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Research Article

Perceptions of the Yangtze River cruise ship brand based on text semantic analysis: A web big data perspective

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Abstract

Relying on the rich natural and human resources of the Yangtze River, the Yangtze River cruise has been a popular and famous tourism route. This study adopts a big data approach to study the perception of and satisfaction with the Yangtze River cruise brand, so as to come up with some practical suggestions for the enhancement of its value. Based on the analysis of the current development of the Yangtze River cruise tour, this paper conducted a textual analysis on 2,260 user reviews of two important Chinese travel OTA companies (Ctrip.com and Tuniu.com) through the theory and method of web text mining. A word frequency analysis, the construction of semantic networks, and a sentiment analysis were carried out. The results of the study show that the market perception of each cruise company's brand is not very different, and the relevant companies have not yet developed their own special products and services. "Service" is the most frequently mentioned high-frequency word in tourists' reviews. The sentiment analysis shows that the frequency of positive emotions in tourists' reviews is high (exceeding 80 %). Through the satisfaction analysis of six dimensions of Yangtze River cruises, it is found that "cruise dining" and "cruise entertainment" are weak points.

1. Introduction

River cruise ships are passenger vessels that sail in inland rivers and lakes, possessing the ability to operate for more than 24 h, providing food, lodging, and entertainment services for tourists (Camilleri, 2018). River cruise ships can serve tourists with abundant catering, perfect accommodation, and entertainment facilities, and can provide overnight recreation services in larger waters, such as inland river basins and offshore (Li et al., 2015). Cruise ships, dubbed "theme hotels at sea", mostly conduct medium- and high-end leisure tours with strong "ship-shore" interaction. The hull size of river cruise ships is limited by the river size and, therefore, there are fewer amusement facilities compared with cruise ships (Kwortnik, 2008). However, the advantage is that river cruise tourism is often more relaxing and richer due to its deep integration into onshore tourism resources. Consequently, it has been popular in Europe for a long time, and is gradually gaining popularity in China.

The development of river cruise tourism is closely bound with the development of human settlements on major rivers. Many rivers are crowned as the cradles, or mother rivers, of civilization

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because of their essential role in the cultural development of the basin (Coates, 2013). River cruises have also developed out of the search for historical monuments and the origins of civilizations, and have subsequently become a high-class modern way of traveling. European river cruises enjoy a long tradition and history, forming classic routes such as the Rhine, Seine, Dnieper, Douro, Elbe, Moselle, etc. (Mehlhorn, 2019). Prominent inland cruises include, among others, USA Mississippi cruises, Australia Murray River cruises, and Brazil Amazon and Egypt Nile cruises.

The Yangtze River, the longest river in China and the third longest in the world, serves as the golden waterway of global inland rivers, and is an important water and land transportation hub, with its basin covering a population of over 400 million. It also boasts rich tourism resources and more natural and cultural landscapes along the route. The Yangtze River riverboat tourism market relies on the Yangtze River economic belt. It has seized the advantages of abundant resources to upgrade services through continuous construction of new vessels, therefore attracting numerous tourists and winning a certain share of the international market.

For cruise companies, clear and specific brand positioning is essential for better service, as well as better promotion (Gui et al., 2011). However, there are few studies on Yangtze River cruises, and there is no comprehensive or systematic research on the product and image perceptions of, or satisfaction with Yangtze River cruise tourism. The large amount of online textual content generated by online travel agency (OTA) platforms provides academics with a low-cost, large-sample, and “out-of-the-box” data collection channel (Wong et al., 2020). For example, researchers like Zhang used stepwise regression to explore the influence of cruise ship attributes on customer satisfaction and dissatisfaction based on the online review data of a large number of cruise passengers (Zhang et al., 2015), and Brejla analyzed tourist reviews and satisfaction scores based on 34,425 online reviews on the Cruise Critic website (Brejla et al., 2014). Therefore, this paper conducts a systematic and comprehensive study of the perceived differences in product and image perceptions of, emotional expressions of, and satisfaction with Yangtze River cruise tourists using the textual analysis of user reviews from famous Chinese tourism OTAs: Ctrip.com and Tuniu.com. The purpose of the study is to quantitatively analyze the textual content using the big data method and provide references for the enhancement of the brand value of Yangtze River cruises.

2. Research method and data source

2.1 Sample selection

According to the latest China cruise ship development report, there are mainly seven companies running deluxe cruise ships on the Yangtze River, consisting of 34 deluxe cruise ships with a total capacity of about 14,000 passengers. With standard rooms as the minimum room configuration, they basically meet the hardware standards of five-star hotels on land. In 2017, the Yangtze River deluxe cruise ship capacity was 800,000 tourists, actually receiving 640,000 with an average attendance rate of 80 % and annual sales revenue of about 1 billion yuan. The specific cruise ship fleet is shown in **Table 1**.

Table 1 Basic information of Yangtze River cruise companies (ordering random).

Cruise companies	Brands	Number of ships	Number of cabins
Chongqing Yangtze Gold Cruise Co.	Yangtze Gold	7	1,419
Chongqing Dongjiang Industry Co.	Victoria	7	862
Chongqing Guanda Cruises Co.	New Century	7	1,055
China Yangtze River Overseas Cruise Ship Corporation	Yangtze River Overseas	5	577
Hubei Wuhan Yangzi River Cruise Company	Presidents Series	5	849
Chongqing Damei Yangtze River Three Gorges Cruises Co.	Goddess Series	2	288
Yichang Oriental Royal Cruise Company	Yangtze River Discovery Cruises	1	60
Total		34	5,110

In terms of data collection, there are two reasons explaining why Ctrip.com was selected as the platform for obtaining online reviews from cruise tourists: 1) compared with other websites, Ctrip possesses more products for Yangtze River cruises and can provide more tourist reviews; 2) reviews on Ctrip.com are of high quality, including information on food, accommodation, and transportation on the tour. Meanwhile, the way and the number of data selection were also controlled. Sorted by the “most valuable” attribute, and based on the principle of data validity, reviews with as many words and aspects as possible were selected, as the selected ones should include such aspects as cruise facilities, catering, services, shore activities, and so on.

