

Analyzing TripAdvisor reviews of wine tours: an approach based on text mining and sentiment analysis

Elena Barbierato, Iacopo Bernetti and Irene Capecchi
DAGRI, University of Florence, Florence, Italy

Received 15 April 2021
Revised 21 July 2021
17 August 2021
Accepted 22 August 2021

Abstract

Purpose – Wine packaged tours as a specific aspect of wine tourism have so far been neglected in research, for this reason, the purpose of this study is to study the key elements for the success of the wine tour in Tuscany (Italy), evaluating the points of strength and weakness.

Design/methodology/approach – The study combines approaches of text mining, sentiment analysis and natural language processing, drawing on data from the TripAdvisor platform, obtaining through an automatic procedure 9,616 reviews from 600 tours in the years 2010–2020.

Findings – The authors identified six elements of successful wine tours expressed by research subjects: tour guide; logistical aspects; the quality of the wine; the quality of the food; complementary tourist and recreational activities; the landscape and historic villages. The key strength associated with success was the integration of the leading wine product with food, landscape and historic villages, while the main criticisms were concerned with the organization and planning of the tour. Furthermore, the tour guide also plays a fundamental role in consumer satisfaction.

Research limitations/implications – The limitations of the method were linked to the origin of the data used. The main one is that TripAdvisor does not allow you to have social and personal information about the tourist who wrote the review; therefore, the methods are substantially complementary to the traditional survey through questionnaires.

Practical implications – The proposed model can be used both by professionals to improve the quality of their products and by policymakers to promote the territorial development of quality wine-growing areas.

Social implications – The proposed model can be useful for policymakers to promote the territorial development of quality wine-growing areas.

Originality/value – The methodology we tested is easily transferable to many countries and to the authors' knowledge, for the first time attempts to combine multidimensional scaling, sentiment analysis and natural language processing approaches.

Keywords Text mining, Natural language processing, Sentiment analysis, TripAdvisor, Wine tours, Multidimensional scaling

Paper type Research paper

1. Introduction

There is now shared evidence that wine tourism is among the most dynamic in tourism ([World Tourism Organization, 2012](#)) and numerous studies highlight the increased importance. Worldwide, an estimated 93% of travelers have engaged in experiential



tourism during their recent vacations and 49% indicated that food and wine were the main reasons for at least one journey in the past two years (World Food Travel Association, 2016).

One of the forms in which wine tourism is practiced is through organized group wine tours. Even though this form of tourism is becoming increasingly more important, the characteristics of the winescape of organized tours at the macro and micro levels have not yet been sufficiently studied. On a macro level, organized tours can combine all elements of the winescape in one package: wine, food, landscape historic villages and winery visits. In contrast, the expectations of wine tourists are high (Garibaldi *et al.*, 2017) and the packages are complex; therefore, it is necessary to objectively understand how these elements are valued in a specific wine region. At the micro-level, moreover, studies have focused almost exclusively on the quality of winescapes without considering the problems of service failure. An important factor influencing a client's perception of the quality of a service is the number and extent of problems they encounter and how these problems are handled by the provider. Organized wine trips can be particularly susceptible to the problem of service failure because of the complexity of the service offered and the fact that it is a strongly people-based service.

The broad topic of our work is to study the elements of the quality and failure of wine tours by applying an innovative method based on the combination of text mining and sentiment analysis of social media data. This study aims to increase the limited knowledge about organized wine tours by analyzing the specific characteristics of wine tours in Tuscany. Specifically, this research aims to answer the following research questions.

RQ1: What are the dimensions of packaged wine tour experiences that emerge from reviews left by users on travel sites? We applied a multidimensional scaling method and cluster analysis to TripAdvisor reviews to identify the emerging themes in tourists' experiences. We believe that the results of the research can provide useful information for operators to improve the quality of wine tourism products and for policymakers to promote tourism development in quality wine regions. *RQ2:* What are the elements of perceived quality? Understanding the value that wine tourists place on the characteristics of the winescape is important to the design of new tours. *RQ3:* What are the determinants of service failure? We used sentiment analysis to separate perceived positive and negative themes. By better understanding, the causes of customer complaints, the number of problematic events can potentially be reduced and better remedies can be provided.

2. Literature review

Wine tourism through organized tours is a complex product that is made up of tangible assets such as the wineries visited, the wine tasting and the eventual purchase and intangible assets such as the landscape perceived during the trip, the visits to historical villages and the information given by the guide and the winemakers. The study of wine tours by means of social media data analysis, therefore, includes three theoretical fields of research: winescapes, package tours and the theory of content analysis/lexical analysis applied to social media. In this literature review, we will first give brief references to these three fields of research and then examine the most recent methodological developments in the wine tour-specific literature.

2.1 Winescape literature

Our work adopts the theoretical definition proposed by [Johnson and Bruwer \(2007\)](#), which defines the winescape as the interaction of the natural landscape and environment, heritage, architecture and interior of a winery, vineyard, wines and the complementary services of tourist information and organization. This definition has been applied by the literature on two spatial scales. Some studies take a micro approach that is specific to the individual winery visited and apply service quality methodologies ([Griffin and Loersch, 2006](#); [Petrick, 2002](#)) to this definition. Other studies take the macro approach in which the winescape is conceptualized by the context of a wine landscape or wine route ([Bruwer and Lesschaeve, 2012](#); [Getz and Brown, 2006](#); [Bruwer and Gross, 2017](#)). Both approaches have advantages and limitations ([Quintal et al., 2015](#)). The macro approach is certainly holistic in that it more easily captures the relationship that exists between the tangible and intangible dimensions of the winescape. However, it is difficult for the macro approach to generalize and measure specific attributes of the winescape, in part because of the great variability these characters have around the world, resulting in few empirical studies of the winescape. The micro approach has complementary merits and limitations: it is easy to define the characteristics of winescapes at the level of a single winery, as the winery visit process is similar in all wine regions of the world. However, the complementarity between wine production and rural territory is lost and it is not possible to evaluate the effect of the externalities of the landscape on the quality of the wine tourism experience.

2.2 Packaged tours

The literature on packaged trip management is vast. Focusing the literature review on topics complementary to winescapes, studies that apply theories of group dynamics are of interest. [Quiroga \(1990\)](#) analyzed the characteristics of package tours and found that the variables that influence the degree of final satisfaction depend on group dynamics such as the interaction, setting, group size and group cohesion.

Other studies have focused on the relationship between tour leader likability and knowledgeability and tourism value cocreation behaviors and have examined the mediating effect of tour leader attachment on this relationship ([Huang et al., 2010](#); [Zhu and Xu, 2021](#)).

The importance of communication skills and guiding knowledge also emerges from the studies that applied the member-leader fit theory to tour guides ([Chang et al., 2020](#)). The tour member-leader fit refers to the compatibility between tourists and their guide: tour leaders are usually mentors to their tour members, monitors of the itinerary and managers of the entire tour. The results indicated that travel agencies should consider the concept of fit when organizing tour guides for various types of groups to maximize the additional and complementary fit between the tour leader and members.

2.3 Content analysis

Content analysis is a research tool used to determine the presence of certain words, themes or concepts in some qualitative textual data. Using content analysis, researchers can quantify and analyze the presence, meanings and relationships related to words, themes or concepts ([Neuendorf, 2002](#)). Traditional content analysis involves subjective human interpretation, as a research team must either formulate a classification scheme and apply it manually or train coders generally based on deep learning.

To overcome this limitation, linguistics researchers developed lexical analysis ([Lai and To, 2015](#)), which helped reduce subjective interpretation due to the subjective definitions of categories. The simplest methodologies rely on indices derived from co-occurrences between

terms and document-term frequency matrices. More complex methods group keywords based on themes and present graphically identified themes or clusters.

A particular form of content analysis is sentiment analysis. In sentiment analysis, texts are classified into only three categories referring to their emotional polarity based on a scaled score: positive, neutral or negative.

Content, lexical and sentiment analyzes have been applied to social media data from the tourism industry in general. TripAdvisor is the most widely used review platform for marketing. TripAdvisor has many advantages: it is the platform with the highest number of reviews (more than 884 million reviews and an average of 460 million visitors each month). Additionally, TripAdvisor checks the system to avoid false reviews (Fileri *et al.*, 2015; Schuckert *et al.*, 2015; O'connor, 2010). Sentiment analysis has been applied to the analysis of service quality and service failure through TripAdvisor reviews mainly of restaurants (Bhardwaj *et al.*, 2018; Agüero-Torales *et al.*, 2019; Wang *et al.*, 2019; Zuheros *et al.*, 2021) but also heritage sites and natural parks (Lee *et al.*, 2020).

