



## Sentiment analysis of reviews of spa hotels in Serbia

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### Article info

#### Original scientific paper

DOI:

<https://doi.org/10.46793/ICEMIT23.059T>

UDC/ UDK:

640.412:615.838(497.11)

159.942.52-057.67

### Abstract

*An important but underutilized new resource for gathering input on customer experience for the hospitality industry is consumer reviews posted on Internet travel portals. These data are frequently large and unstructured, which makes analysis difficult for conventional techniques because they were made for well-structured, quantitative data. Data obtained from customers can be used to assess satisfaction and dissatisfaction, with the aim of improving hotel services. Spa hotels offer an exclusive experience for their guests by offering plenty of additional services such as pools, saunas, massages, and various treatments. This research focused on examining textual online reviews of spa hotels in Serbia. A total of 20 hotels were included in the research, with 319 online reviews to be processed. Word frequency analysis, sentiment analysis, and analysis of the distribution of helpful votes were performed. Considering that spa hotels offer their guests specific services, by analyzing the frequency of words, key words that describe the services and experience in spa hotels were singled out. Sentiment analysis showed that there are no extremely negative sentiment values, which indicates a lower presence of negative feelings, but the highest sentiment value does not indicate the presence of extremely positive feelings either. By performing an analysis of helpful votes in reviews, it was found that the majority of reviews are not classified as helpful.*

**Keywords:** sentiment analysis, spa, hotels, reviews

## 1. Introduction

Due to the rise in spa tourism in recent years and the trend toward activity-based travel over destination-specific travel, spa hotels have become a significant component of the hotel industry (Denizci Guillet & Kucukusta, 2016; Lo et al., 2015; Smith & Diekmann, 2017). Balneotherapy, a historic medical practice that has claimed benefits in battling sickness through bathing, is one of the many health activities that are frequently offered at spa hotels or resorts to provide services (Sotiriadis, 2016; Verhagen et al., 2015). In many countries, the hotel industry extensively uses online reviews to access customer satisfaction and dissatisfaction, which is crucial in developing strategies for improving service quality, compensating for poor service, and achieving loyalty (Berezina et al., 2016). Many users are reluctant to express their complaints and objections to service organizations directly (Ekiz & Au, 2011), while on the other hand, sharing experiences through social media, websites, blogs, and other Internet platforms is much easier.


However, there has not been enough focus on using new methodologies for examining sentiments and satisfaction of customers of spa hotel services based on online reviews. This study presents a new method that uses big data from TripAdvisor portal to extract sentiments from reviews, in order to solve this research gap.

## 2. Literature review

Using qualitative methods for the analysis of customer reviews can help in examining customer content and understanding customer expectations. Using secondary data sources, such as online customer reviews, can improve services as well as business performance (Memarzadeh & Chang, 2015; Dawson & Titz, 2012). There is growing interest in employing automatic approaches including text mining and sentiment analysis, to process massive vast of UGC and bring out

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valuable knowledge and insights as consumers continue to submit a lot of textual content on various social networking sites. Text mining is a new technology that tries to swiftly extract valuable information from a lot of textual materials (Liu et al., 2011; He et al., 2013). The goal of text mining is to extract meaningful trends, models, rules or patterns from unstructured textual data (Romero et al., 2008; He, Wu, Yan, Akula, & Shen, 2015; He, Shen, Tian, Li, Akula, Yan, & Tao, 2015).

*Sentiment* – Polarity or valence involves positive or negative nature of a statement in a message (Buttle, 1998). Online reviews valence is related to their evaluative orientation and can be positive, negative or neutral (Lee et al., 2009). While negative WOM is viewed as a form of customer dissatisfaction, positive WOM has been linked to pleasant customer experiences (Singh & Pandya, 1991). A neutral review provides the reader with descriptive information about the target product or service without any evaluative direction. A positive review offers information that positively evaluates a product or service, and vice versa for a negative review. Most previous information generally has a stronger impact than neutral or positive information (Herr, Kardes & Kim, 1991; Lee et al., 2009; Xue & Zhou, 2010; Yang & Mai, 2010). Sentiment represents the customer's emotions, which include both extreme negative emotions such as anger and frustration, as well as extreme positive ones such as excitement or delight (Geetha et al., 2017). Negative emotions such as disappointment and regret affect customer dissatisfaction, the spread of negative e-WOM as well as complaints (DeWitt & Brady, 2003; Jeong & Jun, 2010). Positive emotions can improve the perceived quality of products or services, which indicates satisfaction, while negative emotions are an antecedent of dissatisfaction (Dai et al., 2015).