Furthermore, of the seven cruise companies operating on the Yangtze River, six cruise companies with more cruise products and richer reviews were selected. Their corresponding brands are: the Yangtze River Golden Cruise, Victoria Cruise, New Century Cruise, Yangtze River Overseas Cruise, Presidents Series Cruise and Goddess Series Cruise.

A total of 2,260 reviews were eventually obtained, spanning the period from 2017 to 2019. These include 500 reviews for the Yangtze Gold Cruise, 280 reviews for the Victoria Cruise, 340 reviews for the New Century Cruise, 270 reviews for the Yangtze Overseas Cruise, 370 reviews for the Presidents Series Cruise, and 500 reviews for the Goddess Series Cruise. Through the corresponding analysis of text data and satisfaction data, the image perception of tourists towards the six cruise brands is effectively identified.

2.2 Research method

“Internet plus” is a new model of economy developed by traditional industries and relies on the Internet, which has brought not only a significant impact on the national economic life, but also a new vision of big data application for related research (Wang et al., 2016). With the maturation of cruise tourism product sales model on OTA platforms, tourists prefer the consumption pattern of planning and booking in advance. Also, OTA platforms provide a convenient way for tourists to evaluate products and express their true feelings. This internet-based third-party platform facilitates tourists in the choice of comfortable and cost-effective cruise products. The online reviews by other users also become the basis for tourists to choose products which, in turn, influences the sales of cruise products. This also provides a rich material for us to conduct research, and this paper conducts an in-depth study by collecting these review texts and by mining online user reviews (Tourist comment website: https://vacations.ctrip.com/travel/detail/p20842576/?city=21868#ctm_ref=www_hp_bs_lst).

Step 1: Product and brand perception research based on word frequency analysis. Based on online reviews of tourists, the text data obtained were analyzed by means of word frequency. Word frequency analysis is mainly used to count the number of occurrences of words in online text materials, to discover the core information hidden in the text content, and to explore the regularity in the lexical description of the research object with the help of semantic network analysis and other means (Illia et al., 2014). ROST CM 6.0 software performs word analysis on the obtained web comments to obtain the feature words with high frequency, and this paper mainly analyzes the top 60 high-frequency words and then summarizes them.

Step 2: The study of brand characteristics and differences based on semantic network analysis. The fundamentality of semantic network analysis mainly lies in the word frequency analysis, with the focus not on the words themselves, but on the relationship patterns between words and words (Schultz et al., 2012). The method allows deconstructing the semantic paths between syntax and concepts of web text content, so as to identify the associations and meanings of text words. In this paper, we used ROST CM 6.0 software to perform semantic network analysis of the obtained web reviews in terms of the general text and seven dimensions of each cruise line.

Step 3: Satisfaction study of products and brands based on sentiment analysis. Sentiment analysis, as a research method in marketing, can reflect consumers’ comprehensive evaluation of a product or service in an efficient and real-time manner (Philander & Zhong, 2016; Rambocas,

2017). In this paper, we use ROST CM 6.0 software to analyze the sentiment analysis of 2,260 reviews taken from Ctrip.com by using the sentiment analysis to qualitatively and quantitatively analyze tourists' perceptions of, and satisfaction with, cruise products.

Finally, this study will propose suggestions for the Yangtze River cruise products and brand value enhancement.

3. The result of word frequency analysis

The frequency analysis includes two levels: one is to analyze the cruise tourists' overall perception of cruise products, and the other is to analyze the image perception of different cruise brands. Through the summary study, it is found that the top 60 keywords extracted from the overall text data are basically the same as those extracted from the texts of major cruise brands, respectively. There is not much difference among the cruise brands, which indicates that tourists do not understand much about each cruise brand, and the brands themselves do not have a high degree of recognition. On the other hand, through analysis, it is found that tourists' concerns about cruise products are mainly focused on cruise facilities, cruise services, food and beverages, tour guides, and shore activities.

3.1 Analysis of high-frequency words for object evaluation

3.1.1 High-frequency words of cruise ship facilities

The high-frequency words of cruise ship facilities include "room", "facilities", "restaurant", "balcony", "entertainment", etc. Positive comments include "the room is bigger than the cruise ship to Japan", "high class, complete hardware and software facilities", and "nice interior decoration, nice balcony". The corresponding negative comments include "the room smells not very good", "the swimming pool is too dirty", and "the hardware facilities are rudimentary and there are few things to do". These comments on cruise ship facilities include accommodation, food, and entertainment, which are the most basic demands of tourists, fully reflecting the functions of cruise ships of transportation, sightseeing, leisure, and vacation.

3.1.2 High-frequency words related to tourist destinations

The high-frequency words related to tourist destinations mainly include "Baidi City", "Dam", "Yichang", "Shennong Stream", etc. These words fully reflect the characteristics of the Yangtze River cruise line. The natural and human resources along the Yangtze River are also fully exploited to create a better cruise experience for tourists and to meet their demands for cruise products.

3.1.3 High-frequency words related to cruise service

High-frequency words related to cruise service include "cruise ship", "guide", "waiter", "considerate", "enthusiasm", and so on. Related comments include "the customer service is really good for their good attitude and seriousness as well as responsibility", "the service of the travel consultant is quite good", and "the service of the guide is quite good". But there are also many negative comments, such as "the tour guide is not very responsible", "customer service is not timely", and so on. No matter whether the comments are positive or negative, these high-frequency words indicate that tourists are concerned about and are satisfied with the cruise service. Among these words, "tour guide", "customer service", and "waiter" are mentioned the most frequently, indicating that they are the group with the most direct contact with customers. The quality of their work directly affects customers' experience of and satisfaction with cruise ships. Current studies also show that the guide service during shore excursions has a positive effect on customer satisfaction, intention to revisit, and word-of-mouth recommendation behavior.