2.4 Wine packaged tours

There is limited statistical data on packaged wine tours. In a study entitled “Wine Road of Northern Greece,” Alebaki and Iakovidou (2010) found that 28.8% of the wine tourists who were surveyed came by tour bus. According to a study on wine tourism by Tourism Research Australia (2014), the wine tour segment represents 11.9% of all tourism. These data seem to align with what was found by Charters and Ali-Knight (2002), who identified the wine tourist segment interested in organized tours as the “wine novices.” According to Wargenau and Che (2006), organized bus tours can offer wineries new ways to reach customers. Interest in organized motorcoach tours varied based on the size and scale of winery operations. The authors found that larger wineries work with tour operators, as these wineries take buses upon reservation by applying costs for the bus and for tastings. Tour operators direct small groups of people with more wine knowledge and, therefore, are more inclined to buy at small wineries.

Finally, Garibaldi *et al.* (2017) examined the profile of 540 wine tourists interested in wine-related businesses and 109 wine tour operators in the USA. The authors found that wine tour data are an important tool for the international promotion of wine tourism. Therefore, it is important that tour operators address several issues if they aim to attract and satisfy wine (and food) tourists who tend to shy away from other forms of organized travel (Croce and Perri, 2017). They concluded that future research is needed to better understand the convergence between customer needs and tourist proposals and highlight the critical issues that allow tour operators to enter the market successfully.

2.5 Wine tourism and content analysis

Some very recent works have analyzed TripAdvisor reviews about wineries and wine tours. The most commonly used approach is content analysis with different levels of complexity.

In their research, Terziyska and Damyanova (2020) adopted a qualitative netnographic approach to verify the perception of winescape dimensions at a macro scale for a single tour in Piedmont (Italy) with 118 reviews. Despite the small sample size, the results help to address the limitation of excessive descriptive dimensions of the winescape by identifying the dimensions most perceived in the region considered. Another interesting finding of this study is that the tour guide is one of the most important dimensions of the perception and quality of the experience.

Content analysis was applied to the analysis of reviews related to wine tourism in specific wine regions through classification methods based on deep learning algorithms.

The two studies applying this methodology (Thanh and Kirova, 2018; Kastenholz *et al.*, 2020) adopted a macro definition of the winescape and are both based on the QSR NVivo software applied to classify categories of experiences defined a priori by the researchers who also contributed to the training of the coder. The two studies described the winescape through experiential dimensions based on the Entertainment, Educational, Esthetics, Escapist model for the Cognac region (Thanh and Kirova, 2018) and on a literature review for the Barreida region (Kastenholz *et al.*, 2020). The main limitation of the adopted methodology is that class definitions and coder training are defined subjectively by researchers and, thus, may be limited by the epistemological position of the researcher, which may impact the reliability of the results (Wilk *et al.*, 2019).

Recent work applies lexical analysis (Brochado *et al.*, 2020a, 2020b) by processing reviews explicitly referring to tours, wineries and wine hotels and, thus, has an approach oriented not only to the macro scale but also to the micro-scale. All three works applied cluster analysis based on the co-occurrence of terms processed in a graphical concept map by the Leximancer software. The main advantage of this procedure over deep learning classification using the NVivo software is that the dimensions of the winescape are not defined a priori but arise from the exploratory analysis of the textual data. Brochado *et al.* (2020a) collected 4,114 reviews of 52 wine hotels in 11 countries. The winescape themes identified through a lexicographic analysis were wine, lodging, food, scenery, staff and recommendation. Brochado *et al.* (2020a) collected 470 reviews related to winery visits in the Douro wine region from wine tourists posted on TripAdvisor and identified 12 topics: wine, view, staff, room, hotel, food, restaurant, pool, service, Douro, deliciousness (food and wine) and comfort. The only work specifically related to organized wine tours is that of Brochado *et al.* (2020b). The authors identified the dimensions of sustainably organized tours from the tourists' perspective by analyzing 878 reviews of 20 tours in Portugal written on TripAdvisor. The authors calculated a concept map containing the following topics: tour, guide, experience, excursion, service, food, recommendation, fun, return, walk, difference and wildlife.

2.6. Gaps in the literature

The literature regarding winescape dimensions at the macro and micro levels specifically related to organized wine tours still has some gaps. The research focused on recent years is based on netnographic methods (Terziyska and Damyanova, 2020) and lexical analysis (Brochado *et al.*, 2020b). The findings identify the winescape dimensions specific to organized group tourism, but the areas of study are still too limited and one case study was based on a low number of reviews analyzed. Additionally, to the best of our knowledge, research that focuses specifically on quantitative perceptions of winescape quality and quantitative analysis of wine tour service failure is absent.

3. The study area

Tuscany is a region in central Italy with an area of about 23,000 square kilometers. The production of wine in Tuscany concerns the entire territory; six Appellation of Controlled and Guaranteed Origin areas and 35 Appellation of Controlled Origin areas are defined, in each of which various wines are classified among the best worldwide are produced. Furthermore, it hosts the highest number of roads of wine and is the first Italian region to practice agritourism, both in absolute terms and the different types of services offered – catering, accommodation, tasting and with proposals for experiences.

According to Colombini (2015), Tuscany is the most popular region for both Italian and foreign tourists because it offers four fundamental things: surprising landscapes, high

culture, exceptional food and great wines. Furthermore, it manages to maintain its supremacy, owing not only to an excellent tourism network of services but also to the offer of many activities (such as antique fairs, art festivals, concerts and other cultural events) while the names of famous people are often linked with the region and luxury shopping. Therefore, we chose Tuscany as our study area.

4. Method

The methodology used to answer the research questions was divided into five phases. In the first phase, we acquired the data from the TripAdvisor platform. Next, the texts were preprocessed to make them suitable for subsequent analyzes. We then applied the multidimensional scaling method to the corpus of reviews to identify winescape dimensions specific to wine tours.

Subsequently, through sentiment analysis, the positive or negative polarity of the review was assessed. On the TripAdvisor website, users write opinions and rank their overall experience in the TripAdvisor Bubble Rating, a score ranging from 1 to 5 bubbles where 1 represents a terrible opinion and 5 represents an excellent opinion. The reviews were classified into four categories combining sentiment polarity and TripAdvisor ratings:

- (1) reviews with positive sentiment and positive evaluation (bubbles > 3);
- (2) reviews with negative sentiment and negative evaluation (bubbles ≤ 3);
- (3) reviews with negative sentiment and positive evaluation (bubble > 3); and
- (4) reviews with positive sentiment and negative evaluation (bubbles ≤ 3).

Natural language processing procedures were applied to each of the three groups. A flowchart of the procedure is shown in [Figure 1](#).

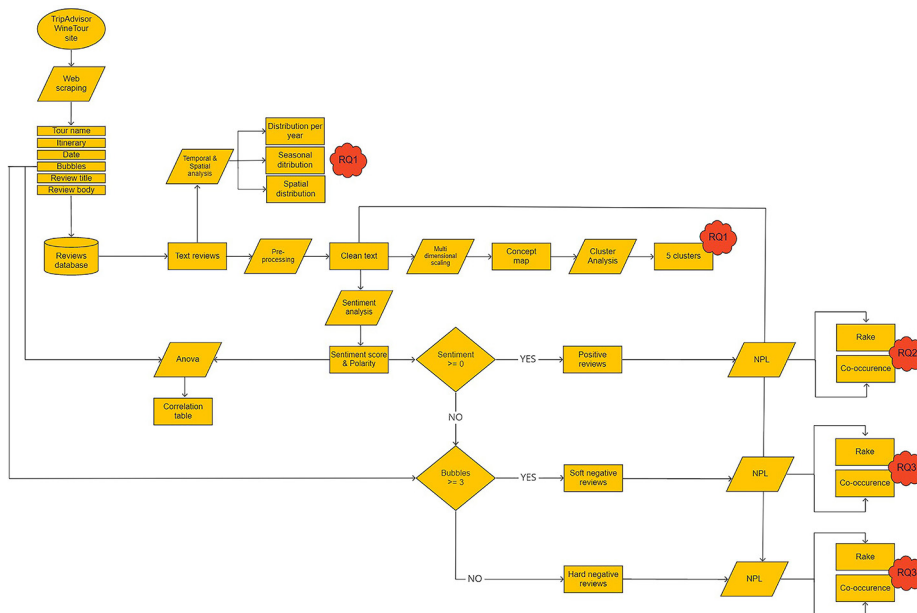


Figure 1.
Flow chart of the methodology

4.1 Data collection

We scraped the TripAdvisor reviews related to the theme “Wine tasting in Tuscany” in the section “Food, Wine and Nightlife” (URL https://www.tripadvisor.com/Attraction_Products-g187893-zfc11891-zfg11868-Tuscany.html). The following information was collected:

- Tour,
- name,
- URL,
- itinerary,
- review,
 - date,
 - bubbles,
 - title,
 - review title,
 - review body.

