

Extracting Insights From Competitor's Mistakes: A Sentiment Analysis Approach Using Competitive set Online Reviews

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Abstract – Sentiment analysis was used to understand the key aspects of the hotel quest stay with emphasis on the drivers of positive/negative experience. Other studies evaluated the impact of the online reputation on the business performance but the minority of the studies focused on the use of online reputation analysis within the competitive strategy creation. This study uses an open-source tool to crawl and analyze 15 907 online reviews from Booking.com, TripAdvisor.com, and Google.com for selected company and its competitors. The results show strength and weaknesses of individual companies that might be used to strengthen the company's position of the market.

Keywords – Sentiment analysis, online reputation, user-generated content analysis, competitiveness, market competition.

1. Introduction

The company's position in the highly competitive market is induced from many variables and their combination, while the product characteristics and product valuation (commonly described as product competitiveness) might be considered the crucial ones [1].

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By understanding the deficiencies and conveniences of the company products and their benchmarking towards the competition, the managers can set the right strategies to gain or maintain the competitive advantage [2].

From this perspective, it is crucial to address the question of competitive data collection and validity. Kumar et al. [3] propose the use of multisource data where the valuation of the product might be done through the questioning or interviews, which, in most cases when the proper sampling is not conducted, might not reflect the general opinion on the products and might not be used to benchmark the product towards competition as it is complicated to get this detailed data on the competitive products. On the other hand, the opinions of customers and their evaluation of the products and the other aspects of the company are considered vital for competitiveness. [4]

The advancement of the Internet has led to significant progress mainly user-generated content (UGC), the entrepreneur might collect the competitive intelligence data from the freely available sources like search engines, review websites, distribution channels or social media [1], [5]. Above mentioned data sources play a crucial role in enterprise marketing communication and customer decision-making process [6], which is mainly visible in the services-providing industries.

Electronic word-of-mouth (eWOM) can significantly affect the purchasing decisions of business customers [7] in many forms, where online reviews represent the most trusted ones. When focusing on the eWOM, it is crucial to distinguish between paid and unpaid content, where the unpaid eWOM (mainly the organic online reviews) is considered more trustworthy and the paid eWOM created mainly by the social media influencers more emotionally linked to the target audience [8]. In both cases, the positive effect can be identified.

This study aims to apply text mining and sentiment analysis in evaluating the selected aspects of the products on the market and their benchmarking.

This study uses open-source tools for both activities, text mining and advanced sentiment analysis. The results of this study might be used to create the competitive strategies in the context of the real identification of the strength and weaknesses of the business and its competitors.

2. Literature Review

While the concept of competitiveness might be accessed on various levels, entrepreneurs and business owners must identify their position on the market and build their strategies using competitive intelligence [3].

In many industries, the competitors are entering the market with homogenous product and need to position themselves on the market by stating the uniqueness of their product to attract the customers.

Identifying the unique selling propositions can be done using the predefined characteristics of the product or by the customers who share their experience with the product online [9]. Konstantopoulou et al. [10] used in-depth interviews to understand the connection of the eWOM with the customer's SME choice finding that the customers tend to reflect their previous experience when choosing the product and prefer the well-evaluated products (mainly on the online platforms or by the influencer) [10].

The effect of the online reputation and online reviews on business performance and competitiveness was evaluated by researchers in hospitality industry [12], [13], [14], gastronomy [15], retail [10], destination management [16], [17], multimedia industry [3], gaming industry [18] or manufacturing [2]. As an example, Anderson [12] showcases the direct impact of the UGC on the key performance indicators of the accommodation facilities, where the increase in the online reputation measure on the 100-point scale leads to improvements in the occupancy of the business and the average selling rate. Sangkaer and Zhu [19] used the online reviews from Tripadvisor.com to understand the experience of the visitors of local markets.

For example, Mariani and Visani [20] used the Data Envelopment Analysis to measure the performance of the companies on the market, extending this approach by eWOM. Their extension improved the output and usability of this method, mainly for low-tiered businesses. The impact for high-tiered companies was lower but still acknowledgeable. While focusing on low-tiered and low-cost oriented businesses, online reviews play a crucial role in dynamic capabilities that might lead to significant competitive advantage [21].

