satisfaction using survey questionnaires. One study revealed the importance of wine bars and stores as wine distribution channels by collecting paper questionnaires to gain insight into the characteristics of tourists' demand for wine bars and stores in a German World Heritage destination [13]. Another study collected data through a self-administered, highly structured questionnaire to explore the impact of the winery visit experience on visitor sentiment and satisfaction, as well as the impact of these sentiments on visitors' intentions to revisit and recommend the winery [14]. Additionally, other studies have conducted a quantitative study to explore the status, perceptions, views, and actions of sustainable bars in China through a questionnaire survey of tavern practitioners and interviews with tavern managers [15]. Nevertheless, these studies were limited to a certain number of subjects and regions and were studied through surveys.

Therefore, with the development of online reviews, a large amount of data generated by various online sources has been used to fill the gap in survey research methods [16–19]. However, there are not many studies using online reviews on customer satisfaction in wine bars. Therefore, this study aims to understand customers' behavior through online review and to examine customer experience to determine the key attributes that influence customer satisfaction significantly. The current study aims to examine the customer experience and satisfaction with Busan wine bars by extracting the semantic keywords and classifying their attributes and by exploring the influencing factors of customer experience and their relationships with customer satisfaction analysis. In this study, review data from Google Travel (google.com/travel, accessed on 16 February 2022) were collected and analyzed by the text mining technique, semantic network analysis using Ucinet 6.0, and quantitative analyses such as exploratory factor analysis and linear regression analysis using SPSS software 23.0.

2. Literature Review

2.1. Online Review

Online reviews are also known as electronic word of mouth (eWOM). Customers can voluntarily describe or rate the service they used. These reviews are considered more trustworthy and objective than the information that the company provides. This is why online reviews are important before serving the customer experience [20]. Before customers choose a product, it is essential to search for various pieces of information to have confidence in their choice, and through this they try to reduce the perceived risk. Information is collected through user reviews provided by people who have already

experienced it, and the information is actively reflected in the selection [21]. Therefore, online reviews are perceived as having relatively high reliability, relevant information, and wine bar management aspects because they influence those who plan to visit a restaurant or wine bar to shape their overall expectations for the wine bar, particularly with regard to the menu and the service [22–24].

In addition, online reviews can be accessed 24 h a day, 365 days a year, so information can be stored continuously as text or images [25]. In the public dimension, the scope of delivery has been widened, and it has the characteristics of spreading information quickly [26]. The application of online customer reviews in tourism and hospitality has been well proved by many previous studies. For instance, Ban and Kim conducted a study on the perception of consumers about restaurants by analyzing online English reviews from customers, as well as the service quality evaluation factors (service, food, value, environment) suggested by TripAdvisor [27].

2.2. Wine Bar and Service Quality

The word 'Bar' comes from the French word 'Bariere', and the concept of bar crossed between customers and the barman came to be a generic term for restaurants that sell alcohol. In other words, a bar can be said to be a place where drinks are sold or provided to customers by a bartender in a cozy atmosphere [28]. In general, a bar is a place that has differentiated facilities, furnishings, and equipment, and is sold and used by human service members, unlike a restaurant or place that sells drinks [29]. Wine bars are not classified according to the type of service or special interior but mainly serve wine to customers. This is the main difference between a wine bar and a restaurant [30].

Although the definition of a wine bar by previous researchers has not yet been established, the definition of a wine bar is based on the definition of the bar above. The wine bar is 'a special place with facilities and menus that fit the atmosphere. That can be defined as a place where wine is sold or offered to customers by a sommelier or people with some knowledge of wine'. The characteristics of a wine bar include the harmony of wine and food, the role of a sommelier, the fact that the wine list becomes the best promotion strategy for a wine bar, and the importance of holding equipment for wine service [31]. These characteristics can be an attribute that leads customers to choose to drink in a wine bar, enabling wine bar owners to gain a competitive advantage over other stores.

When customers choose a wine bar, service quality plays an important role. Customer's decision making is the total process from starting to being decided by desire and need, and when customers who are on a certain budget choose a wine bar, they make decisions based on factors such as menu type and location [32,33]. The selection attributes of a wine bar or restaurant can vary depending on individual circumstances, and service quality plays an important role in the selection of a wine bar or restaurant [34].

In other words, the service quality of a wine bar can be defined as all the tangible and intangible factors that wine bar consumers consider in the decision-making process for choosing a wine bar. Since the service quality of wine bars coexists intangibly and tangibly, it requires a different selection attribute from consumers who purchase general products [35]. As a result of examining several previous studies, although there are slight differences, factors such as food quality and taste, diverse menus, employee friendliness, business atmosphere, and reasonable prices are important service quality factors that are commonly considered when selecting a wine bar or restaurant [36]. In addition, based on the previous studies on wine bars, as shown in Table 1, it seems that there are insufficient studies on service quality evaluation and wine bar recognition using qualitative and quantitative analysis methods using online wine bar review data.

Table 1. Recent research on wine bars.

Author Name	Year	Title	Implication
Wolf, Wolf, and Lecat [37]	2022	Wine market segmentation by age generations in the Western US: expectations after the COVID-19 pandemic	As a result of this study, segmentation by generation is appropriate when creating products, pricing, determining channels of distribution, and creating messaging for a specific wine brand. The COVID-19 pandemic caused channel shifting that is expected to continue after the pandemic.
Gazzola, Grechi, Pavione and Gilardoni [38]	2022	Italian wine sustainability: new trends in consumer behaviors for the millennial generation.	This study reflects the Italian reality of the pre-COVID-19 period. Obviously, the pandemic situation and the geographic scenario analyzed could change the results of a second wave of the survey.
Fu and Kim [39]	2021	A study on wine cognition using semantic network analysis: Focused on the Chinese wine market	This study could be considered as one of the research paradigms of the utilization of big data in the wine industry for the Chinese market and meaningful information extracted from this study could be an instrumental example for illustrating the significance of big data and semantic network analysis in the research of wine industry.
Deroover, Siegrist, Brain, McIntyre, and Bucher [40]	2021	A scoping review on consumer behavior related to wine and health	This review summarizes the current research published on consumers' health perception of wine and health. Five topics were identified: perceived healthiness of wine, moderate wine consumption, the role of health in wine consumption decision making, labeling, and consumer perception and behavior related to wine innovations. Consumers are confused about the exact health impact of wine and there is still an important need for further educational efforts on this matter.
Dressler and Paunovic [13]	2019	Customer-centric offer design: Meeting expectations for a wine bar and shop and the relevance of hybrid offering components	Wine bars and shops need to concentrate on hybrid offerings of wine-related products and services to create a memorable experience. It should position itself on the market based on its strengths and consciously emphasize distinctiveness from regular wine-sales channels.