The data were scraped through an *R* language script based on the “rvest” library. The structure of the script was as follows. First, the list of tour URLs was obtained in the “Wine tasting in Tuscany” section, the HTML code of each URL was downloaded and processed by retrieving the general data and all the reviews of the tour and, finally, the reviews were recorded in a database. All the collected reviews were written in English.

4.2 Preprocessing

Before conducting the analysis procedures, we preprocessed the text. The steps we performed on the database were as follows:

- tokenization of the text that involves the division into words of the text itself;
- the removal of stopwords defined as words that do not carry significant information for the analysis;
- stemming and rooting, which consist of reducing words to the root;
- the removal of extra numbers and spaces;
- the removal of punctuation; and
- part-of-speech tagging also called grammatical tagging – the process of marking a word in a text as corresponding to a particular part of speech: verbs, adjectives, adverbs, etc.

4.3 Multidimensional scaling method and cluster analysis

In the present work, we used the multidimensional scaling (MDS) method, which can graphically represent on a Cartesian plane the complex multivariate world of consumer judgments in a perceptual map. This aims to identify similarities in the set of concepts that correspond to the dimensions of the winescape. The advantage over the more frequent topic analysis is that MDS is based on a distance model and, therefore, it is easy to graphically interpret neighboring words to identify the dimensions of the winescape. The first step of the analysis is the construction of the

document-terms matrix. A document-term matrix is a mathematical matrix that describes the frequency of terms occurring in a collection of documents. In a document-term matrix, the rows correspond to the documents in the “corpus” (the collection of reviews), whereas the columns correspond to the terms. In these applications, documents are represented by reviews. The document-term matrix has the following formulation:

	t_1	t_2	...	t_j	...	t_m
d_1						
d_2						
...						
d_i				$P_{i,j}=\{1,0\}$		
...						
d_n						

where $d_i = \{d_1, \dots, d_n\}$ are the documents (reviews), $t_i = \{t_1, \dots, t_n\}$ are the terms and P_i are binary variables. The document-terms matrix is subsequently transformed into a co-occurrence matrix, which represents the number of times a pair of terms appear in the same review.

	t_1	t_2	...	t_k	...	t_m
t_1						
t_2						
...						
t_h				$\{f_{h,k}\} h \neq k$		
...						
t_m						

where $f_{h,k}$ is the co-occurrence frequency of terms t_h and t_k . To evaluate the strength of the associations (distances) between the terms, the cosine similarity (CS) index was used, defined as follows:

$$CS^{h,k} = \frac{f_{h,k}}{\sum_{j=1}^m \binom{t_h^j}{2} \cdot \sum_{j=1}^m \binom{t_k^j}{2}}$$

In this application, the cosine method was chosen because it is more efficient for extremely large data sets (Sacchelli *et al.*, 2016). Thus, we obtained a matrix of distances (similarity) between the terms.

	t_1	t_2	...	t_k	...	t_m
t_1						
t_2						
...						
t_h				$CS^{h,k}$		
...						
t_m						

□

The next step consisted of transforming $CS^{h,k}$ into sets of coordinates in an abstract two-dimensional space through a multidimensional scaling method. A nonmetric scaling method, the Sammon method, was used in this study, as it tends to produce more readable results (Higuchi, 2016). Given the number of dimensions chosen (two in the application), the nonmetric method identifies the pairs of coordinates (one pair for each term), which minimizes a parameter that evaluates the efficiency of the fitting.

This function, called *the stress function*, is typical of the adopted method. In Sammon’s method, the stress function has the following form:

$$S = \sum \frac{CS^{h,k} - d^{h,k}}{CS^{h,k}}$$

with $d^{h,k}$ distance between t_h and t_k in Sammon space.

The last step is the identification of clusters that define the main themes of the reviews. We restricted the analysis to nouns and adjectives with a frequency higher than a threshold identified by analyzing the graph term frequency-document frequency (TF·DF). The frequency threshold is chosen to select nouns and adjectives that are present both in many documents and with high frequency and, therefore, significant for defining the concept of winescapes. To generate the clusters, we used Ward’s method with a cosine distance calculated in Sammon space. The number of clusters was chosen via the agglomeration graph. The elaborations were carried out using KH Coder 3 software.

4.4 Sentiment analysis

Sentiment analysis is a subdiscipline of computational linguistics that focuses on the opinions expressed in a textual document. The essential questions are how the feelings are expressed in the textual documents and whether the expressions indicate positive or negative opinions regarding the experience. Sentiment analysis uses a predefined lexicon to calculate the scores associated with words. When sentiment analysis is performed on a text, each relevant word obtains a score based on its proximity to a positive or negative word in the library. Therefore, it is necessary to have a lexicon that assigns each word a positive or negative polarity and a score. In this study, sentiment analysis was conducted using the “syuzhet” library of R software using the AFINN lexicon (Nielsen, 2011).

The sentiment scoring procedure is as follows:

- Each review is broken down into its sentences $d_i = \{s_{i,1}, s_{i,2}, \dots, s_{i,n}\}$ based on punctuation; subsequently, each sentence is broken down into words (w) $s_{ij} = \{w_{ij,1}, w_{ij,2}, \dots, w_{ij,l}\}$ using a semantic annotation procedure.
- Punctuation, except for pause punctuation marks (commas, colons, semicolons), which are considered “comma words” (cw) within the sentence, is removed.
- The words in each sentence, $\{w_{ij,k}\}$, are searched and compared with the lexicon of polarized words and each of them is assigned a negative or positive score. Not all words have a sentiment score; therefore, we can obtain a subset of polarized words $\{pw_{ij,k}\} \subseteq \{w_{ij,k}\}$.
- Users often write reviews with complex linguistic structures that, through contextual valence shifters, can change the polarity of the feeling (e.g. “not very happy,” “far from pleasant,” “definitely not beautiful,” etc.). To consider this, for each polarized word, a polarized context cluster is identified considering four words before and two words after. The cluster can be represented as follows:

$$c_{ij,l} = \{pw_{ij,l,k-4}, \dots, pw_{ij,l,k}, \dots, pw_{ij,l,k+2}\}$$

Through the lexicon, the valence shifters of the polarized context cluster are classified into the following categories:

$$\textit{neutral} : w_{ij,l,k}^0$$

$$\textit{negator} : w_{ij,l,k}^n$$

$$\textit{amplifier} : w_{ij,l,k}^a$$

$$\textit{de-amplifier} : w_{ij,l,k}^d$$

$$\textit{commaword} : w_{ij,l,k}^{cw}$$

Amplifiers are generally adverbs or adjectives that intensify the meaning of a sentence. Using our previous example, the sentiment of the altered negator phrase “I seriously don’t like the pie” is amplified with the addition of the amplifier “seriously.” While the de-amplifiers decrease the intensity of a polarized word such as in the phrase “I barely like the cake,” the word “barely” narrowly de-amplifies the word “like.”

- Each polarized word is weighted by the number of valence shifters that directly surround the positive or negative words using the specific weights in the lexicon. Comma words (punctuation denoting a rest that includes commas, colons and semicolons) are indexed and considered when calculating the upper and lower bounds in the polarized context cluster. This is because these signs indicate a change in thinking and the preceding words are not necessarily connected with the words after these punctuation marks. The following rules apply:

- Amplifiers become de-amplifiers if the context cluster contains an odd number of negators.
- The negation flips the sign of the polarized word; linguistically, two negatives equal a positive, three negatives equal a negative, etc.
- Finally, these weighted context clusters are divided by the square root of the word count ($wn_{i,j}$), yielding an unbounded polarity score $\delta_{i,j}$ for each sentence.

$$\delta_{i,j} = \frac{\sum\{c_{i,j,l}\}}{\sqrt{wn_{i,j}}}$$

4.5 Natural language processing

Natural language processing procedures were used to identify the strengths and weaknesses of the tours based on reviews classified according to sentiment and the evaluation of bubbles made by users. Two procedures were used: rapid automatic keyword extraction (RAKE) and co-occurrence graphs.