Cho et al. [9] showcase the position of the online reputation within business management where the positive online reputation can attract highly qualified and enthusiastic employees, the pivotal element in services and their delivery. These are identified as critical drivers for positive eWOM [22]. In this scope, it is crucial to mention that customers tend to be more positive while stating their experience online and the majority of reviews are positive [23].

When focusing on the services and mainly the hospitality industry, many studies are focusing on the valuation of online reviews and their effect on business effectiveness [12], but lack the studies that would apply these results in the competitive strategies and would evaluate the product characteristic in the context of the market position. Gao et al. [15] propose using online reviews within the market structure analysis, competition identification and evaluation using the competitive index and dissimilarity index and identification of the product strength and weaknesses. The study uses Python to scrape the data from Dianping.com while using the subsections and critical concepts created by Wang et al. [24]. The application of this approach might be valuable not only for competitiveness assessment but also for identifying the customer trends [24].

The usage of online reviews of the businesses can be found as well in the evaluation of the destinations and their competitiveness on the micro-destination level [17], while the whole concept of destination competitiveness is more complex as there are many other more influential factors like: distance, the masculinity of the population, and economic factors [25].

Xia et al. [13] use the automatically crawled data from Booking.com and the data mining techniques based on kernel density estimation proposed by Vinh et al. [26]. This study shows the need for managerial intervention while identifying the competition set and its features. The results are based on the numerical evaluations extracted from the reviews, while the textual part of the reviews is omitted. The comparison with the competition set is only based on the cleanliness, comfort, location, staff, value (Value for Money evaluation), Wi-Fi, service, and facilities rating. However, it provides reliable results that can be implemented by the managers while setting their competitive strategy. The upcoming study of the authors [14] extended the scope to hotel groups, where the evaluation for the business under a similar brand was aggregated and led to the development of the competitive strategy based on the brand-specific characteristic. Combining the brand and online reviews can highly affect the customers' booking intentions and create a comprehensive image of the accommodation facility [27].

The practical implication of these studies is in adopting these competitive advantages in marketing communication and the underperformance in the improvement and optimization of the operation [28]. Xia et al. [13] also state that the online reviews can be used only to distinguish between low-tier and high-tier companies, while the high-tier companies that share the high level of customer satisfaction might not be distinguished as the numerical rating does not reflect individual aspects of the customer experience.

Similarly to these studies, Hargreaves [29] used the TripAdvisor.com data to evaluate the performance of the selected hotels using the online reviews and the principal component analysis to propose the managerial implications mainly in quest satisfaction and marketing communication. The same data source and conjoint analysis were applied by Rhee and Yang [30] to distinguish between the customer market segment and the difference in the needs and wants of the market segments. Similarly to Rhee and Yang [30], Ahn et al. [31] used the self-identification of the customers while describing different needs, wants, and level of satisfaction within the online reviews. These results should be transferred to competitive strategy building in identifying competitors based on the target market group instead of hedonic characteristics like location or business classification. The proper understanding of customers, their behaviour, and their profiles can also match the product with the customers on a highly personalized level [32].

Previously mentioned studies used mainly single sourced data. Liu et al. [1] uses the data from the online product reviews for mining the product competitiveness and proposes a multisource framework to eliminate the effect of fake or biased reviews. The proposed framework based on the quantile regression model leads to strengthening the decision-making process based on the product characteristic of the competitive market with specific competitive levels.

The importance of the online reviews and their direct connection to the building and maintaining the competitive advantage is as well declared by others stating the high rated and reviewed business that are more likely to be recommended by the customers to their relatives and friends in real life [20] or placed on the top positions within the business listings and distribution channels [33]. These can also be used to identify the unique selling proposition and use them in marketing strategies [34]. These findings might be accompanied by the fact that a low level of online reputation can affect the business's overall performance and decrease the product-purchasing rate of the specific company [35].