2.3. Customer Satisfaction and Experience

Customer satisfaction can be said to be an extremely subjective and personal emotional state that a consumer feels after receiving a product or service and paying for it. A previous study generally explains the consumer's reaction to the difference between expectations and perceived product performance after consumption [41]. One study defined it as the relative purchasing performance of customers about the recovery and compensation of the

purchase about the expectation before the purchase [42]. Another study has also explained that, based on the expectation-discordance theory, if the performance is less than expected, it is inconsistent, and if the performance is as expected, it is a simple agreement [43]. The expectation-discordance theory is judged to be a very important issue in the restaurant industry and hospitality industry, where intangible services are provided and brand image, satisfaction, and revisit are evaluated with these intangible services.

The operational definition of customer satisfaction in the present study is defined as overall satisfaction perceived after using a wine bar. In general, consumers express their satisfaction with a product or service as revisit intention, repurchase behavior, word-of-mouth behavior, brand change, and general image [44]. The customer's decision to revisit depends on the satisfaction of the restaurant they have visited. When satisfaction with a restaurant or company is high, the intention to revisit increases, and when satisfaction is low, the intention to visit again decreases [45]. To increase the intention of revisiting a restaurant or catering company, it is necessary to increase the customer satisfaction level, and customer satisfaction and dissatisfaction are closely related to the perceived price and service quality, which is correlated to revisit [46].

A previous study analyzed the effect of wine selection attributes on customer satisfaction and repurchase intention by focusing on different types of wine consumers [47]. Another study revealed the relationship between service quality, emotional response, customer satisfaction, and revisit intention in wine restaurants [48]. Recently, one study has also shown the effect of servicescape on service quality and the revisit intention of a restaurant specializing in wine. It has been confirmed that if these customer satisfaction factors are positive, they also positively affect repurchase intentions [49]. As a result of reviewing several previous studies, although there are some differences, factors such as the type and taste of wine bar alcohol, various menus, staff friendliness, work atmosphere, and reasonable prices are important to service quality factors that are generally considered when choosing a wine bar [49–51]. In this study, based on previous research on wine bar service quality factors, satisfaction, and experience, a study was conducted to analyze the effect of service quality factors of wine bars in Busan on satisfaction and experience through online review data.

2.4. Text Mining and Semantic Network Analysis

Text mining is defined as the use of information retrieval, information extraction, and natural language processing techniques to discover unknown useful patterns and knowledge in the text [52]. In general, the text mining process includes steps such as data collection, data extraction and data analysis, and it includes a management information system [53]. The first step is to identify the type of information the researcher is trying to find. Thereafter, it is necessary to narrow down the scope of the data to be collected and become acquainted with the characteristics of the keywords. Data extraction is the procedure to convert unstructured textual data into a structured form. The analysis part is on the basis of information extraction, clustering, and classification techniques for the text, which is used as the knowledge gained by the management information system [52].

Text mining has been applied to many research areas. A large number of published studies based on customers' feedback have focused on analyzing the textual content of users' comments through text mining and sentiment analysis [54–56]. Those studies advance our understanding of the travel and hospitality industry through a case study of big data analysis of online reviews. Semantic network analysis is a social network analysis that emphasizes the relationship between actors when understanding the system structure of society. Social network analysis is applied to communication messages. Social network analysis focuses on the relationship between individual actors, not individual entities, as the driving force that creates social phenomena. For the sake of clarity, the semantic network analysis of meaning through structural relationships of works involves components of knowledge [57,58]. Semantic network analysis presupposes social network theory.

Social network analysis consists of individuals called 'nodes' and 'links' between them and comprehensively analyzes the interrelationships between individuals. Applying this to semantic network analysis, a 'node' is a 'word' that is mainly dealt with in each study, not an individual. 'Connection relationship' refers to 'connection relationship between words' [59]. Semantic network analysis shows how individual nodes are related to each other as a connection relationship, and in the process, it visually shows which nodes are being used to build a discourse. The inter-word connection structure formed in this way, that is, the semantic network structure for a specific issue, enables systematic analysis of a specific issue, as well as systematic analysis of how and why discourse is constructed [60].

In addition, the semantic network analysis applies the word as an actor to grasp the network structure and meaning in the text. In general, people select a specific word and use it repeatedly when emphasizing a certain meaning, so it is a method of analyzing content through the relationship between words that appear simultaneously in a sentence or paragraph. Indices that serve as analysis criteria are macro-level analysis indicators of density, inclusiveness, and concentration for the network depending on the level of analysis, and micro-level connectivity analysis indicators such as connection degree, strength, and distance for individual nodes are used. In addition, there is centrality as an analysis index indicating the influence of each node in the network. As an index for classifying subgroups based on the similarity between nodes, an analysis based on structural equivalence is being conducted [61].

3. Methodology

3.1. Sample Design and Data Collection

As shown in Figure 1, the online review is where customers leave reviews and provide information accordingly, and later it is used by various customers [25]. This study collected texts written mainly on reviews left by experienced visitors at wine bars in Busan through Google. The data collection period was from 1 January 2018 to 31 December 2020, and 1337 reviews were extracted.