Following [Rose et al. \(2010\)](#), keywords are defined as a sequence of one or more words that provide a compact representation of the concepts in a document. Ideally, keywords are the condensed forms of the relevant contents of a document. According to the authors, this method is particularly effective for documents that do not follow specific grammatical conventions. RAKE begins the process of extracting keywords by identifying a set of candidate words in the text. The first step is to split the text into a word list and remove stopwords from that list. The algorithm then splits the text into phrase delimiters and stopwords to create candidate expressions. Once the text has been split, the algorithm creates a matrix of word co-occurrences. One of the unique characteristics of the RAKE method is the identification of not only single keywords but also terminologies consisting of two or more words. To do this, RAKE inserts into the matrix of co-occurrence sequences of words that are repeated in sequence and the same order more than twice (e.g. “flow chart,” “linear regression,” etc.). The words are scored after the matrix is built. The score can be determined by the sum of the number of co-occurrences the word has with any other content word in the text, the number of times the word appears in the text or the number of co-occurrences divided by the frequency.

The co-occurrence graph is derived from the co-occurrence matrix. By identifying the most frequent adjacent words, the co-occurrence matrix can be converted into a co-occurrence graph to identify the frequency with which words are associated in reviews.

5. Results

5.1 Primary information

At the weblink cited in the methodology, 1,234 wine tours were listed, but we were only able to download 9,616 reviews from 600 tours. This is because many tours were scheduled on dates after the survey (TripAdvisor is also used for booking); therefore, there were no reviews. In addition, many scheduled tours were canceled due to the pandemic. In the download process, approximately 10% of the reviews were lost due to a server timeout error and duplicate reviews and reviews without text were discarded.

The frequency of reviews in [Figure 2](#) seems to show that the demand for wine tours has been growing strongly recently. The number of reviews grew weakly until 2017, with growth rates lower than the total number of reviews posted on TripAdvisor. Starting in 2018, the number of reviews shared underwent a surge with a growth rate of up to 250%. The sharp decline in 2020 is most likely due to the pandemic emergency to which wine tour products are particularly sensitive.

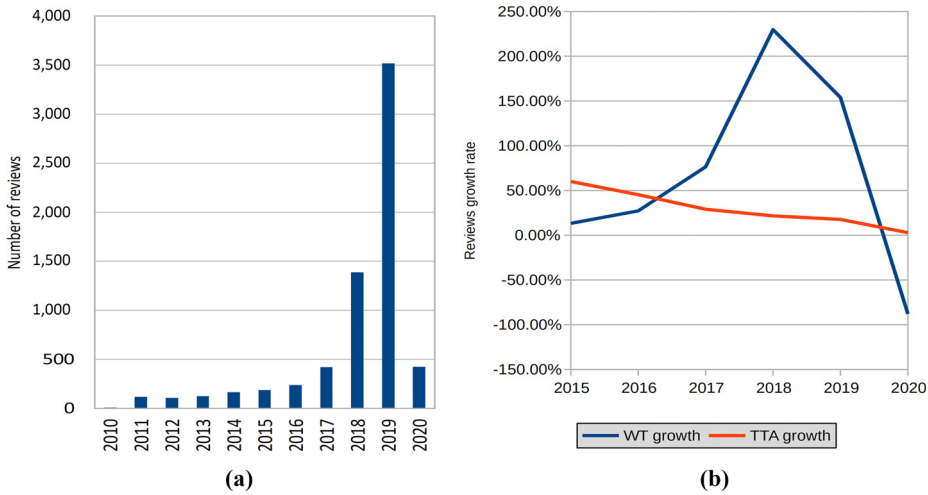


Figure 2.
(a) Frequency of reviews per year, (b) Growth rate of reviews: WT: Wine tours, TTA: TripAdvisor total reviews

The distribution of reviews per month (Figure 3) shows a peak in October and November, which are the months following the harvest in Tuscany, an intermediate level of attendance in the spring and summer months and a low number in the winter month.

Finally, the spatial distribution of the tours (Figure 4) focuses on the hills of central Tuscany and is centered on the art cities of Florence, Pisa and Siena. Currently, recent appellations of the southern coast of Tuscany are not currently regularly frequented by wine tours.

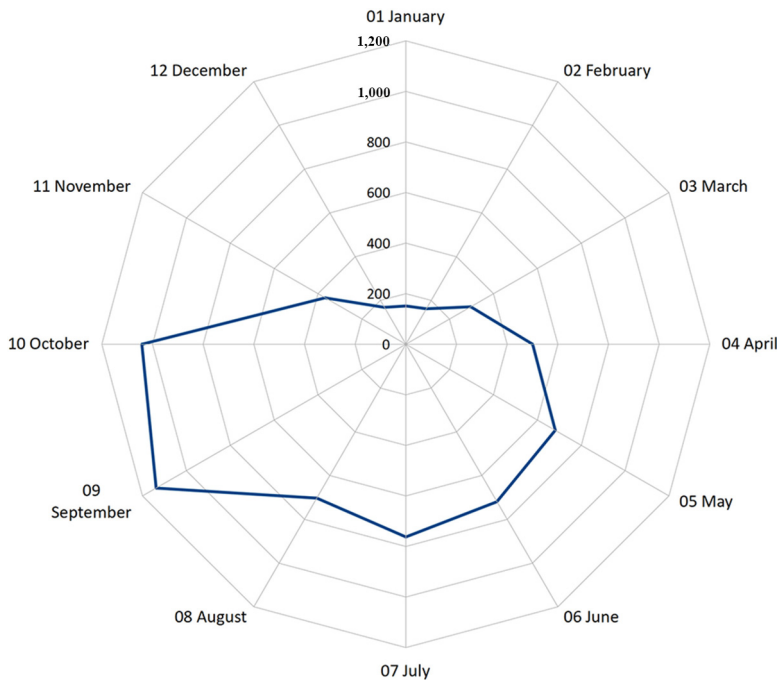


Figure 3.
Monthly distribution of reviews

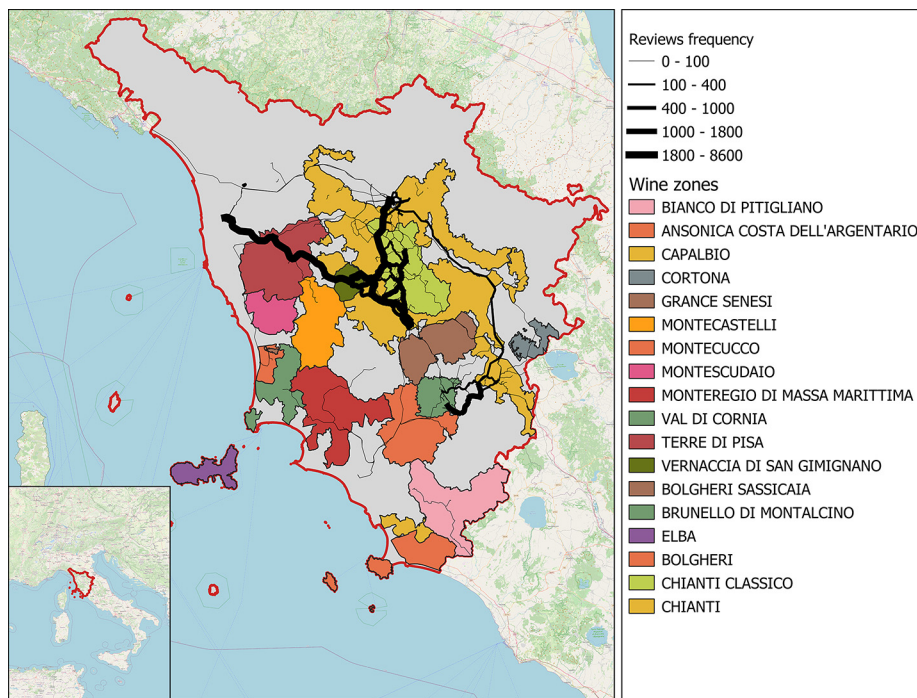


Figure 4.
Spatial distribution of
tours

5.2 Multidimensional scaling method and cluster analysis

Multidimensional scaling and cluster analysis (Figure 5) highlight the characteristic elements of wine tours and how they are perceived by different types of users. The method allowed us to identify five clusters in the space of the two Sammon dimensions with a significant stress value (0.152). The frequency threshold of 500 terms was identified by analyzing the TF-DF graph [Figure 6(a)] to exclude terms that appear in relatively few reviews and are, therefore, not representative for describing the characteristics of the winescape of wine tours in Tuscany. Based on the agglomeration graph, we chose to generate 5 clusters [Figure 6(b)].

Cluster 1 in the third quadrant mainly focuses on service issues. In fact, the most significant nouns in this cluster are “tour,” “guide,” “lunch,” “trip,” “bus” and “driver,” all associated with adjectives that express a positive perception in terms of both specifically referring to the service (“comfortable” and “friendly”) and more generic terms (“great,” “best,” “fantastic,” etc.).