3.2 Analysis of subject perception high-frequency words

3.2.1 High-frequency words of travel groups

The high frequency words of the travel group mainly include “elderly” and “children”. The related comments mainly include “accompanied the old people to visit”, “my parents were very satisfied”, and “took two old people over 70 and a child under 1.2 m to travel”. This shows that, with the development of China’s economy and the aging population, residents’ demand for tourism is changing from consumption to leisure. Therefore, cruise tourism should provide a suitable way for the elderly and children and provide young people the chance to fulfill their filial duty and enable them to accompany their children in a comfortable environment.

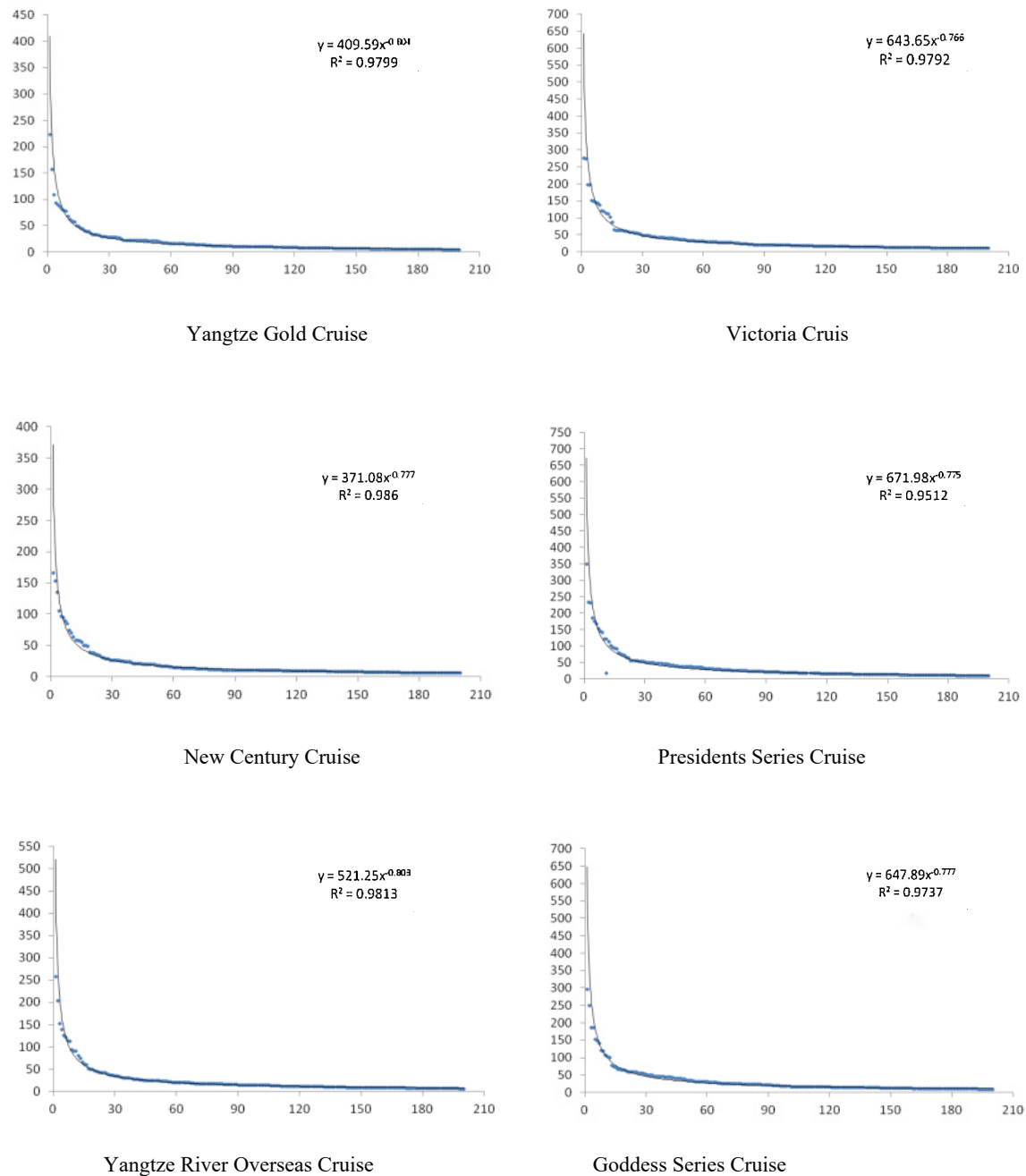


Figure 1 Long-tail distribution of frequently used words in different cruise brands.

3.2.2 High-frequency words related to tourists' perceptions

High-frequency words related to tourists' perceptions include “colorful”, “comfortable”, and “worthwhile”. The word “colorful” means that there are various kinds of activities and buffets on the cruise ship, which indicates that Chinese tourists attach more importance to food and beverages and are more eager to participate in different entertainment activities. “Worthwhile” shows that tourists are much more satisfied with cruise products and value the freedom and leisure experience of cruise vacations.

3.3 High-frequency words of cruise ship brand perceptions

From the high-frequency words in the top 30 of each cruise brand in **Table 2**, the tourists' perceptions of the major cruise brands are basically the same, as are the words that appear with higher frequency. In order to further analyze tourists' perceptions of different cruise brands, the serial numbers and frequencies of the top 200 high-frequency words of the six cruise brands were used as variables for curve fitting, and it was found that the high-frequency words conformed to the power index distribution, as in **Figure1**.

Table 2 Top 30 of high-frequency words for cruise ship overall image cognition.