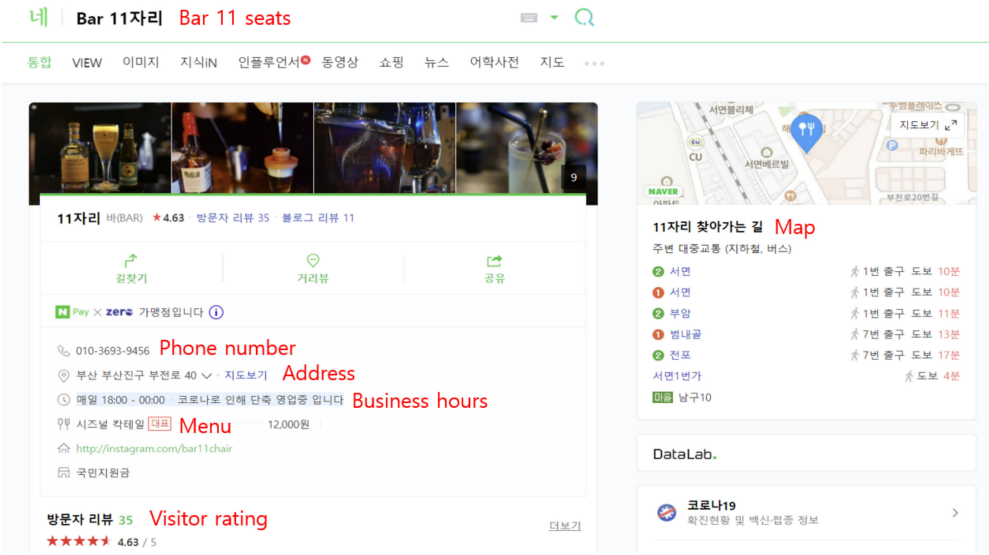

Figure 1. Busan wine bar online reviews.

As shown in Figure 2. This study collected the research data in the first stage. The collection period of this study was set as 3 years, from 1 January 2018 to 31 December 2020. The online Busan wine bar reviews were acquired from Google, the world's largest search engine. The website is easy to access, and it is easy share the online Busan wine bar review. The data collection was conducted by SCTM 3.0 (Smart Crawling & Text Mining 3.0), which

is a statistical program for web crawling and data processing developed by the Wellness & Tourism Big Date Institute of Kyungung University.

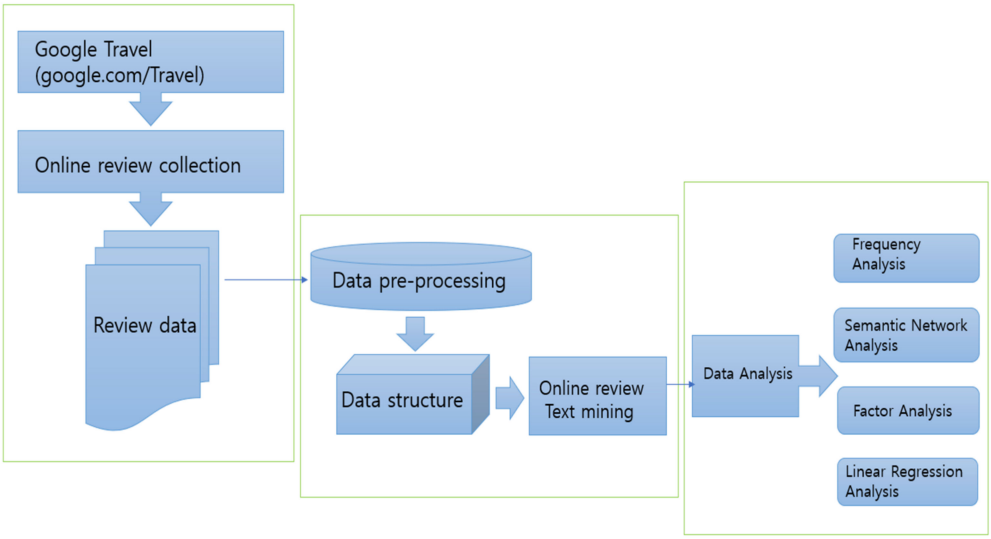

Figure 2. Research procedure.

Originally, a total of 1337 online reviews were collected from Google Travel (google.com/travel, accessed on 16 February 2022) and analyzed. After removing online reviews in non-English languages, 50 words with a high frequency in online reviews were extracted.

3.2. Data Analysis

Based on the previous studies, this study followed steps with text mining and qualitative analysis with factor analysis and linear regression analysis [23,24,27]. Text Mining is a technique that detects and reveals new, uncovered knowledge and inter-relationships and patterns in unstructured textual data resources and analyzes un-discovered knowledge from the mass text data [62]. Contrastingly, researchers can acquire specific documents from search engines and Information Retrieval (IR) systems by using specific search targets such as search query or keywords [63]. Data mining algorithms (e.g., classification, clustering, association rules) are commonly used in this research field to explore and discover new information and relationships in textual sources. It is novel in the fact that this field combines information retrieval, data mining, machine learning, statistics and computational linguistics [64].

The first step of the current study was to apply the text mining method to gain word frequency from the online Busan wine bar reviews. In the data screening process, insignificant, meaningless words (e.g., articles, prepositions, and pronouns) were excluded, and only words that are directly related to the Busan wine bar experience were kept in the refined data. The collected data were modified to manually select the top 50 frequently used words. Moreover, the overall satisfaction score was used to determine the level of satisfaction of users and served as the dependent variable because its value can be considered to be the core output variable. Lastly, the word matrix (keyword × keyword) was derived for further data analysis.

In the second step, UCINET 6.0 package and NetDraw (i.e., visualization tool) performed semantic network analysis using the top 50 frequently appearing words. In addition, Freeman's degree centrality and Eigenvector centrality were selected to illustrate the semantic network. Finally, we performed CONCOR (iterative CONvergence of iterated CORrelation) analysis, which is a method of iterative correlation analysis, to find the appropriate similarity group. In this study, CONCOR analysis was performed based on the results of semantic network analysis and produced subgroups of these words to understand these intertwined correlations and to identify the facets of interest to the client.