Cluster 2 and nearby Cluster 3, both in the first quadrant, are characterized by wine and food associations. The nouns “winery,” “experience” and “food” for Cluster 2 and “tasting” and “winery” for Cluster 3 are connected to the central term “wine.” The two clusters differed in more peripheral elements in both clusters. Cluster 2 presents nouns that refer to an experience of greater quality and exclusivity (“truffle,” “class,” “small” and “family”), whereas Cluster 3 seems to refer to traditional and typical gastronomic elements (“oil,” “olives,” “cheese,” etc.). Cluster 4, which is in the second quadrant and smaller in terms of both the number and the frequency of words, associates the wine tour with the landscape and architecture (“castle” and “countryside”) and active fruition experiences (“bike” and “ride”). The adjectives, all indicating a positive sentiment, seem to be specifically attributable to the recreational experience (“fun,” “easy” and “sure”) and the quality of the landscape (“beautiful”). Finally, Cluster 5 in the fourth quadrant includes perceptions based on the cultural

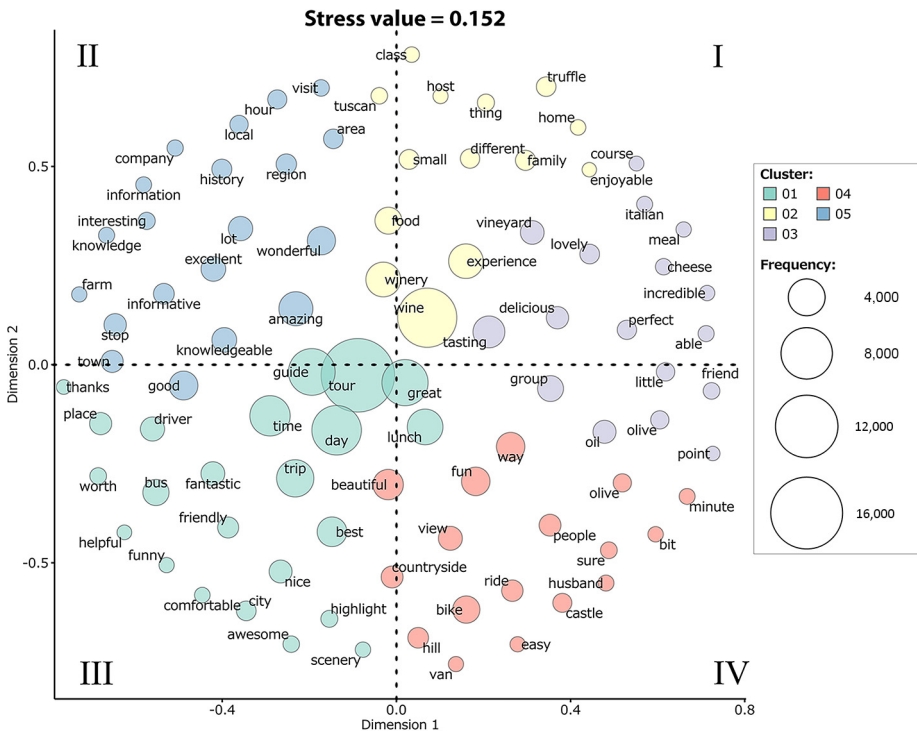


Figure 5.
Multidimensional
scaling method and
cluster analysis
results

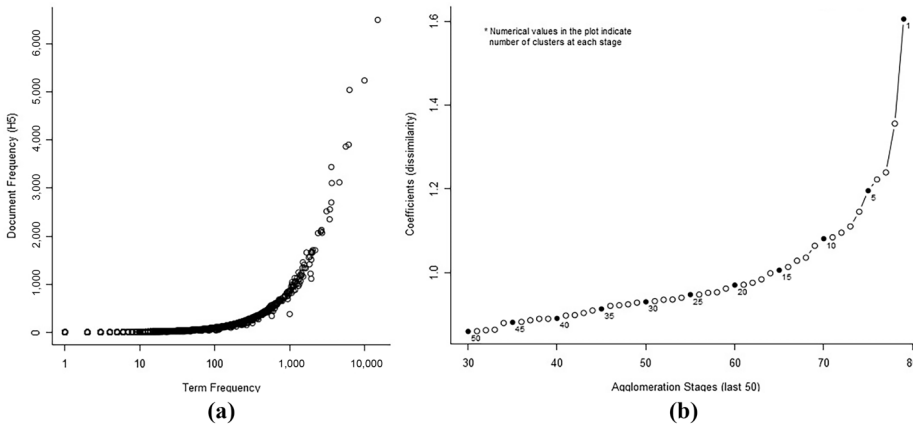


Figure 6.
MDS model
parameters

Notes: (a) TF-DF graph; (b) agglomeration graph

content of the tour (“information,” “knowledge,” “history,” etc.) associated with terms related to the travel experience (“visit,” “region,” “stop,” “local,” etc.). The adjectives are both specific to the theme of knowledge (“interesting,” “knowledgable” and “informative”) and generic in appreciation of the product/service offered (“wonderful,” “amazing” and “excellent”).

5.3 Sentiment analysis

The results of the sentiment analysis calculated using the AFINN lexicon are shown in Table 1. In general, the reviews of the wine tours show a tendentially positive sentiment, with an average score of 15.21 (median 14); the dispersion is relatively high and symmetrical, with the first and third quartiles equal to 9 and 20, respectively.

Table 1 also shows that the average and median sentiment values progressively increase from reviews, with a rating of one to four bubbles. Only in the case of evaluations equal to one bubble are most reviews with negative sentiment (median -0.5 and average -1.5). Figure 6 shows the boxplots by class of bubbles and the results of the student's *t*-test for increasing pairs of ratings used to verify the actual consistency of classification in bubbles. The test result shows that the classification in bubbles given by the tourists is consistent with the sentiment score of the review text. In fact, all comparisons between adjacent ratings are highly significant, apart from the comparison between two and three bubbles, which is significant with a probability level of 95%.

5.4 Natural language processing

The key elements of definitely positive reviews (bubbles > 3 and sentiment score > 0) are shown in Figure 7. The results of the RAKE analysis and the analysis of co-occurrences seem to provide complementary information. The RAKE analysis underlines the relationship between wine and landscape. In fact, bigrams "olive oil," "olive grove" and "countryside" appear in the first three places of the analysis. However, a little further down the graph, there are also "Tuscany countryside" and "small-town." The presence of elements that lead to the production of wine is also interesting: "wine make" and "organic farm."

The analysis of co-occurrences highlights the importance of logistical and information aspects; the most frequent co-occurrence is "tour-great-guide" linked to the "guide-knowledgeable" co-occurrence. The second element that emerges from the analysis is the wine-food link, with the co-occurrences "wine-food," "wine-oil," "wine-tasting" and "wine-lunch." Figure 8 shows the RAKE analysis and co-occurrence graph of reviews with negative sentiment and low bubbles (≤ 3). The critical elements highlighted by the two procedures are related to logistical and organizational aspects. The RAKE analysis highlights the importance of choosing the location of the meeting point ("meeting point" and "train station") and the relationship with the tour guide ("tour guide" and "tour company"). The qualitative characteristics of the wine that are positioned at the bottom of the graph ("wine" and "tasting") appear to be less critical. The graph of co-occurrences also emphasizes the importance of the efficient organization of the wine tourism experience with the "tour-people-guide" and "tour-bus" associations.

Figure 9 reports the results of the natural language processing of substantially positive reviews but with critical elements. The results of this analysis appear to be less consistent than in previous cases because the number of reviews is considerably small (only 37 reviews). Nevertheless, an interesting result is the presence of the "credit card," which turns

Table 1.
Sentiment analysis
results

Bubbles	Min.	1st Qu.	Median	Mean	3rd Qu.	Max.
1	-31	-5.75	-0.5	-1.519	3.75	13
2	-10	1	5	5.956	9.5	37
3	-9	3	8	8.079	12	41
4	-7	7	12	12.47	16	46
5	-17	10	15	15.9	20	79
Total	-31	9	14	15.21	20	79