No.	Overall	Yangtze Gold	Victoria	New Century	Yangtze River Overseas	Presidents	Goddess
1	cruise	cruise	service	Cruise	Service	Service	service
2	service	service	cruise	Service	Cruise	Cruise	cruise
3	on board	Three Gorges	on board	Service	Cruise	Cruise	cruise
4	Three Gorges	on board	itinerary	Arrangement	Three Gorges	Three Gorges	Three Gorges
5	sights	sights	arrangement	Itinerary	arrangement	Sights	sights
6	arrangement	Tour	sights	Sights	Three Gorges	Room	arrangement
7	itinerary	itinerary	satisfied	Satisfied	Sights	Itinerary	itinerary
8	satisfied	satisfied	room	Three Gorge	itinerary	arrangement	satisfied
9	room	guide	Three Gorges	Room	Guide	Presidents	tour
10	tour	arrangement	tour	this time	satisfied	Satisfied	Goddess
11	guide	Gold	travel	Onshore	Tour	this time	room
12	self-financed	Room	this time	Happy	this time	self-financed	staff
13	onshore	Chongqing	guide	Catering	Room	Onshore	this time
14	staff	self-financed	onshore	Tour	Happy	Tour	self-financed
15	happy	Staff	catering	New Century	self-financed	Staff	Chongqing
16	Chongqing	Yangtze river	happy	Cozy	Staff	Free	guide
17	catering	this time	enthusiasm	Elderly	onshore	Landscapes	onshore
18	travel	facilitate	performance	Facilitate	landscapes	Catering	travel
19	outing	overall	self-financed	self-financed	Time	Outing	outing
20	Yangtze river	experience	time	Outing	catering	Upgrading	happy
21	landscapes	program	outing	Entertainment	Chongqing	Dam	enthusiasm
22	elderly	travel	attitude	Choice	Elderly	Happy	appreciation
23	enthusiasm	elderly	staff	Abundant	Dam	YiChang	everyday
24	choice	onshore	entertainment	Attitude	enthusiasm	Overall	Cathay
25	overall	landscapes	clean	Staff	overall	Travel	landscapes
26	facilitate	YiChang	choice	Experience	attentive	Facilitate	catering
27	time	upgrading	booking	Enthusiasm	disembarkation	Guide	buffet
28	YiChang	choice	overall	Travel	Travel	Cozy	sightseeing
29	experience	outing	accommodation	Scenery	Cozy	Choice	choice
30	cozy	outing	attentive	Environment	Choice	Everyday	overall

It is further found from the figure that tourists' perceptions of cruise brands show an obvious long-tail distribution, and the words in the head of the distribution are core ones, which are tourists' overall perceptions of cruise products. Through the analysis, it is found that these core terms do not differ much for different cruise brands, indicating that tourists' perceptions of different cruise brands are not apparent.

Through the analysis of the long-tail words, it is found that tourists mainly focus on such basic needs as "hotel", "shopping", and "cuisine" instead of something featuring cruise ship brands despite their different perceptions. This shows that tourists have little knowledge of cruise tourism, while they pay special attention to the entertainment, food, and shore activities on the cruise ship.

The particularly high attention paid to shore activities indicates that some tourists only regard cruise ships as "a kind of water transportation", and do not really enjoy the leisure or vacation function of cruise ships. Viewed from another perspective, it shows that the major cruise brands operating on the Yangtze River have not developed their own characteristics for different customer groups, and the designed routes are relatively simple, without meeting the diversified needs of tourists. Therefore, different cruise companies should explore their own characteristics and strengthen their brand building so as to improve tourists' satisfaction with and recognition of their brands, thus enhancing the overall competitive edge of their companies.

4. Construction and analysis of semantic networks

In this paper, ROST CM 6.0 software is used to analyze the semantic network of the obtained web reviews in seven dimensions, including the overall text and the six cruise lines. The following are the semantic networks (**Figures 2 and 3**). **Table 3** shows the Top 10 bilingual corresponding terms of cruise tourism semantic network map.

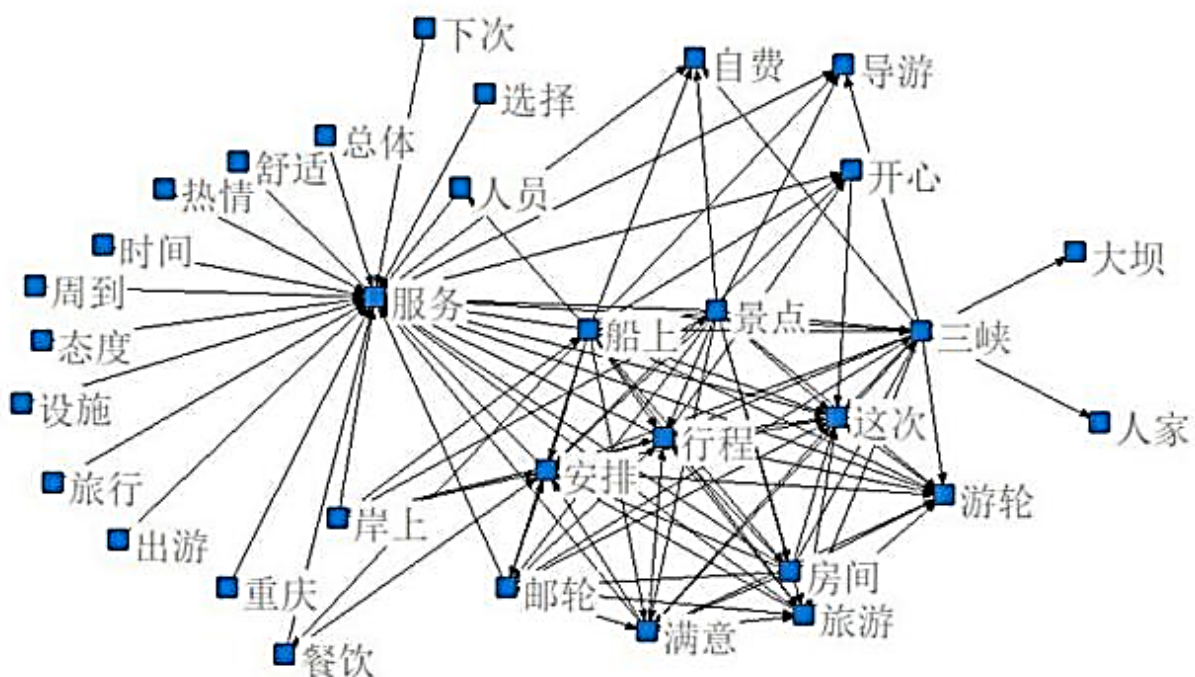


Figure 2 Overall semantic network.