As a final step, factor analysis and linear regression analysis were used with the results of the semantic network analysis. First, factor analysis was conducted to extract factors from the 50 top-frequency words, which, in turn, were used as independent variables for linear regression analysis. Afterward, linear regression analysis was performed using the results of aforementioned factor analysis (i.e., independent variables) and the overall satisfaction score as a dependent variable so that the following research question is answered: does Busan wine bar experience presented in online reviews explain customer satisfaction?

3.3. Research Hypothesis

The proposed research model is presented in Figure 3. The figure shows six satisfaction details, which are reflected in the total score of Busan Wine Bar. The causal relationships were analyzed by setting 'Service', 'Staff', 'Menu', 'Entertainment', 'Recommendation', and 'Atmosphere' as variables that affect the overall satisfaction scores of these six details.

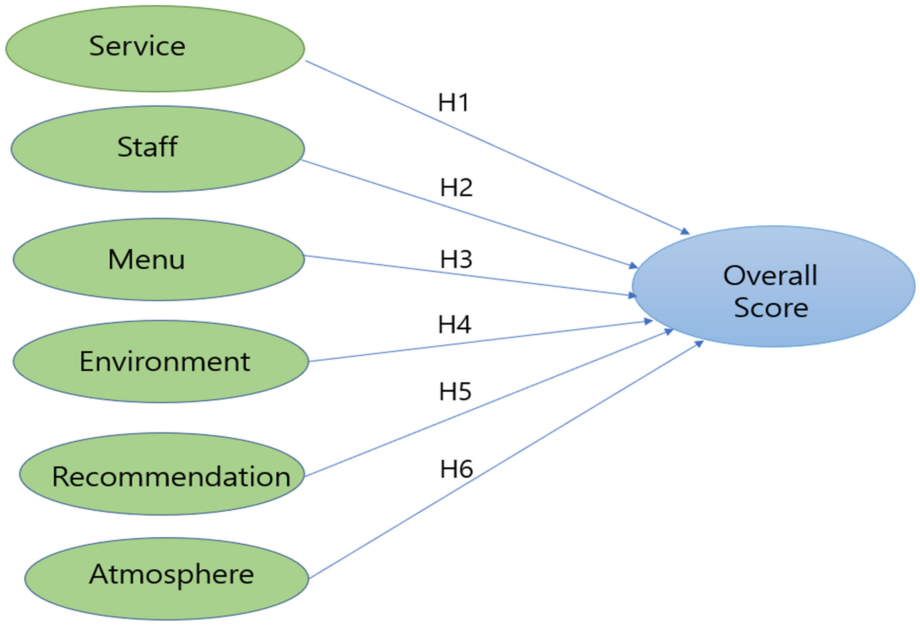

Figure 3. Research model.

Hypothesis 1 (H1). *Service has a positive impact on the overall satisfaction score of Busan Wine Bar.*

Hypothesis 2 (H2). *Staff has a positive impact on the overall satisfaction score of Busan Wine Bar.*

Hypothesis 3 (H3). *Menu has a positive impact on the overall satisfaction score of Busan Wine Bar.*

Hypothesis 4 (H4). *Environment has a positive impact on the overall satisfaction score of Busan Wine Bar.*

Hypothesis 5 (H5). *Recommendation has a positive impact on the overall satisfaction score of Busan Wine Bar.*

Hypothesis 6 (H6). *Atmosphere has a positive impact on the overall satisfaction score of Busan Wine Bar.*

4. Result

4.1. Frequency Analysis

Table 2 lists the top 50 frequently used words related to the Busan wine bar experience and their proportional share to the occurrence of total words. The top seven words are 'atmosphere', 'cocktail', 'snack', 'whiskey', 'drink', 'service', and 'price', which constitute 56.39% of all words, and the frequency of the network visualization results is shown in Figure 4. Words describing the menu, such as 'cocktail', 'snack', 'whiskey', 'wine', 'cheese', and 'food', and describing the service, such as 'manager', 'friendly', bartend', and 'staff', were revealed to be high-frequency words. Moreover, there were words related to interior, such as 'light', 'floor', 'table', and 'toilet', and the words related to the date or location, such as 'drink', 'restaurant', 'seomyeon', 'weekend', 'bar', 'place', 'gwangalli', 'foreigner', 'dinner' and 'Busan'.

Table 2. Frequencies and ranks of the top 50 frequently used words.

Words	Frequency	Rank	%	Words	Frequency	Rank	%
atmosphere	651	1	27.58%	light	21	26	0.89%
cocktail	227	2	9.62%	reservation	21	27	0.89%
snack	113	3	4.79%	guest	21	28	0.89%
whiskey	107	4	4.53%	mood	21	29	0.89%
drink	91	5	3.86%	Gwangalli	20	30	0.85%
service	73	6	3.09%	conversation	18	31	0.76%
price	69	7	2.92%	experience	18	32	0.76%
wine	66	8	2.80%	interior	17	33	0.72%
friendly	53	9	2.25%	variety	16	34	0.68%
restaurant	52	10	2.20%	amount	16	35	0.68%
place	48	11	2.03%	recommendation	15	36	0.64%
bartend	46	12	1.95%	floor	14	37	0.59%
alcohol	45	13	1.91%	foreigner	14	38	0.59%
taste	40	14	1.69%	liquor	14	39	0.59%
Seomyeon	36	15	1.53%	food	13	40	0.55%
selection	32	16	1.36%	toilet	13	41	0.55%
staff	31	17	1.31%	dinner	13	42	0.55%
weekend	31	18	1.31%	order	13	43	0.55%
quality	27	19	1.14%	table	12	44	0.51%
bottle	27	20	1.14%	flavor	11	45	0.47%
bar	27	21	1.14%	manager	11	46	0.47%
cheese	26	22	1.10%	special	10	47	0.42%
Busan	24	23	1.02%	feel	10	48	0.42%
music	24	24	1.02%	difference	10	49	0.42%
performance	22	25	0.93%	beer	10	50	0.42%