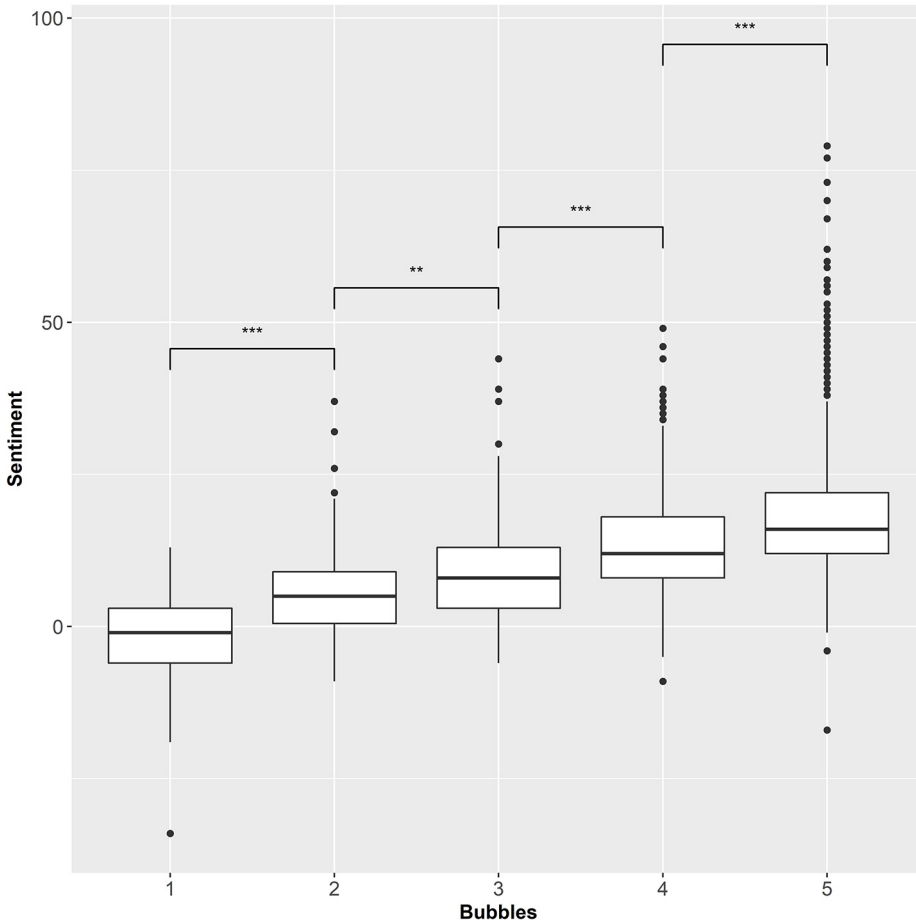


Figure 7.
Sentiment analysis
and bubbles

out to be an element of disappointment typical of this class of reviews. The remaining terms seem to refer to the organizational aspects of wine tours such as the category of definitely negative reviews (Figure 10).

Finally, the results of the processing of reviews that were substantially negative (less than 3 bubbles) but that showed positive aspects (sentiment score > 0) did not yield particularly useful results, as they were very similar to the case of reviews that were certainly positive but with decidedly lower sentiment scores (Figure 11, Table 1).

6. Discussion

6.1 Research questions

Regarding the first research question (RQ1), research has shown that in Tuscany, wine tour products have experienced strong growth in demand in recent years and the seasonal distribution follows the work phases of grape harvesting and wine production. Spatially, the tours are limited to the wine regions located on the Florence-Pisa-Siena routes. Therefore, policymakers should encourage the expansion of wine tours to wine regions located on the

Figure 8.
(a) RAKE analysis
and (b) Cooccurrence
graph of reviews with
a positive sentiment
and high bubbles
(>3)

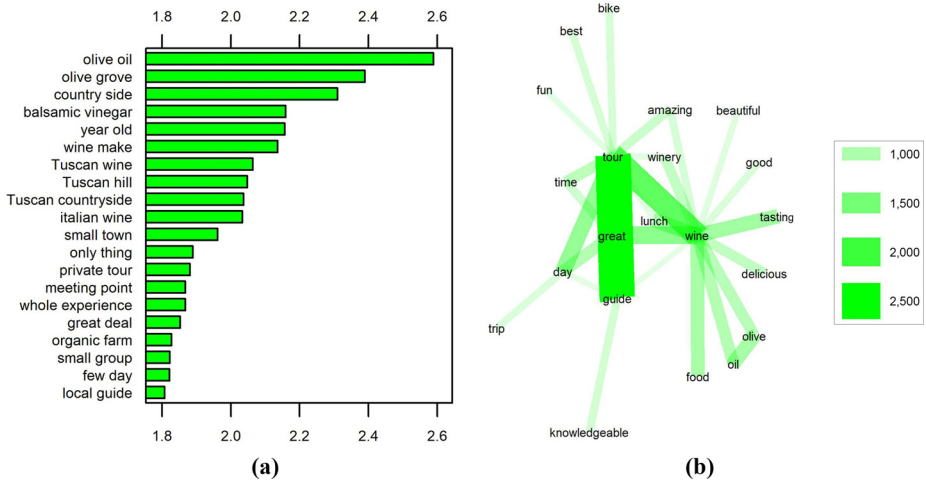
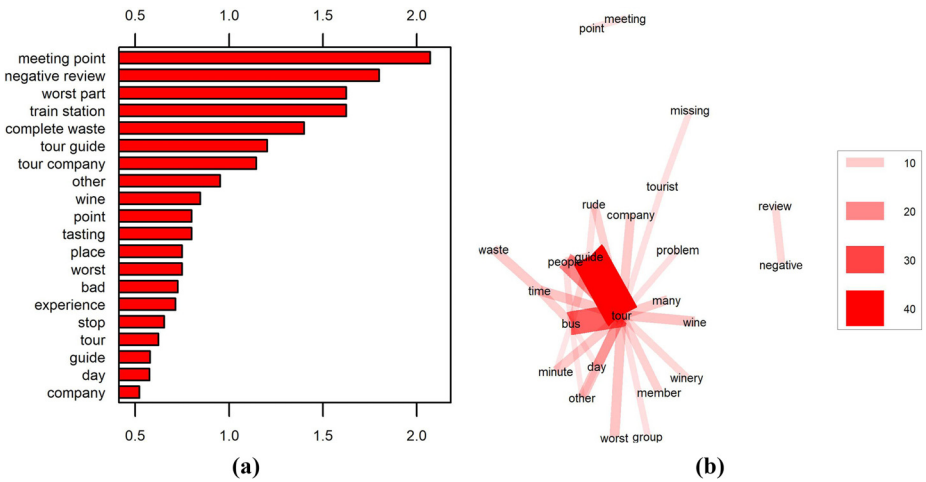


Figure 9.
(a) RAKE analysis
and (b) Cooccurrence
graph of reviews with
negative sentiment
and low bubbles (≤ 3)



Tuscan coast by promoting the link between seaside tourism and food and wine tourism. Furthermore, the results of the analysis make it possible to identify and evaluate the following six characteristic dimensions of wine tour products (Terziyska and Damyanova, 2020):

- (1) Professionalism of the tour guide and quality of explanations.
- (2) Logistical and organizational aspects.
- (3) Quality of the wine.
- (4) Quality of the food.
- (5) Complementary tourist and recreational activities.
- (6) Landscape and historic villages.

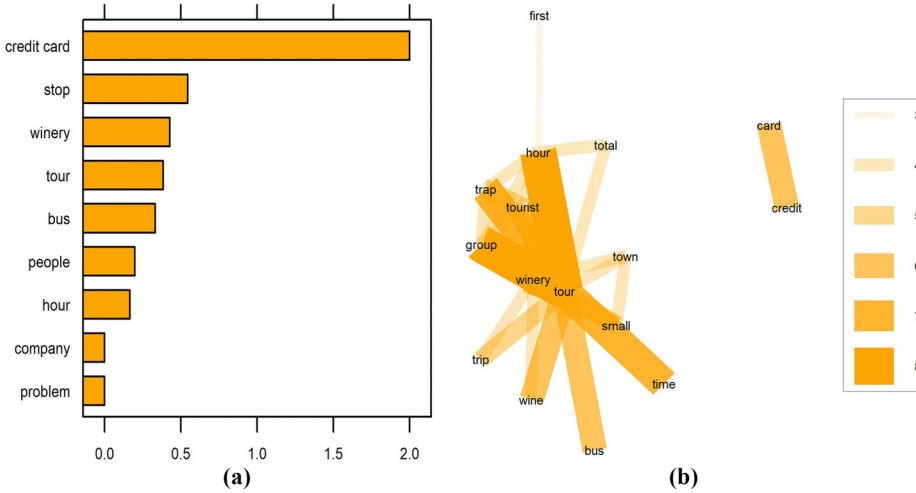


Figure 10.
(a) RAKE analysis
and (b) Cooccurrence
graph of reviews with
negative sentiment
and high bubbles