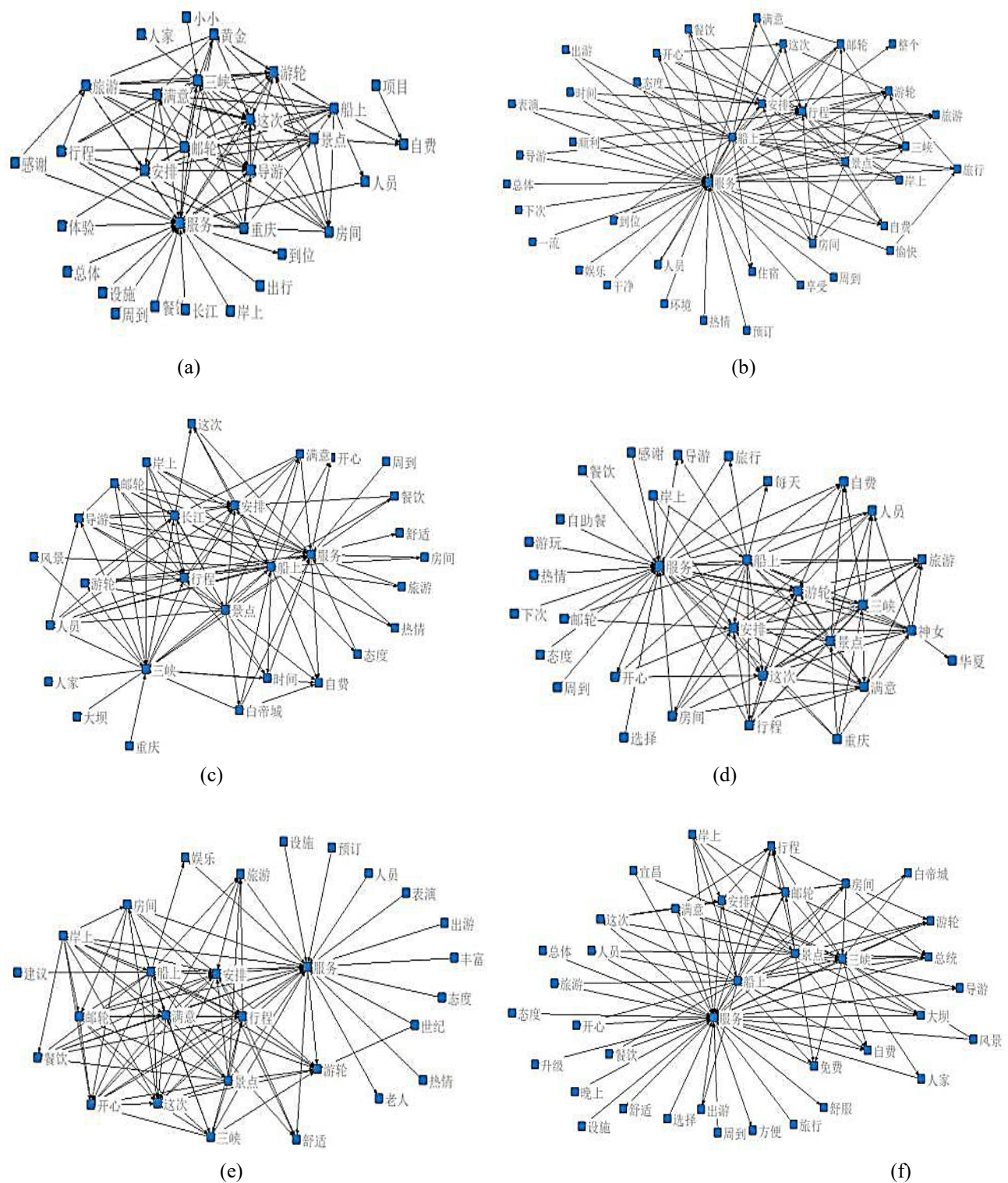


Figure 3 Semantic networks of different cruise brands.

Note: (a) Yangtze Gold; (b) Victoria; (c) Yangtze River Overseas; (d) Goddess Series; (e) Presidents Series; (f) New Century.

Table 3 Top 10 bilingual corresponding terms of cruise tourism semantic network map.

	Chinese	English
Cruises overall	行程、景点、三峡、旅游房间、满意、游轮、这次、船上、安排、服务	itinerary, sights, the Three Gorges, travel room, satisfied, cruise, this time, on board, arrangement, service
Yangtze Gold	景点、三峡、游轮、这次、旅游、导游、服务、安排、行程、满意	sights, the Three Gorges, cruise, this time travel, guide, service, arrangement itinerary, satisfied
Victoria	行程、服务、船上、安排、游轮、景点、三峡、导游、时间、房间	itinerary, service, on board, arrangement, cruise, sights, the Three Gorges, guide, time, room,
New Century	服务、游轮、安排、行程、船上、景点、这次、满意、岸上、房间	service, cruise, arrangement, itinerary, on board, sights, this time, satisfied, ashore, room
Presidents Series	服务、安排、导游、行程、长江、三峡、船上、景点、游轮、满意	service, arrangement, guide, itinerary, the Yangtze river, the Three Gorges, on board, sights, cruise, satisfied,
Yangtze River Overseas	服务、船上、满意、安排、景点、房间、三峡、大坝、免费、游轮	service, on board, satisfied, arrangement, sights, room, the Three Gorges, dam, free, cruise
Goddess Series	服务、船上、安排、景点、神女、游轮、三峡、这次、人员、自费	service, on board, arrangement, sights, Goddess, cruise, the Three Gorges, this time, staff, self-financed

Table 4 Vocabulary at different levels of cruise tourism semantic network map.