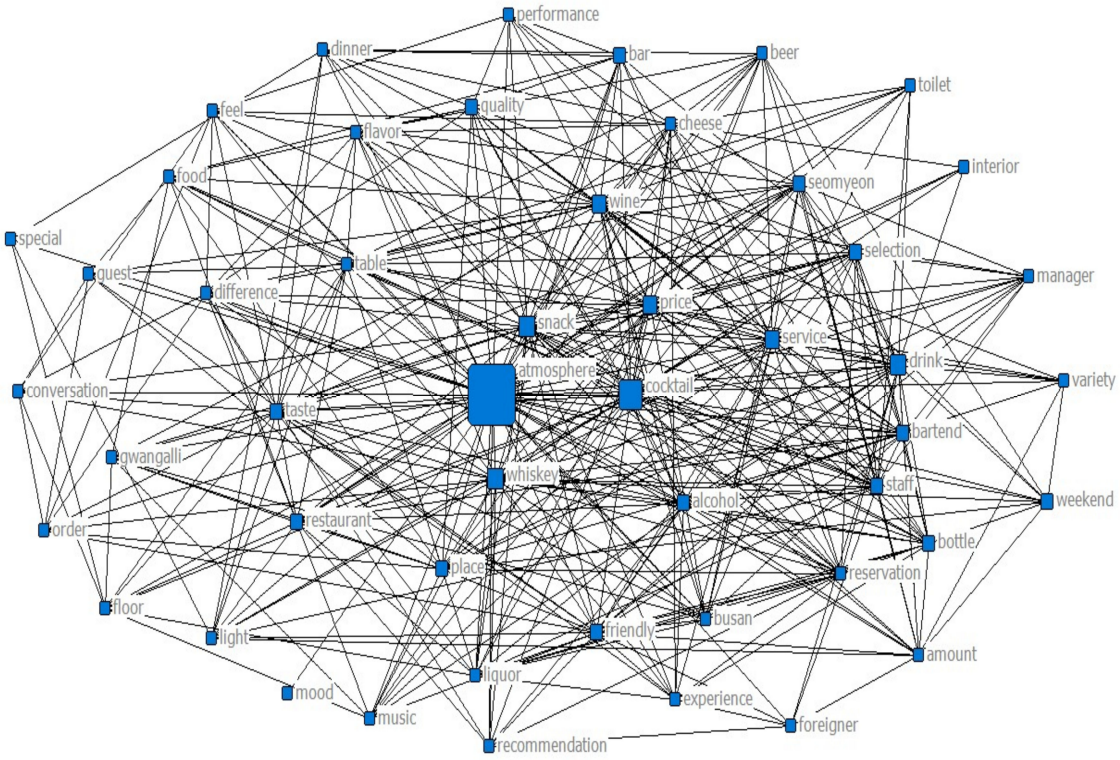

Figure 4. Visualization of top frequency words.

4.2. Semantic Network Analysis

Semantic network analysis identifies the relationships and connections between words by performing keyword centrality analysis (i.e., Freeman's degree centrality and Eigenvector centrality). The comparison between keyword frequency and their centralities was demonstrated in Table 3.

The degree centrality, a simple centrality measure, calculates how many neighbors a node has. It refers to the degree to which a word has many connections and becomes the center. The more connections it has, the greater its influence on other words and the more dominance it has [65]. The eigenvector centrality expands the concept of connection centrality; not only must the number of connective words be considered but also the importance of the connection relationship. In this regard, it is critical finding the most influential central node in the network [66]. It is sometimes used to measure the influence of a node in the network. It performs matrix calculations to determine adjustments. The degree, betweenness, eigenvector, and closeness are all a measure of an actor's prominence in a network [67]. Although considerable conceptual overlap might exist between these constructs, they also may be conceptually distinct. For instance, a node in the center of a star or wheel is the most central node in the network; however, nodes with a high degree of centrality are not necessarily the most strategically located in other network configurations [68]. One way to identify such distinctions among the constructs is based on how actors who occupy positions high on each type of centrality transmit influence to other actors in a network.

The result found that 'atmosphere', 'cocktail', 'snack' and 'whiskey' were among the top in terms of degree and eigenvector centrality. The word 'bartend' was in a lower rank in frequency than in-degree centrality and eigenvector centrality, suggesting that 'bartend' was not frequently used in customer reviews; however, its connection with other nodes in the network is very strong and it greatly impacts other nodes. The words 'light', 'guest', 'amount', 'order', 'table', and 'manager' recorded higher ranks in degree and eigenvector centrality compared to frequency. However, the word 'bar' was recorded

higher in frequency than in degree and eigenvector centrality, and this implied that it was posted by customers frequently in their reviews, but its connection to, and impact on, other words is not as strong as its rank of frequency.

Table 3. Comparison of key words' frequency and centrality.