To extend the scope of online review analysis where most of the previously mentioned studies are focusing on the volume and valence of the online reviews, Jang et al. [18] propose the use of textual content of the reviews and their sentiment analysis. As the authors identified, product sales drivers are the quantity and overall rating within the reviews and the complex emotional context of these reviews, where the same rating with high positive emotional evaluation can drive more sales. The textual part of the online reviews brings a more detailed view into the customers' experience and can directly influence the marketing strategies of the companies on the market. It is crucial to understand the importance of certain concepts like the cleanliness of the facility, level of services and, for example, perceived value of the product within the customer experience [36]. Simple identification of these concepts might not be valuable and might lead to misunderstanding or misinterpretation of these results. That is why it is essential to base the text mining on lemmatization instead of stemming, which might lead to grouping the concepts by their context and improve the quality of analysis output. [37]

The content of the reviews can be as well used to forecast the revisits or repurchases of the products by the customers, where the loyal customers tend to share more comprehensive, more product-oriented and positively biased reviews [38]. To improve the quality of the reviews, many websites implemented endorsement systems that gave the users the power to rate the utility of the single reviews and their perceived value [39].

Fan et al. [40] created a complex review of research using the text mining and sentiment analysis of online reviews. They highlighted the need for combining several data sources and several types of data (for example, the combination of numeric ratings, text, and sentiment analysis) to deliver unbiased information and accurate analysis results. There are many different text and sentiment analyses [41], while the researchers use different tools. On the other hand, any application of text mining of online reviews would increase the possibility of shifting to big data understanding, analysis, and implementation in business operations.

3. Methods and Data

This article aims to provide the framework for benchmarking and competitive analysis in the service industry based on mixed-sourced data using text mining and sentiment analysis of the textual part of the online reviews. The selected method is derived from the previously mentioned studies [13], [14] using the available tools and applications.

The whole approach can be described in the following steps, (1) business and competition set identification, (2) data source selection, (3) review crawling and concept mapping, and (4) sentiment analysis of the reviews.

For the analysis, open-source tool R was selected with extensions rvest (for web crawling and data extraction) and tidytext (for sentiment analysis) using AFINN lexicon.

3.1. Business and Competition Set Selection

The hotel selection uses the managerial intervention proposed by Xia et al. [13], where the case hotelier picked the competitors from the existing competition set. Alternatively, the sentiment analysis might be used as well in this stage as proposed by Ye et al. [42]. This adoption might not consider hedonic characteristics of the selected accommodation facility as not all the market segments are shopping online. The naive selection was preferred to eliminate the possible misunderstanding of the overall business product portfolio.

The competition set is not directly linked to the location and the business category but reflects the market orientation and product portfolio structure. Six main competitors were identified for the analysis and benchmarking. The selection can improve the quality of practical implications and evaluate the competitor's performance impact on the selected business.

3.2. Data Source Selection

As proposed by Liu et al. [1], multisource online information is used to reduce the effect of biased information that might be connected to the use of single-sourced data. The primary sources of the customer opinions and online reviews were Booking.com [13], [31], [33], TripAdvisor.com [29], [30], and Google. The use of multisource information is commonly connected to the use of various scoring systems or scales [43]. On the other hand, we can see the shift in the standardization of these scales to fit better the needs of the customers and the entrepreneurs [44]. Reflecting the various scales on the different sources, this study uses their rescaling and focuses mainly on the textual part of the online reviews, which is not directly affected by the scaling systems. The rescaling leads to the creation of the new 100-point scale from 0 to 100.

3.3. Review Crawling and Concept Mapping

Using the rvest extension of R, the reviews were crawled, and the text analysis was conducted. In total, 15 907 reviews were obtained and used for further processing.

From these reviews, the main concepts were extracted using the lemmatization approach to capture the word count and their context and proper meaning. Following context, groups were created and extended by several subgroups, as Ray et al. [37] proposed. For these groups, several subgroups are mentioned below.

- Amenities (the architecture, business facilities, elevator, building, and its maintenance)
- Bar (the service, prices, wines, alcoholic and non-alcoholic drinks, other beverages)
- Cleanliness (cleanliness of the rooms, beds, bathrooms, hotel, furniture, bedroom)
- Comfort (air conditioning and its maintenance, beds, bathroom size, noise level)
- Food (breakfast, breakfast prices, breakfast variety, menu, food prices)
- Hotel (type of the hotel, hotel maintenance, cleanliness)
- Location (accessibility and distance to city centre, airport, parking, and parking rates)
- Price (price of the food, breakfast, parking, Wi-Fi and overall value evaluation)
- Room (furniture, cleanliness, minibar, and other amenities)
- Service (booking process, room service, service friendliness, and professionalism)
- Vibe (designer vibe, friendly atmosphere, luxurious vibe, modern vibe)
- Wi-Fi (costs and maintenance)

For these groups and subgroups, the number and the structure of the mentions were calculated based on the sentiment analysis mentioned below.