*Helpfulness* – With the rise in popularity of online reviews, it becomes more challenging for customers to navigate through the multitude of reviews and evaluate the usefulness of the information provided (Park & Lee, 2008). To reduce the necessary time needed to evaluate reviews and avoid the problem of information overload, travel websites have introduced the option of "review helpfulness" which is a key indicator to help customers to evaluate the quality of reviews (Cao et al., 2011; Ghose & Ipeiritos, 2007; Mudambi & Schuff, 2010) and which is used as a cue for more efficient filtering of relevant opinions (Ghose & Ipeiritos, 2007; Mudambi & Schuff, 2010). Helpfulness can be defined as "a measure of perceived value in the purchase decision-making process" (Mudambi & Schuff, 2010, p.186). A review that has received a helpful vote implies that it has: a) been read; b) has some value to the voter that may influence purchase decisions and c) is more informative compared to a review that has not received any helpful votes (Weiss, Lurie & MacInnis, 2008). Deviation in the proportion of "helpful votes" indicate that not all reviews are created equal (Godes & Mayzlin, 2004), and therefore not rated equally. The reason for this is reflected in the fact that customers do not use an exact format when putting their product ratings on the Internet (Park & Kim, 2008). As a result, reviews appear to vary from simple recommendations followed by overwhelmingly positive or negative statements, to distinctive ratings backed by extensive reasoning, affecting the review's helpfulness.

### 3. Methodology

This research focused on examining textual online reviews of spa hotels in Serbia. TripAdvisor was chosen because it is the world's largest platform for travel guidance, which makes the travel process easier for a large number of people, from planning to booking and staying. The TripAdvisor website and app are used by tourists from all over the world to find lodging, attractions, and dining options based on reviews from other travelers. As a travel guidance company, it is present in 43 markets and 22 different languages (TripAdvisor, 2021).

Since analyzing feedback from customers is still a challenge, textual reviews were investigated in this research. In addition to those two variables, another variable that is considered is the helpfulness of the reviews. The helpfulness of reviews is the number of votes that marked the review as „helpful“. The helpfulness has been the subject of research by numerous authors (e.g. Korfiatis et al., 2012; Kwok & Xie, 2016; Qazi et al., 2016).

*Word frequency analysis* - Spa hotels are intended for a longer stay, and motives of the visit are primarily determined by spa-rehabilitation treatments. Mozdeh Text Analysis was used for extracting the most frequent words from reviews.

*Sentiment analysis* - Sentiment analysis was applied with the aim of identifying positive, neutral or negative sentiments in online reviews. For this analysis, the Python programming language was used. It was necessary to install libraries that are provided for sentiment calculation (Pandas, NumPy and NLTK). The first step was cleaning the documents, that is, removing punctuation marks, stop words, and Unicode characters. After that, the text was lemmatized, that is, words were reduced to their root form.

### 4. Results

This research focused on examining textual online reviews of spa hotels in Serbia. Five destination of spa tourism were selected: Vrnjačka Banja, Sokobanja, Koviljača, Vrdnik and Kanjiža. Only hotels that are officially categorized and visible on TripAdvisor are considered. A total of 20 hotels were included in the research, with 319 online reviews to be processed.

### Word frequency analysis

Generic English nouns such as “effort”, “people”, “city” were excluded from the analysis due to lack of specificity. Generic verbs, such as “need”, “stay”, “want” were also excluded from the analysis because it is assumed that the meanings of these words are related to the objects to which the verbs refer. Also, words associated with hotel brand names and hotel names such as “Marriott”, “Hilton”, “Izvor” were excluded from the corpus because the identity of the hotel is certainly contained in the original data set. Conjunctions “and”, “but”, prepositions “on”, “of”, “in” and articles “a”, “an”, “the” were also excluded from the analysis. The word “hotel” was not included in the analysis because the reviews referred to the hotel experience and was considered redundant.