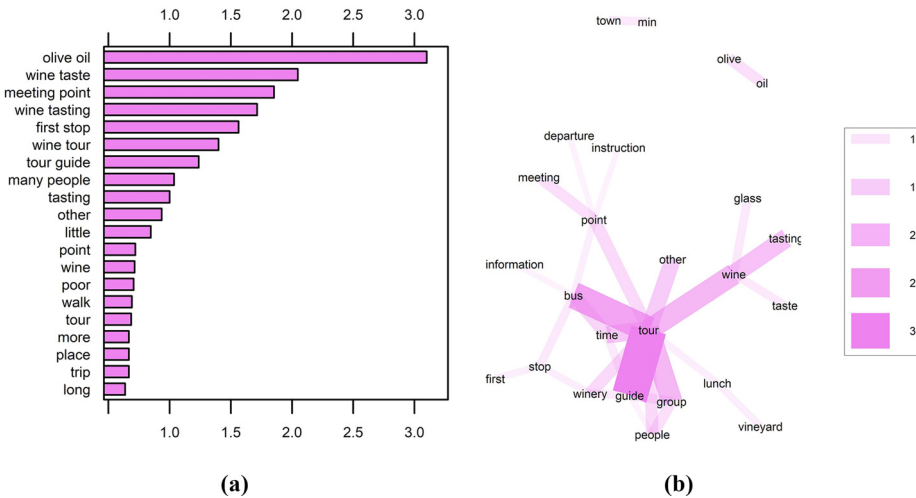


Figure 11.
(a) RAKE analysis
and (b) Cooccurrence
graph of reviews with
positive sentiment
and low bubbles

The tour guide is the most complex element of a wine tour service. In fact, the tour guide is present both in reviews with negative sentiment and low bubbles and those with positive sentiment and high bubbles. Furthermore, the tour guide has a central position in the multidimensional scaling graph (Figure 5) close to the words “wine” and “tour.” The tour guide is one of the most important elements in wine tours, plays an intermediary role between tourists and the destination and is the first contact with the wine region that tourists are going to visit (Rabotic, 2010). The literature has identified storytelling and cultural intermediaries as important concepts for interacting with tourists at winery doors (Maguire et al., 2020). In fact, the tour guide is mentioned in almost all reviews, often with the guide’s proper name and a detailed description of their characteristics, both in a positive and negative sense. The adjectives that occur most often are “knowledgeable” and “informative”;

therefore, good knowledge of the place and the ability to know how to present and convey it are the main characteristics that a good tour guide must possess.

In the context of positive reviewers (*RQ2*), the perceived qualities are related to the knowledge of wine and its environment (Figure 7). In fact, the most closely associated words are “knowledgeable” and “wine.” The results obtained from the analysis of natural language processing are confirmed by the five sentences with the highest sentiment scores shown in Table 2. Enthusiasm and passion for the tour guiding job are easily noticed by tourists and reflected in the review with the best sentiment scores: “[...] guides who truly enjoyed themselves while making sure their guests were happy, safe and having a fabulous day!” (sentiment score of 75 points) and “. . . our guide Lavi and the other guests who were mostly young professionals were lovely people to be around for a whole day. We’d absolutely go again” (sentiment score of 73 points).

In negative reviews (*RQ3*), however, aspects related to the relationship and mediation between tourists prevail. In Figure 9, “guide” is connected to “people” and “rude” and the logistic management of the bus and behavior (“rude”). In addition, in this case, the sentences with the lowest sentiment (Table 3) scores confirm the results of natural language processing, highlighting the lack of empathy with customers – “Worst of all, our tour guide had a negative attitude, scorned at people who had to clarify questions and kept losing people because she didn’t give clear meeting place instructions” (sentiment score of –17) – or the lack of professionalism – “Awful tour guide (Amanda) lost 3 members of the group” (sentiment score of –17) and “The tour guide was poorly trained and the information that was given was so basic anyone coming to Florence would already know the facts given” (a sentiment score of –16).

Sentence	Sentiment score
<i>We had the most amazing time, great wine, fabulous food, stunning views and a super fun way to travel on the off-roads of Tuscany</i> (GabbyanneAva August 2019)	79
<i>You will have a heavenly experience filled with fun, breathtaking scenery and guides who truly enjoyed themselves while making sure their guests were happy, safe and having a fabulous day!</i> (Diana B, June 2021)	75
<i>My boyfriend and I had an awesome time on this tour- perfectly organized from start to finish, great wines (although we learned that we weren’t a great fan of Chianti wines, that didn’t detract from the overall experience) – highlights include the best meal I had in my week in Florence (truffle raviolis) served in a panoramic, non-touristy setting, fun and interesting stories by our guide Lavi and other guests who were mostly young professionals, lovely people to be around for a whole day. We’d absolutely go again.)</i> (Crispliid, September 2018)	73
<i>Not only did we get a wonderful tour of the Tuscan countryside but we also had a blast with the amazing tour guides (and got a great workout in too!) The guides were absolutely wonderful and gave a splendid tour of the vineyard and winery where you got the opportunity to taste delicious red wine and fresh olive oil all while enjoying the beauty of Tuscany and the castle that the winery is located in!</i> (Rachel L, October 2014)	70
<i>Hosts incredibly friendly and welcoming, a really fantastic tour packed with information followed by beautiful wines in a genuinely heavenly setting accompanied by the absolute best in local cheeses, meats, pieces of bread olive oils and the highlight spiced cherries so bountiful that this was our lunch for the day and honestly the highlight of our weekend, the cherries astounded me, the spicing was perfect to complement the wines, the various cheeses and local meats all accompanied by the pieces of bread and olive oils, I will remember this tour always and dearly hope to return next year</i> (SpanielTash, August 2019)	64

Table 2.
The sentences with the highest sentiment scores in the reviews with bubbles > 3 and sentiment score > 0

Table 3.

The sentences with the lowest sentiment scores in the reviews with bubbles ≤ 3 and sentiment score < 0

Sentence	Sentiment score
<i>As my friend and I left the bus and walked alone approaching the Florence train station, two intoxicated tour members came up to us and called us vile names and the male physically threatened us for purportedly not being nice to the tour guide Lavinia (Lisa7234, February 2018)</i>	-31
<i>Worst of all, our tour guide had a negative attitude, scorned people who had to clarify questions and kept losing people because she didn't give clear meeting place instructions (michellestraveling, September 2016)</i>	-17
<i>Even the lunch was horrible and the wine was awful (jenny4480, February 2018)</i>	-17
<i>Awful tour guide (Amanda) lost 3 members of the group. She had TERRIBLE organization and all timings were late. Due to her lack of organization when asked if we would miss the sunset (the tour is called sunset in sienna and is meant to include a panoramic vantage point to watch the sunset) she replied "I don't know what time it sets" (Norah, October 2018)</i>	-17
<i>The tour guide was poorly trained, the information that was given was so basic anyone coming to Florence would already know the facts given (happy_trail10, May 2019)</i>	-16

Logistical and planning aspects are typical of negative reviews (*RQ3*). The greatest criticism seems to be related to the planning of the trip, especially regarding the “meeting point” and the “wasted time” (Figure 8). The lack of the ability to pay by credit card (Figure 9) constitutes a minor annoyance that does not seem to affect the total quality perceived by wine tourists. The sentences with the lowest sentiment score in the reviews with high bubbles and negative sentiment score (Table 4) also report the following: “My husband attempted to pay with a credit card on the website and the paperwork we had stated this is an option” (sentiment score -5) and “Driver refused a credit card and said they do not take credit cards. They take you to an ATM to withdrawal cash” (sentiment score of -4). When comparing sentiment scores, however, it is evident that the credit card problem is perceived as less critical than the lack of competence of the guide.

The quality of the wine, quality of the food, complementary tourist activities and landscapes and historic villages are the dimensions that allow the reviews to be segmented into specific clusters (*RQ1*) and are part of the strengths of Tuscan wine tours (*RQ2*). Reviews with positive sentiment emphasize the complementarity between

Table 4.

The sentences with the lowest sentiment scores in the reviews with bubbles > 3 and sentiment score < 0

Sentence	Sentiment score
<i>The pasta that followed was even more disgusting and the vegetarian pasta was worse than prison food (Somewhere, June 2018)</i>	-8
<i>The only thing I did not like was being left at the bus station after dark. It was not the easiest thing to get from the bus station to the train station, which was the central place where we met in the morning (Lorraine J, February 2020)</i>	-6
<i>The minus star is for the fact that the tour was advertised as being no more than 25 people and there were 55 people on my bus (dreamincolor39, August 24, 2019)</i>	-5
<i>My husband attempted to pay with a credit card on the website and the paperwork we had states is an option... Driver refused a credit card, said they do not take credit cards, they take you to an ATM for cash withdrawal (boosgrandma, July 2019)</i>	-5
<i>The booking online was easy, the only drawback was that we had to pay cash due to the guide being a freelancer and couldn't use a credit cards – the website and booking part did say credit cards could be used (Whenz, July 2016)</i>	-4

wine, typical landscape, gastronomy and cycling, thus defining the wine tour as a typical example of the concept of winescape (Bruwer and Gross, 2017; Thomas *et al.*, 2018). The two sentences with the highest sentiment score are the following (Table 2): “We had the most amazing time. Great wine, fabulous food, stunning views and a super fun way to travel on the off-roads of Tuscany” (sentiment score 79) and “You will have a heavenly experience filled with fun, breathtaking scenery [...]” (sentiment score 75).