3.4. Sentiment Analysis

This study uses sentiment analysis as well to evaluate not only the overall performance of the businesses based on their aggregate rating but as well individual aspects of the customer experience [45]. Figure 1 showcase the representation of identification of positive and negative sentiment within the online review.

Room: very nice design , comfortable and clean but unfortunately no view Staff: super friendly and helpful Location: good Spa: perfect! Breakfast: miserable Cleaning -staff: on the first day they wanted to clean the room in the afternoon, while we were there.. on the check out day they woke us up 2x by knocking on the door to clean the room, even check out was at 12..

Figure 1. Sentiment identification within the online review.

Source: own research

Based on the number of mentions and their sentiment, rating the categories and subcategories presented in the previous section of this paper is created. The overall rating represents the relative number of positive mentions on the scale from 0 to 100. The results of this data processing are presented in the section below.

4. Results

Using the numeric rating from the reviews was previously mentioned by the studies of Ahn et al. [31], Hargreaves [29], Xia et al. [13], [14], where the authors state that these ratings might be used for benchmarking only in the situation when there are expected significant differences between the businesses. Figure 1 described the development of the overall rating on the updated scale for the selected company and its competitors. It can be seen that even though there are minor differences between the companies, they all maintain a homogeneous level of their rating, and no significant changes can be identified. The dashed line shows the competition set average. We can state that the selected company continuously over-perform its competition.

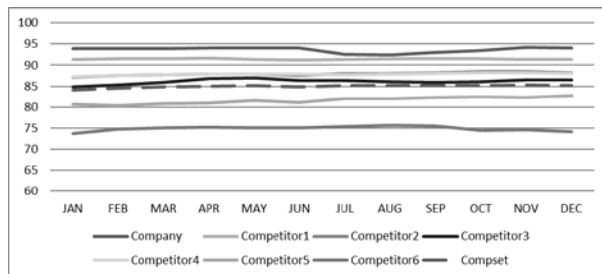


Figure 2. Development of average rating of selected companies.

Source: own research

Similarly to Xia et al. [13], this study results show the need for a more detailed evaluation of the company's performance by implementing the results of the sentiment analysis instead of simply using numeric evaluation [18], [36], [46]. The combination of the numeric data and the content of the reviews, positive, negative, and neutral mentions, were used to set the level of customers satisfaction within partial categories mentioned in the previous section of this paper.

Aggregate evaluation of the individual companies is showcased in Figure 3, which reflects mainly the content of the reviews, extracting from their numeric ratings. As shown in Figure 3, there was a decrease in the overall evaluation of the company in June and July. From this perspective, we assume that the number of negative mentions increased and was not directly reflected in the overall numeric rating but might decrease the company's perception within the customer decision-making stage [27]. These results are in contrast with the results of numeric benchmarking presented in Figure 2. Considering previously mentioned studies, these results show the need for a more detailed evaluation of the reviews that better understand customer satisfaction.

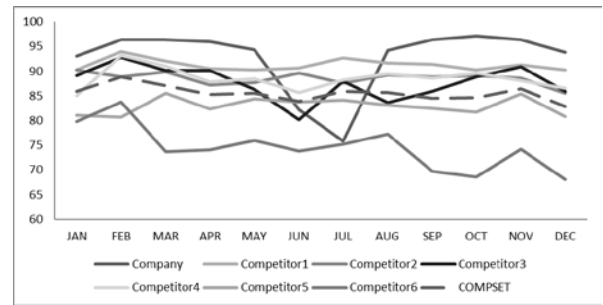


Figure 3. Development of overall performance of selected companies.

Source: own research

Digging deeper into the causes of the decrease in the overall rating within this specific period, the word map of the negative mentions for the selected company was created and is shown in Figure 4. The advanced understanding of faults and weakness was proposed by Chang et al. [47], who highlighted the need for proper staff training and improved room cleanliness. They as well mentioned that the hoteliers should better communicate their location and destination information. In our case, there is an immediate need for better communication with the segment of group leisure tourists in the mean of the hotel presentation by the tour operators and improved hotel amenities' cleanliness.



Figure 4. Word map of negative mentions for June and July.