Figure 1 represents the visually the most frequent words extracted from online reviews. The most frequent words are represented by larger words. The word size in the visual representation decreases with decreasing frequency. Words that stand out in reviews of spa hotels are *spa*, *water*, *thermal*, *pool*, *wellness*, and *massage*. These words determined the integral part of the range of services in this type of hotel.

**Figure 1.** The most frequent words in reviews of spa hotels

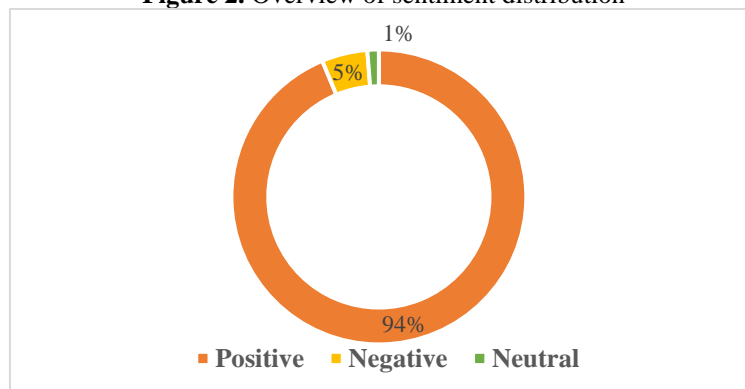


Source: Work of authors

### Sentiment analysis

Figure 2 shows an overview of sentiment distribution. From Figure 2, it can be seen that the majority of reviews (94%) have positive sentiments. Negative sentiments are identified in only 5% of reviews, while only 1% of reviews have neutral sentiments. Considering that the majority of reviews are positive, the dominance of positive sentiment is not surprising.

**Figure 2.** Overview of sentiment distribution



Source: results of research

Polarity shows the sentiment of a piece of text and is subtracted based on negative and positive words that define it. Values range from -1 to 1, where -1 represents extremely negative sentiment, 0 is neutral, and 1 is extremely positive sentiment. By looking at Table 1, it can be noticed that there are no extremely negative sentiment values, which indicates a lower presence of negative feelings, and the highest sentiment value does not indicate the presence of extremely positive feelings either. Based on the values presented in Table 1, it can be concluded that the average polarity of reviews of spa hotels is moderately positive. This is not surprising, given the much higher proportion of positive reviews compared to negative ones.

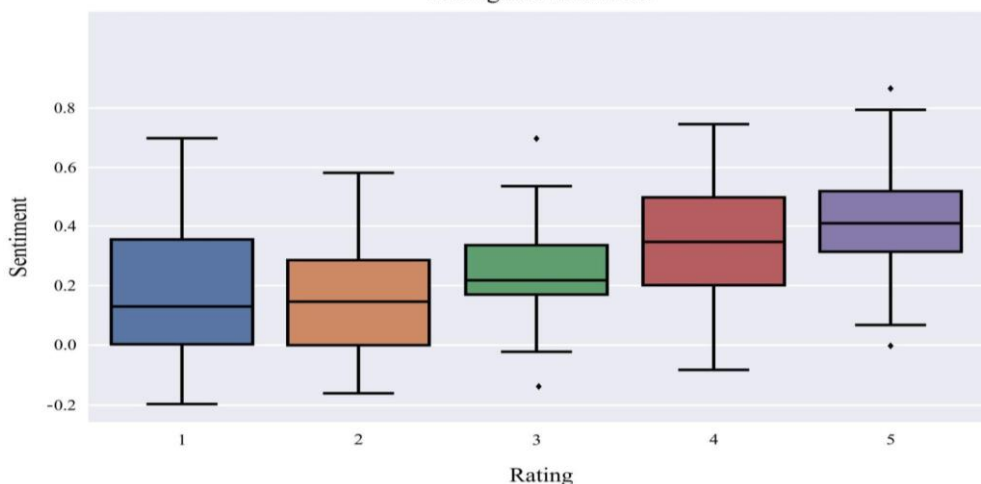
**Table 1.** The scores of sentiments of reviews