Words	Frequency		Freeman's Degree Centrality		Eigenvector Centrality	
	Frequency	Rank	Coefficient	Rank	Coefficient	Rank
atmosphere	651	1	13.121	1	0.577	1
cocktail	227	2	8.403	2	0.511	2
snack	113	3	4.058	4	0.267	4
whiskey	107	4	4.574	3	0.285	3
drink	91	5	2.845	5	0.141	8
service	73	6	2.581	6	0.19	5
price	69	7	2.185	7	0.142	7
wine	66	8	1.609	12	0.122	9
friendly	53	9	1.993	9	0.103	12
restaurant	52	10	1.753	10	0.115	11
place	48	11	1.285	14	0.057	25
bartend	46	12	2.005	8	0.148	6
alcohol	45	13	1.248	17	0.077	16
taste	40	14	1.200	19	0.064	24
seomyeon	36	15	1.645	11	0.117	10
selection	32	16	1.453	13	0.091	13
weekend	31	18	0.888	28	0.075	19
staff	31	17	1.116	21	0.08	15
quality	27	19	1.152	20	0.076	18
bottle	27	20	1.056	22	0.048	29
bar	27	21	0.564	38	0.031	42
cheese	26	22	0.900	27	0.054	26
music	24	24	0.912	26	0.077	17
Busan	24	23	0.684	31	0.039	33
performance	22	25	0.648	32	0.042	30
reservation	21	27	1.236	18	0.067	22
mood	21	29	0.024	50	0.003	50
light	21	26	1.008	23	0.084	14
guest	21	28	1.261	16	0.069	21
gwangalli	20	30	0.576	35	0.034	37
experience	18	32	0.444	44	0.016	48
conversation	18	31	0.648	33	0.072	20
interior	17	33	0.312	47	0.033	38
variety	16	34	0.492	41	0.032	41
amount	16	35	0.780	29	0.052	27
recommendation	15	36	0.456	43	0.035	36
liquor	14	39	0.960	25	0.036	35
foreigner	14	38	0.360	45	0.019	47
floor	14	37	0.624	34	0.039	34
toilet	13	41	0.312	46	0.029	43
order	13	43	1.273	15	0.065	23
food	13	40	0.504	40	0.033	39
dinner	13	42	0.564	36	0.033	40
table	12	44	0.996	24	0.052	28
manager	11	46	0.732	30	0.041	31
flavor	11	45	0.564	37	0.029	44
special	10	47	0.264	48	0.022	46
feel	10	48	0.240	49	0.014	49
difference	10	49	0.516	39	0.027	45
beer	10	50	0.456	42	0.04	32

We then performed CONCOR analysis to identify the relationship and discovery mode between connective words and found that the greater the similarity of the connection model, the greater the degree of structural equivalence of other words. It forms clusters containing keywords similar to each other [69], that is, CONCOR analysis is a method of repeatedly analyzing correlations to search for certain levels of similar groups. This study identifies node blocks based on the correlation coefficient of the concurrent keywords matrix to form clusters containing similar keywords [70]. A frequency and construct matrix was created based on the keywords extracted from the frequency histogram. Afterward, NetDraw in the UCINET 6.0 package was used to visualize the results. The nodes are shown as blue squares, their size indicates their frequency, and the network shows the connectivity between them.

The result of CONCOR analysis was presented in Figure 5 and found four intertwined groups. After exploring the words in the group in more detail, the groups were named 'Menu', 'Atmosphere', 'Service' and 'Date & Location'. To make it easier to see which words belong to each group, the words in the cluster and the words that need attention are listed in Table 4. The 'Service' group includes 'service', 'friendly', 'bartend', 'selection', 'staff', 'quality, 'guest', 'conversation', 'recommendation', 'manager', 'reservation', and 'order', which are important terms in the wine bar. 'Menu' comprises 'cocktail', 'snack', 'whiskey', 'price', 'wine', 'taste', 'bottle', 'cheese', 'food', 'beer', 'amount', and 'taste', which represent all kinds of food and beverages provided by the wine bar menu. 'Date & Location' includes 'drink', 'dinner', weekend', 'seomyeon', and 'gwangalli', and this group also contains words such as 'restaurant', 'bar', 'place', 'Busan', and 'foreigner'. The last group, 'Atmosphere', is related to the atmosphere and comprises 'special', 'music', 'difference', 'feel', 'atmosphere', and 'mood' and also contains words relating to the interior, such as 'table', 'light' 'floor', and 'toilet'. Based on this, after CONCOR analysis, 48 words closely related to Busan wine bar experience and satisfaction were extracted for further analysis.

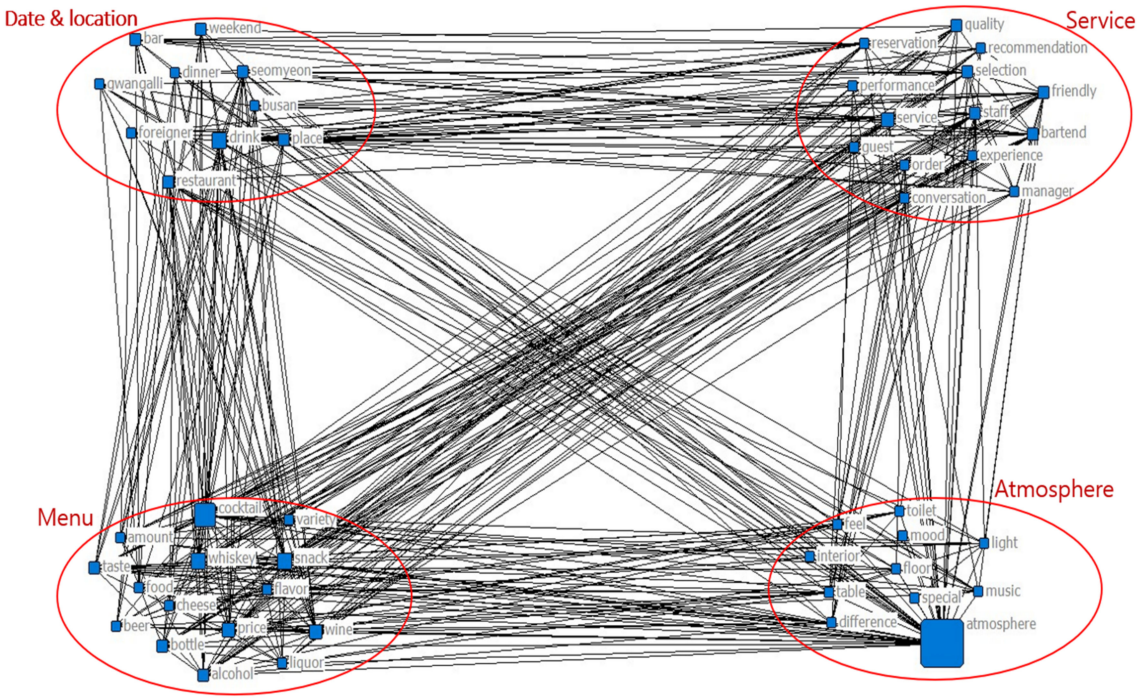

Figure 5. Visualization with CONCOR analysis.