Source: own research

The same approach on negative and positive mentions identification was used to evaluate the company's performance and competitors' performance using various categories and subcategories. This approach was proposed by Ray et al. [37] and brought the context into the text analysis, which improved the quality of the results and decreased the possibility of their misinterpretation.

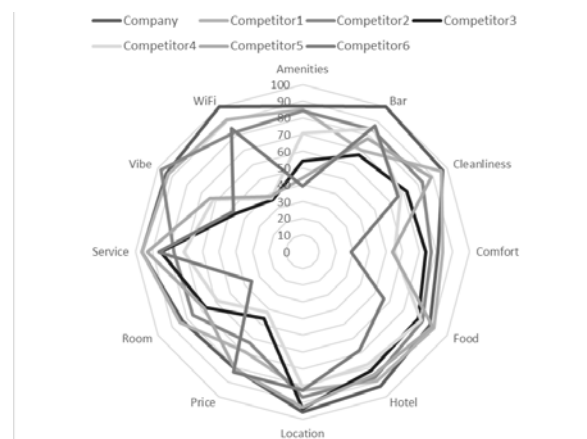


Figure 5. Evaluation of the companies mined from online reviews using the defined context categories.

Source: own research

Figure 5 describes the performance of the companies in predefined categories. When focusing on a simple comparison of the company with its compset (average evaluation for the competitors), the selected company over-performs the competition in all the categories. However, it is mainly caused by the lower rating of the competitors five and six, who gained a higher number of negative reviews with negative mentions. To decrease the relative number of negative reviews, entrepreneurs might benefit from managerial responses [48], [49] and use them to improve their online image.

When focusing on the partial performance, the selected company maintain an excellent evaluation of food and bar, which might be used to highlight the level of gastronomy and increase the visibility of these services. Signification variability of evaluation of price, room, comfort, and vibe within the compset (Competitive Set) and high evaluation of the groups for the company create significant opportunity to promote the product with excellent value for money characteristics and suitable atmosphere for the stays. Considering the consistency of the service, minor fluctuation can be identified for the company during the year, which might be mainly reduced by the proper staff training and proper meeting of predefined standards.

These results show that the output of the presented methodology might be used to improve the quality of provided products and service and improve their communication, mainly in areas where the competitors cannot meet customers' expectations. These results create unique selling propositions that must be the core of competitive marketing strategies.

5. Conclusions

The application of text mining and sentiment analysis on online reviews is crucial to understanding products' perception, structure, and quality. This study focused mainly on benchmarking the performance of selected companies and brought valuable insight that might be beneficial for business operations and building competitive strategies. There is a strong link between text mining and sentiment analysis the business operations [50]. The online reviews provide a deeper understanding of the marketing strategies' results, understanding of the customer's intentions and behavior, and product quality evaluation. On the other hand, the text analysis application needs more than a simple application of the modern methods and tools on existing big data [41].

The proposed approach and the results of this study eliminate the typical limitations of the application of text mining and sentiment analysis on the online review – the application costs of these solutions and the used data combination.

This study combined the numeric rating and the content of the reviews from various data sources while creating a unique rating based on the positive, negative, and neutral mentions. The application costs are eliminated by using open-source tools and application applied in business operations. On the other hand, similarly to other researchers [11], there is an significant and still growing niche between the researchers and practitioners, which leads to the need for improvement of the university curriculums to decrease future training costs and the speed of implementation of the new technologies.

The uniqueness of this study is in dealing with the limitations of previously mentioned studies, mainly in the way the data are collected from several sources and combination of the numeric and textual evaluation of the delivered product. Han [46] proposed that there is still room for improvement in the review's valuation, where the reviews and reviewers' helpfulness might extend the overall review perception. On the other hand, there are still limits that need to be considered for further application and research. One of the limits of this study is within the use of industry un-specific dictionary, which might not reflect the specifics of the industry by not implementing the industry-specific terms. Some terms might be misunderstood by the tools as well as the other literary techniques like irony. Another limit of the study focuses on specific company and their competitors that are showcasing the application with its specific connection to the evaluation of this selected business but does not secure the same results in further applications.

When focusing on the limitation of the text mining and sentiment analysis application in business operations in general, the previous studies and this application call for a better understanding of the concepts, their functionality and applications in business operations by the practitioners. The lack of big data analysis understanding leads to the situation where the practitioners cannot benefit from precise business data.

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