Circles	Core Level	Sub-core level	Marginal layer
Cruises overall	itinerary, sights, the Three Gorges, travel room, satisfied, cruise, this time, on board, arrangement, service	self-financed, guide, ashore, happy, catering, staff	considerate, Chongqing, cozy, facilities, enthusiasm, travel, attitude, next time, choice, overall, outing, exactly, time, dam, everybody
Yangtze Gold	sights, the Three Gorges, cruise, this time travel, guide, service, arrangement itinerary, satisfied	room, gold, this time, on board, staff, Chongqing, self-financed, experience, facilities, appreciation	program, small, overall, considerate, the Yangtze river, ashore, catering, next time
Victoria	itinerary, service, on board, arrangement, cruise, sights, the Three Gorges, guide, time, room, travel	self-financed, travel, exactly, performance, satisfied, attitude, happy, lodging, ashore, this time, catering, accommodation	dam, all, success, next time, considerate, staff, environment, entertainment, enjoy, clean, booking, overall
New Century	service, cruise, arrangement, itinerary, on board, sights, this time, satisfied, ashore	room, happy, the Three Gorges, Century, entertainment, cozy, catering, travel	suggestion, staff, attitude, facilities, elderly, outing, performance
Presidents Series	service, arrangement, guide, itinerary, the Yangtze river, the Three Gorges, on board, sights, cruise	satisfied, self-financed, Baidi City, staff, this time, ashore, time, catering	cozy, considerate, travel, happy, room, enthusiasm, attitude, landscapes, people, dam, Chongqing
Yangtze River Overseas	service, on board, satisfied, arrangement, sights, room, the Three Gorges, dam, free, cruise	guide, staff, this time, travel, ashore, itinerary, Presidents, self-financed, YiChang	landscapes, people, attitude, facilities, travel, upgrade, cozy, considerate, convenient, happy, outing, overall, catering, scenery, Baidi City
Goddess Series	service, on board, arrangement, sights, Goddess, cruise, the Three Gorges, this time	staff, self-financed, Chongqing, travel, itinerary, satisfied, travel, happy, ashore	room, guide, dam, everyday, buffet, choice, appreciation, catering, considerate, outing, enthusiasm

From the overall semantic network diagram, there are three distinct layers (**Table 4**). The middle core layer is mainly composed of “service”, “on board”, “arrangement”, “room”, etc. This shows that the services and facilities of the cruise ship are the most important part for tourists. The next outer layer is “onshore”, “guide”, “self-financed”, “catering”, and “the three gorges”, mainly related to the special scenery and shore activities of the cruise line. The outermost part is “cruise”, “choice”, “enthusiasm”, “overall”, “next time”, etc. Through these three layers, tourists’ overall perceptions of the cruise ship are visually expressed.

Subsequently, the paper analyzed the semantic networks of different brands and, through the comparison, it is found that there is no big difference among different brands. It is noteworthy that the word “gold” also becomes the core word in the semantic analysis of Golden Cruise, which shows that tourists have certain brand awareness of Golden Cruise, but do not have a good understanding of its brand characteristics.

In addition, “Century” and “Goddess” also appear in the sub-core level in the web semantic analysis of New Century Cruises and Goddess Cruises. In the reviews of New Century Cruises and Shen Nui Cruises, visitors only mentioned their names without describing the brand features. The word “recommendation” appears in the marginal words of New Century Cruises and, when we look for the text information where “recommendation” occurs, different comments can be seen, such as “recommend friends to take the cruise”. “It is recommended to choose a larger ship”, and “It is recommended not to go to a certain attraction”, indicating that New Century Cruises could be improved in terms of infrastructure and onshore activities.

Some reviews compared Yangtze River cruises with sea cruises and pointed out the shortcomings of Yangtze River cruises in such aspects as onboard entertainment facilities and catering. Further analysis of the marginal words of other cruise brands reveals that no words could particularly highlight the characteristics of the brands, which once again indicates that tourists do not recognize the different cruise brands well.

5. Sentiment analysis and satisfaction evaluation

The text content of tourists’ sentiment analysis comes from Ctrip.com and, through the sentiment analysis of tourists’ travel experience, we can generally grasp tourists’ perceptions of cruise products. In satisfaction analysis, quantitative analysis is adopted. A three-stage scoring system is divided into three levels, namely “Satisfaction”, “General”, and “dissatisfaction”, allowing tourists to rate six aspects covering “cruise service”, “cruise accommodation”, “cruise entertainment”, “shore activities”, “cruise dining”, and “tour escort service”. Through the satisfaction analysis, a more intuitive understanding of tourists’ perception of each cruise brand can be obtained.

5.1 Sentiment analysis

Sentiment analysis, as a research method in marketing, can reflect consumers’ comprehensive evaluation of a product or service in an efficient and real-time manner (Shumin & Juehao, 2012). In this paper, by using ROST CM 6.0 software to conduct a sentiment analysis on the selected 2260 reviews (**Table 5**), it was found that tourists’ perceptions of the Yangtze River cruises were mainly positive. Negative emotions also existed, but the proportion was relatively small. In addition, according to the high-frequency adjectives in the text, it was found that words like “very good”, “good”, “enthusiastic”, “enjoyable”, “satisfied”, and “happy”, expressing tourists’ positive emotions, appear many times. On the contrary, some tourists commented with “disappointed”, “bad”, “too bad”, and so on. The neutral terms include “basically ok”, “average”, and so on. Overall, the tourists’ emotional perceptions of the Yangtze River cruises are still dominated by positive ones. The analysis results are as follows:

Table 5 Sentiment analysis of major cruise ship brands.