Type of hotel	The lowest sentiment score	The highest sentiment score	Average sentiment score
Spa hotels	-0.2	0.867	0.338

Source: results of research

Figure 3 represents the distribution of sentiment depending on the review score. Rectangles in various colors indicate the ranges of sentiment values within which there are the largest number of reviews, while dots indicate more extreme values that have a significantly lower number of reviews. It can be observed that with the increase in rating, the value of the sentiment also increases (review polarity). What is unusual is the range of sentiment values for reviews rated 1. Looking at Figure 3. it can be seen that the range of sentiment values is slightly larger, thus forming a square shape instead of a rectangle. It can also be seen that the blue square has a much larger range of values than the green and purple squares, indicating a greater deviation of the sentiment value at a score of 1 compared to scores of 3 and 5. This distribution of values indicates more neutral sentiments expressed in highly negative reviews.

**Figure 3.** The distribution of sentiments depending on the review score  
Rating and sentiment



Source: Work of authors

Review helpfulness is quantifying the number of votes that review gained from readers who found it helpful. Understanding helpful votes can be very helpful to online retailers and review platforms because reviews with maximum helpful votes are considered more essential when it comes to purchasing decisions (Cheung et al., 2008).

Table 1. Represents the distribution of helpful votes per review. The majority of reviews (266; 82.6%) are rated as “unhelpful”, that is, received 0 helpful votes.

**Table 1.** The distribution of helpful votes in sample

Number of helpful votes	Number of reviews	Percentage
0	266	82.6%
1	36	11.3%
2	15	4.8%
3	3	1.0%
4	0	0.0%
5	1	0.3%

Source: result of the research

## 5. Conclusion

Big data and online reviews have a significant part in hospitality and hospitality research (Bortoluzzi et al., 2020; Stylos et al., 2021), and therefore sentiment and content research are of particular importance. Hospitality and tourism are ideal fields for the application of semantic analysis (Ma, Cheng & Hsiao, 2018), as such studies can be helpful for researching various topics such as service compensation (Xu et al., 2019; Gour et al., 2021), user characteristics (Liu et al., 2019), hotel occupancy (Ampountolas & Legg, 2021) and similar.

This research aimed to extract sentiments from online reviews. Due to fact that dissatisfaction is usually associated with negative feelings, it is important to identify customers emotions towards products and services provided. The nature of hotel product is intangible, and that makes it harder to identify the sources of dissatisfaction and negative emotions among customers. Dissatisfaction with tourism services can be under the influence of emotions of anger and regret (Sánchez-García & Currás-Pérez, 2011), and this can lead to a series of negative outcomes, such as complaints or negative eWOM

(Cheng, Lam & Hsu, 2005). Not only that, dissatisfied customers have a tendency to leave the current hotel (Jana & Chandra, 2016) and go to another one, as well as a tendency to express their dissatisfaction in order to relieve tension, get sympathy from others and restitution (Szymanski & Henard, 2001).

This research shows that sentiment in most reviews is positive. Although some of customers were dissatisfied and rated hotel services low (rating 1 and 2), the sentiment analysis showed that there were no negative feelings in their reviews. This can be good for hoteliers, because it is much easier to compensate for bad service when customers are not under the influence of negative emotions, such as anger and frustration. In research conducted by Fang et al. 2016, it was found that a more extreme sentiment has a greater likelihood to be labeled as more useful. Filieri et al. (2018) are considered diagnostic because from them customers can learn what aspects of the product or service was unsatisfactory for the customer, which can further influence the decision-making process. Building on the results of the previously mentioned study, it is not surprising that the largest number of reviews in this study was marked as "useless".

In this research, reviews of spa hotels in Serbia were examined. The research included hotels that are officially categorized, but a certain number of hotels are not available on the TripAdvisor portal, which affected the size of the sample, that is, the number of hotel facilities included in the research. In addition to the sample size, one of the major limitations of this study is that only reviews in English were included due to ease of analysis. Most of the research in this area dealt with the analysis of reviews exclusively in English, because the main problem with multilingual sentiment analysis is the lack of lexical resources (Denecke, 2008).

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