Table 4. Result of CONCOR analysis.

	Extracted Words	Significant Words
Date and Location	drink/weekend/gwangalli/dinner/bar/seomyeon/place/foreigner/Busan/restaurant	drink/weekend/gwangalli/dinner/bar/seomyeon/foreigner/Busan/restaurant
Service	quality/order/staff/reservation/performance/friendly/selection/guest/service/bartend/conversation/experience/manager/recommendation	quality/order/staff/reservation/friendly/selection/guest/service/bartend/conversation/experience/manager/recommendation
Menu	snack/cocktail/taste/amount/bottle/wine/cheese/alcohot/price/beer/flavor/liquor/food/whiskey/variety	snack/cocktail/taste/amount/bottle/wine/cheese/alcohot/price/beer/flavor/liquor/food/whiskey/variety
Atmosphere	light/mood/table/special/floor/feel/difference/atmosphere/interior/toilet/music	light/mood/table/special/floor/feel/difference/atmosphere/interior/toilet/music

4.3. Factor Analysis

Factor analysis was used to extract factors by reducing a large number of variables. The common factor standards are used when extracting factors, such as a minimum factor load of 0.400, eigenvalues greater than 1.0, and a large part of the total variance. The result found six factors with 16 keywords, covering 51.395% of total variance and serving as independent variables.

Table 5 presents the results of the factor analysis. A KMO (Kaiser–Meyer–Olkin) value of 0.549 is in an acceptable range and verified the suitable use of factor analysis for this study. In addition, the Bartlett sphericity test value (X^2) is 1354.189, and the correlation matrix is overall significant ($p < 0.001$). The results suggest that the current data are suitable for exploratory factor analysis. The six factors were named 'Service (Factor 1)', 'Staff (Factor 2)', 'Menu (Factor 3)', 'Environment (Factor 4)', 'Recommendation (Factor 5)', and 'Atmosphere (Factor 6)'. Factor 1 contains 'staff' and 'friendly', which are related to the wine bar service. Factor 2 has 'manager' and 'bartend', which are related to staff in the wine bar. Factor 3 was about the menu containing 'bottle', 'cheese', 'wine', and 'snack'. In addition, Factor 4 consisted of aspects concerning the environment, such as 'interior' and 'light'. Factor 5 has 'reservation', 'experience', and 'Busan', which are related to the recommendation. Finally, Factor 6 includes 'floor', 'place', and 'music', which are related to the atmosphere of a wine bar.

4.4. Linear Regression Analysis

Linear regression analysis was performed to explore how six customer experience attributes extracted from factor analysis influence overall satisfaction score (see Table 6). Six independent variables are Service (Se), Staff (St), Menu (M), Environment (E), Recommendation (R) and Atmosphere (A), and one dependent variable is named Customer Satisfaction (CS). The overall variance explained by the six predictors was 1.9% ($R^2 = 0.019$), which is quite low. This might be due to the absence of plausible factors that might significantly affect customer satisfaction. Given the nature of opinion mining research and the fact that it is impossible to include all relevant variables in the model, such low explanatory power could be possible [71].

Table 5. Result of the factor analysis.

	Words	Factor Loading	Eigen Value	Variance (%)
Service	Staff	0.884	1.836	11.473
	Friendly	0.895		
Staff	Manager	0.793	1.524	9.524
	Bartend	0.776		
Menu	Bottle	0.661	1.391	8.693
	Cheese	0.630		
	Wine	0.558		
	Snack	0.481		
Environment	Interior	0.779	1.253	7.831
	Light	0.710		
Recommendation	Reservation	0.666	1.198	7.490
	Experience	0.647		
	Busan	0.521		
Atmosphere	Floor	0.637	1.022	6.385
	Place	0.522		
	Music	0.506		

Total variance (%) = 51.395; KMO (Kaiser–Meyer–Olkin) = 0.549; Bartlett chi-square (p) = 1354.189 ($p < 0.001$).

Table 6. Results of linear regression analysis.

Model	Unstandardized Coef.		Standardized Coef.	t	Sig.
	B	Std. Error	Beta		
(Constant)	4.434	0.024		184.268	0.000
Service	0.049	0.024	0.055	2.037	0.042
Staff	0.043	0.024	0.049	1.795	0.073
Menu	−0.060	0.024	−0.068	−2.498	0.013
Environment	−0.049	0.024	−0.055	−2.035	0.042
Recommendation	0.066	0.024	0.075	2.749	0.006
Atmosphere	0.020	0.024	0.022	0.811	0.418

Notes: Dependent variable: customer satisfaction (CS); $R^2 = 0.019$; adjusted $R^2 = 0.015$; $F = 4.329$; $p < 0.05$.

The results of regression analysis indicated that 'Service (Se, $\beta = 0.055$, $p < 0.05$)' and 'Recommendation (R, $\beta = 0.075$, $p < 0.01$)' are significant predictors, supporting Hypotheses 1 and 5. The findings also indicated that 'Recommendation (R)' factor holds the highest standardized coefficients (i.e., the most important factor associated with customer satisfaction), and the 'Service (Se)' factor has the second-largest standardized coefficient. However, interestingly, the 'Menu (M, $\beta = -0.068$, $p < 0.05$)' and 'Environment (E, $\beta = -0.055$, $p < 0.05$)' factors were significant but hold the negative standardized coefficients, not supporting Hypotheses 3 and 4. Lastly, Hypotheses 2 and 6 were also not supported with 'Staff (St, $\beta = 0.049$, $p > 0.05$)' and 'Atmosphere (A, $\beta = 0.022$, $p > 0.05$)'.