	Overall	Yangtze Gold	Victoria	New Century	Presidents	Yangtze River Overseas	Goddess
Positive	90.07 %	84.62 %	92.77 %	94.47 %	90.64 %	86.93 %	86.96 %
Neutral	6.03 %	7.69 %	3.92 %	2.55 %	5.17 %	8.51 %	4.35 %
Negative	3.90 %	7.69 %	3.31 %	2.98 %	4.19 %	4.56 %	8.70 %

From the above chart, it can be seen that the highest positive evaluation rate belongs to New Century Cruises, with a positive evaluation of 94.47 %; the lowest positive evaluation rate goes to Yangtze Gold Cruises, with a positive evaluation of only 84.62 %. With respect to the analysis of negative evaluation, the lowest negative evaluation rate belongs to New Century Cruises, with only 2.98 %; the highest negative evaluation rate belongs to Goddess Series Cruises, accounting for 8.70 %. In summary, from the sentiment analysis of each cruise brand, it can be concluded that New Century Cruises performs better. Also, it can be derived that tourists' overall positive sentiments towards Yangtze River cruise tourism is dominant, which fully indicates that there is still great potential in the Yangtze River cruise market.

5.2 Satisfaction analysis

The above analysis only shows that the cruise tourists' perceptions of cruise tourism and each brand of cruise ships is mainly positive, but it is not clear how satisfied the cruise tourists are with all aspects of cruise ships. Therefore, through the scores of tourists on Tuniu.com (a full score being 5), we can analyze "cruise service", "cruise accommodation", "cruise entertainment", "shore activities", "cruise dining", and "tour escort service", and the results of these six aspects are shown in **Table 6**.

Table 6 Analysis according to different dimensions of tourist satisfaction.

Rating Item	Cruise Brands						Averages
	Gold	Victoria	New Century	Presidents	Yangtze River Overseas	Goddess	
Services	4.88	4.56	4.40	4.76	4.48	4.92	4.67
Accommodation	4.92	4.52	4.32	4.76	4.36	4.60	4.59
Entertainment	4.80	4.60	4.12	4.48	4.20	4.60	4.45
Shore activities	4.68	4.44	4.32	4.36	4.32	4.68	4.47
Catering	4.92	4.44	4.40	4.52	4.28	4.42	4.51
Leader service	4.96	4.44	4.28	4.56	4.36	4.84	4.59
Averages	4.86	4.50	4.31	4.57	4.33	4.68	-

The results show that cruise tourists are more satisfied with the four aspects of "cruise service", "cruise accommodation", "cruise dining", and "tour leader service", and the average rating is over 4.50. In contrast, tourists are not very satisfied with "cruise entertainment" and "shore activities". Meanwhile, in terms of cruise service, the Goddess Series cruise had the highest score, and the Yangtze River Golden Cruise followed with 4.88 points. In terms of cruise accommodation, Yangtze Gold Cruises had the highest satisfaction rating (mean score of 4.92). Similarly, in terms of

cruise entertainment, Yangtze River Golden Cruises had the highest satisfaction rate, while New Century Cruises performed somewhat poorly.

In terms of shore activities, overall satisfaction with the six major cruise brands is not high, as reflected in the tight shore itinerary and relatively simple activities. In terms of cruise ship dining, there is a big difference in the ratings. The average value of Yangtze River Golden Cruise reached 4.92 points, while Yangtze River Overseas Cruise only scored only 4.28 points. Satisfaction with tour leader service also varies greatly among brands, which is mainly related to the current distribution model of Chinese cruise tickets.

Longitudinal analysis shows that Yangtze Gold Cruises scored relatively high in all six areas, with only “shore activities” scoring lower, and the overall satisfaction higher. The two brands with worse overall ratings are New Century Cruises and Yangtze River Overseas Cruises. Among the six aspects in the table, the lowest ratings of New Century Cruises are “cruise entertainment” and “tour escort service”, while those of Yangtze River Overseas Cruises are “cruise entertainment” and “cruise dining”. In the horizontal analysis of each evaluation item, the two areas with the lowest average scores are “cruise dining” and “cruise entertainment”.

It can be concluded that Yangtze River cruises have not done enough in the aspect of “cruise entertainment”, and it is necessary to combine the needs of cruise tourists and to learn from the experience of sea cruise ships, and continuously increase the items of cruise entertainment and the attractiveness of cruise entertainment to better meet the needs of cruise tourists.

6. Conclusions and recommendations

6.1 Conclusions

Based on the data of tourists’ reviews on Ctrip and Tuniu.com, the six major river cruise brands operating on the Yangtze River are analyzed by using word frequency analysis, semantic network analysis, and significance analysis methods, and the following conclusions are drawn.

Firstly, from the overall perspective, the high-frequency words for tourists’ brand awareness of cruise ships mainly include “cruise service”, “cruise accommodation”, “cruise entertainment”, “shore activities”, “cruise catering”, and “tour escort service”.

Secondly, in the word frequency analysis, the extracted high-frequency words of major cruise companies are basically the same, which does not reflect the differences of brands, thus indicating that domestic tourists’ brand awareness is poor, and that each cruise company has not formed a clear positioning of its own cruise brand. In the analysis of the core vocabulary of major cruise brands, it is found that “service” is the most mentioned, suggesting that cruise ship service is crucial to tourists’ satisfaction and to the development of cruise ship brands.

Thirdly, during the semantic network analysis and long-tail analysis of tourists’ evaluation, no words were found to highlight the characteristics of each cruise ship brand, which again indicates that tourists do not recognize the cruise ship brand very well. All of these mean that the construction of cruise ship brand characteristics appears more and more important.