5. Conclusions

This study attempts to explore the factors that reflect customer experience using textual date and verify their impacts on customer satisfaction. The current study incorporated both qualitative and quantitative data for wine bar research and industry development. Bar-related research can serve as an important policy concern affecting wine bar operations, production, and facilities, and can contribute to the development of customer segmentation [70]. Therefore, Busan wine bars were selected as the data source for the study, and online reviews were collected. Moreover, this study is designed to use online Busan wine bar reviews to improve customer experience and satisfaction. For the data analysis of online Busan wine bar reviews, the first process is to extract keywords through text mining,

and the second process is to calculate the frequency of words used by customers. Based on the frequency analysis, the degree and feature vector centrality of the top 50 commonly used words were analyzed using CONCOR analysis to find the connections between them and the most influential keywords.

Firstly, the top 50 keywords were divided into four groups, namely, 'Menu', 'Atmosphere', Service', and 'Date & Location'. In addition, they were visualized by drawing networks and nodes using NetDarw in UCINET 6.0. Moreover, factor analysis and linear regression analysis were performed to extract factors and to find the relationships between predictor variables and the dependent variable. The factor analysis reduced the original 48 keywords to 16 keywords, which were further divided into six factors, which are 'Service', 'Staff', 'Menu', 'Environment', 'Recommendation' and 'Atmosphere'.

Secondly, linear regression analysis found that the 'Recommendation' factor had the highest impact. According to the results of factor analysis, the relevant words were 'reservation', 'experience', and 'Busan'. In a highly rated wine bar, employees should have sufficient knowledge of wine and provide customers with adequate explanations and recommendations of wine. In this regard, employees should be regularly trained and educated on wine knowledge so as to provide customers with better services to provide customer satisfaction.

Another interesting finding was 'Service' scored = the second-highest beta value in the linear regression analysis, and its related words, such as 'staff' and 'friendly', scored a very high position in the frequency analysis. In particular, 'service' and 'friendly' appeared very frequently in the online reviews of Busan wine bars. This result is aligned with findings of previous studies, showing that friendly service significantly influences customer experience and satisfaction, which implies that service by staff is a key element for a good reputation in the service industry. Thus, wine bar managers need to train their employees to provide better service to customers and create an appropriate working environment to improve employee satisfaction, which in turn allows employees to deliver better customer service.

Lastly, the 'Menu' and the 'Environment' showed negative relationships with the dependent variable in linear regression analysis. The 'Menu'-related words were 'bottle', 'cheese', 'wine', and 'snack', and the 'Environment'-related words were 'interior' and 'light'. This shows that customers were dissatisfied with the wine bar's menu and environment after experiencing the Busan wine bar. Therefore, the variety of the menu should be improved as much as possible to provide customers with more menu options. Additionally, providing a more comfortable and warm wine bar environment is essential to improve customer satisfaction.

6. Discussion

The findings suggest that there are some theoretical and practical implications. First, previous studies on wine bars have been conducted through questionnaires [72,73] or qualitative analysis through content analysis, focus groups, etc. To a large extent, the research subjects were restricted to a specific scope and related issues. However, this study was conducted through online customer reviews, an open source for hearing customer opinions without the constraints of time and space. Therefore, this study can be considered as a research project that used observation data to understand customers experience at a wine bar. The use of online customer reviews in the wine bar industry and its great economic value, which can save time or effort in collecting online reviews, can be considered as one of the new engines to stimulate sustainable and lasting growth in the industry. For example, the dimensional analysis explored through the CONCOR analysis and factor analysis can be used as a reference to identify key attributes that reflect the customer's experience of a wine bar. Moreover, the analysis of online customer reviews can become the basic database for developing relevant marketing strategies, which is the latest trend to gain new insights for the hospitality and travel industry.

In addition, this study shows that the research expands the application fields of semantic network analysis and has academic significance. Given the significance of the

wine bar segment in the hospitality industry, this study empirically explores wine bar experience and satisfaction using online review analytics. Along the way, the wine bar industry has the opportunity to understand the attributes of online reviews that could investigate corresponding marketing strategies for their significant advantages.

This study tested six independent variables—Service (Se), Staff (St), Menu (M), Environment (E), Recommendation (R), and Atmosphere (A)—and one dependent variable—Customer Satisfaction (CS). The results show that 'Service (Se, $\beta = 0.055$, $p < 0.05$)', and 'Recommendation (R, $\beta = 0.075$, $p < 0.01$)' are significant, meaning these experience aspects of wine bars are the most important factors affecting customer satisfaction. By monitoring online reviews as a reflection of customer experience, wine bars will be able to determine the major attributes needed to build positive post-purchase behaviors and avoid negative actions. Therefore, online reviews serve as effective ways for the wine bar industry to collect feedback from their customers and information on how to generate positive customer purchase intentions after the experience. Moreover, to reach a high satisfaction score and generate positive eWOM, the wine bar industry should consider 'Service', 'Recommendation', 'Menu', and 'Environment'. Among them, 'Recommendation' was the most significant attribute affecting the overall customer satisfaction score. Therefore, wine bar managers should utilize these key factors to increase customer satisfaction. These findings also allow researchers to test theoretical models to better understand the behavior of wine bar customers.

In practice, managers should closely watch online reviews because customer reviews can serve as an important source for wine bars to identify areas that need to be improved and a marketing tool that will generate revenue to them. The findings also suggest that the wine bar operators should strategically allocate their resources based on the importance level of each service attribute. The online review analyses (i.e., text mining and semantic network analysis) provide insight into a reliable assessment of the satisfaction of their customers, and this satisfaction level can also be used to compare their performance with competitors. Furthermore, this approach must be beneficial when making sustainable marketing strategies in this fierce market.

Although there are many meaningful implications, this study is not free of limitations. First of all, because only 58 top wine bars in the Busan area were selected for this study, it is hard to generalize the findings. Therefore, future research could use more geographically diverse and more samples to mitigate geographical uniqueness. Secondly, the methods we used are solely based on the frequencies of individual words, so it is difficult to understand the additional meaning of words. In future studies, it is expected that further positive and negative analysis and sentimental analysis could be conducted to better understand customers' experience and satisfaction. Therefore, it can provide more powerful strategies for the wine bar industry.

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