Fourth, although cruise tourists do not recognize each cruise brand very well, the sentiment analysis shows that tourists have a highly positive attitude toward Yangtze River cruises, and that Yangtze River cruises have gained popularity to a certain extent. The satisfaction analysis of the six dimensions of Yangtze River Cruises shows that tourists give the highest rating to the service of Yangtze River cruises. This demonstrates that the Yangtze River cruises have realized the importance of tourists’ satisfaction and have made great efforts to achieve it. Among these six dimensions, the least satisfactory part goes to cruise ship dining. Chinese people are quite particular about food, so the quality of catering has a great impact on people’s satisfaction. Thus, how to improve the quality of catering, and satisfy the dietary needs of different tourists as much as possible, poses a great challenge for major cruise lines.

6.2 Recommendations

6.2.1 Improve the level of cruise ship services and strengthen service skills training

Through the word frequency and semantic network analysis of cruise ship services, it is found that tourists are very concerned about cruise ship service. Therefore, for the ever-developing market of Yangtze River cruises, it is crucial to improve the service level of the cruises. On the one hand, it can establish a high-end and comfortable product image of Yangtze River cruise ships, so as to attract potential consumer groups. On the other hand, it can improve the reputation of the cruise ship brand among tourists, so as to attract more tourists through evaluation. It can also increase the rate of second boat trips, instead of just making tourists stay at the stage of experiencing new things, thereby ensuring the passenger supply of Yangtze River cruise tourism. That is to say, it is particularly important for cruise companies to enhance the service awareness of cruise-related service personnel, and to strengthen the training of service skills of them. Another major concern of Chinese tourists regarding cruise ship services is catering. As Chinese food boasts its culture and history, and Chinese people believe that “bread is the staff of life”, great importance is attached to all kinds of formal meals and buffet services. Therefore, the cruise ships on the Yangtze River should be equipped with authentic and high-quality Chinese food services and local specialties to meet the dietary needs of tourists. This is also a major starting point for cruise lines to enhance their cruise services and brand recognition.

6.2.2 Improve ship infrastructure construction to enhance tourists’ experience

Due to the hydrological conditions of the Yangtze River, the cruise ships currently operating on the it differ greatly from sea cruise ships in terms of volume and infrastructure, which makes tourists’ satisfaction with Yangtze River cruise ships decline. The word frequency analysis reveals that the words that appear more frequently for the infrastructure of cruise ships are “room”, “facilities”, “interior decoration”, etc. and the related evaluations are “the room smells”, “the swimming pool is too dirty”, and “there are few playable items”. Therefore, companies should position their cruise products as “luxury”, “high-end”, or “light luxury”, so as to eliminate the negative image resulting from poor tourism infrastructure and few recreational facilities. Furthermore, they need to strengthen the product characteristics of social, entertainment, and leisure to give tourists a unique and intimate travel experience.

6.2.3 Improve brand recognition and enhance brand competitiveness

The long-tail analysis finds that there is no great difference in tourists’ image perceptions of major cruise brands on the Yangtze River. Tourists’ recognition of the Yangtze River cruise brands is relatively low, and the major cruise brands have not formed their own characteristics. Therefore, cruise companies should start from the characteristics of the Yangtze River regional market and provide targeted cruise services and products for people of different ages and cultural backgrounds. Moreover, cruise companies should learn from the experience and operation modes of European river cruises and sea cruises, strengthen the image construction of cruise brands, highlight the cultural characteristics of the Yangtze River basin, and strive to enhance competitiveness by improving their own brand characteristics. The Yangtze River cruise companies currently compete in the same market and product lines to a very intense degree, and the traditional model of competing scale and price will only make the Yangtze River Three Gorges, a world-class tourism product, fall behind in quality and brand. Each cruise company should find alternative means to develop personalized and customized services, and to vigorously develop upstream and downstream Yangtze River lines, in order to stand out. In addition, international and local cruise companies exhibit differences in their brands and in product characteristics and, therefore, to highlight the brand characteristics should be the direction of the future development of Yangtze River cruises.

6.2.4 Focus on family travel groups and try to attract young people

In the analysis of the high-frequency words of cruise groups, it is found that “old people” and “children” appear more frequently. The survey on the structure of tourists in the Yangtze River cruise market found that the proportion of tourists over 60 years old reached 41 %. This indicates that older people in the domestic cruise market account for a relatively large proportion. It was found that improved shore excursions and onboard activities were desired by tourists. Older people are very interested in family trips with younger children, which should be given full consideration. Therefore, with the continuous development of the family cruise market, cruise companies are required to add more children’s services and facilities, and increase the number of parent-child facilities. Simultaneously, in order to attract young people, the shopping space on board can be expanded to enhance the shopping experience of tourists and meet their shopping needs. Meanwhile, for the Yangtze River cruise market, the cruise lines can provide free network services, because modern young people have higher demands and needs for network services. Free network service, with good network interaction, is bound to be attractive.

6.2.5 Cultivate cruise culture and expand the source market

Through the analysis of tourists’ evaluation, many tourists still regard cruise ships as a kind of transportation, and treat shore activities, shore tourist attractions, and destinations as the whole of cruise tourism, thus reducing the satisfaction degree of cruise tourists. Therefore, China’s domestic cruise tourism should increase additional services for tourists, which can be done through publicity and explanation, to increase tourists’ awareness of cruise tourism and improve their recognition of cruise tourism. It can also increase the promotion of cruise products through travel agencies, traditional media, social media, brand websites, and other channels. In addition, special emphasis should be laid on the promotion of functions like socialization, entertainment, and sports, so that more people can understand cruise tourism, and people with different needs can be attracted to it. Finally, a standardized market order and mechanism is a crucial ingredient for the healthy development of cruise tourism, requiring close collaboration among the Yangtze River inland cruise companies and the local governments, various distribution channels, and other concerned parties.

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