The “main wine product” is central to the wine tour experience (Getz and Brown, 2006). It significantly affects the perception and satisfaction of tourists and is heavily mentioned in their comments. This study has identified co-occurrences of the main wine product (“wine tastings,” “Tuscan wine” and “wine delicious”), co-occurrences that link wine to oil, the other typical product of the countryside Tuscany and keywords relating to wine production (“wine make” and “winery”). Furthermore, Table 2 shows the following:

“. . . beautiful wines in a genuinely heavenly setting accompanied by the absolute best in local cheeses, meats, pieces of bread, olive oils and the highlight spiced cherries so bountiful that this was our lunch for the day and honestly the highlight of our weekend. The cherries astounded me and the spicing was perfect to complement the wines, the various cheeses and local meats all accompanied by the pieces of bread and olive oils” (sentiment score 64).

The last interesting result derives from the geolocalization of the tours (Figure 4), which has allowed us to verify that not all Tuscan wine regions are interested in the wine tour product and that, therefore, Tuscany still has margins for increasing and differentiating the offerings by also focusing on the wine-sea association.

6.2 Managerial implications

The results of the present study offer useful managerial information for tour operators. First, for tourism operators in the tourism market, the results confirm that customers of wine tours seem to have high expectations and do not forgive mistakes made by organizations and management.

Second, for entrepreneurs who are planning to become tour operators in new wine tourism regions, the results highlight the most important dimensions of the wine tourism experience. When promoting newly organized wine tours, entrepreneurs should emphasize the beauty of the wine landscape and historical villages, the quality of the food and wine offerings and the possibility to obtain information from the winemakers of the visited wineries through competent guides who are able to overcome language barriers.

A third important indication for new tour operators is the complexity of the wine tourism experience, which requires the coordination of art tourism in small villages and food and wine tourism in a single package.

Moreover, the results show the need to train guides who not only are prepared from an ecological point of view but also have psychological training to effectively manage the leadership of the tour and the dynamics of groups of people having different needs. The tour must be planned down to the smallest detail, starting with the choice of departure and arrival locations. Even the choice of wineries must be made carefully, selecting entrepreneurs not only for the quality of the product but also for their communication skills.

Finally, tour operators should use electronic word-of-mouth data to monitor the perceptions of their tours and, thus, continually improve their service design and promptly resolve issues that generate service failures.

7. Conclusions

7.1 *Theoretical implications*

The application of context analysis theory through natural language processing and sentiment analysis methods allowed the identification of winescape themes that influence the perception of the quality of wine tours or that may lead to service failures during the trip and winery visits. In general, the results highlight that organized wine tours is a complex product. In fact, the research confirmed the importance of the territorial (macro) characteristics of the winescape, including the quality of the wine, the landscape, the urban and architectural heritage and the food-wine relationship and the micro characteristics, including the logistics and planning of the experience, quality of the intermediation between wine production and consumers, intermediation and knowledge transfer.

This research fills a gap in wine tourism studies by adopting a new methodological approach and procedure that provides exhaustive answers to research questions. The use of sentiment analysis on freely written reviews has the advantage of being able to extract the real preferences and judgments of consumers to avoid strategic responses. Applying the natural language processing procedures after the classification of reviews based on sentiment scores allowed us to isolate the strengths from criticalities, which are often present simultaneously in the same review. The latest ones concerned a small subset of the reviews and, therefore, would have been difficult to identify if the entire body of the text was united.

7.2 *Practical implications*

The application of sentiment analysis techniques to TripAdvisor reviews made it possible to identify not only the elements of service quality but also the reasons for service failures. A key role is played by the guide, who not only has the important function of cultural intermediation between the winemaker and the consumer but also must exercise leadership in the management of the interpersonal relationships among tourists. Our research has shown that wine tourists positively perceive the technical preparation of the guide and negatively perceive the lack of leadership and empathy in the management of relationships. Logistics and travel organizations are a second element of the typical winescape of wine tours and are perceived almost exclusively according to their failures. Territorial characteristics of the landscape and historical villages are perceived as valuable elements; furthermore, the quality of wine and wine-food matching is fundamental in the overall quality of the experience, but they can also be the cause of very negative perceptions.

The research also found that the rating method adopted by TripAdvisor (the bubbles) is not always efficient. The application of sentiment analysis showed that useful information about service failure is present even in reviews with positive TripAdvisor ratings (three or more bubbles). In addition, reviews with fewer than three bubbles also highlight the positive characteristics of the winescape. In our opinion, tour operators should rely on sentiment scores, rather than TripAdvisor bubbles to monitor the quality of their product.

We believe that the elements with positive sentiment represent the guidelines for the planning of new tours in regions where this product is not yet common. Furthermore, tour operators should carefully monitor negative sentiment issues to maintain the quality of existing tours.

7.3 *Limitations and future research*

The limitations of the method were linked to the origin of the data used. The main limitation is that TripAdvisor does not provide social and personal information about the tourist who wrote the review; therefore, our methods are substantially complementary to the traditional

survey method using questionnaires. Another possible limitation is the use of online reviews, which only consider consumers who have used TripAdvisor and, therefore, could be a statistically biased sample.

A third limitation is that the data set of reviews of wine tours in a wine region has a hierarchical structure: in a region, we can have a set of different tours and a set of reviews of each tour. As the goal of the research is to identify the dimensions of a wine tour's winescape, in this work, we decided to group all the reviews in a single corpus with the results referring to the entire wine region of Tuscany. With this choice, however, we could not evaluate the differences among tours. In future research, we will investigate the possibility of using TripAdvisor data hierarchically to identify if there are sufficiently diversified typologies of wine tours and if they significantly differ in terms of sentiments.

Regarding the results obtained, a further limitation is related to the geographical region in which the study area is located (Italy). If the study had been conducted in other states or on other continents, the results could have been different because of the diverse nature of wine tourism products. Therefore, future research is needed to validate this method for different contexts.

The final useful development of the research is related to the identification of methodologies for monitoring the quality of single wine tours over time by means of TripAdvisor reviews to provide tour operators tools for controlling the quality of the service.

References

- Agüero-Torales, M.M., Cobo, M.J., Herrera-Viedma, E. and López-Herrera, A.G. (2019), "A cloud-based tool for sentiment analysis in reviews about restaurants on TripAdvisor", *Procedia Computer Science*, Vol. 162, pp. 392-399.
- Alebaki, M. and Iakovidou, O. (2010), "Segmenting the Greek wine tourism market using a motivational approach", *New Medit: Mediterranean Journal of Economics, Agriculture and Environment = Revue Méditerranéenne D'Economie Agriculture et Environment*, Vol. 9 No. 4, p. 31.
- Bhardwaj, P., Gautam, S. and Pahwa, P. (2018), "A novel approach to analyze the sentiments of tweets related to TripAdvisor", *Journal of Information and Optimization Sciences*, Vol. 39 No. 2, pp. 591-605.
- Brochado, A., Souto, J. and Brochado, F. (2020b), "Dimensions of sustainable tour experiences", *Journal of Quality Assurance in Hospitality and Tourism*, Vol. 22 No. 5, pp. 1-24.
- Brochado, A., Stoleriu, O. and Lupu, C. (2020a), "Wine tourism: a multisensory experience", *Current Issues in Tourism*, Vol. 24 No. 5, pp. 597-615.
- Bruwer, J. and Gross, M.J. (2017), "A multilayered macro approach to conceptualizing the winescape construct for wine tourism", *Tourism Analysis*, Vol. 22 No. 4, pp. 497-509.
- Bruwer, J. and Lesschaeve, I. (2012), "Wine tourists' destination region brand image perception and antecedents: conceptualization of a winescape framework", *Journal of Travel and Tourism Marketing*, Vol. 29 No. 7, pp. 611-628.E.
- Chang, S.Y., Tsaour, S.H., Yen, C.H. and Lai, H.R. (2020), "Tour member fit and tour member-leader fit on group package tours: influences on tourists' positive emotions, rapport, and satisfaction", *Journal of Hospitality and Tourism Management*, Vol. 42, pp. 235-243.
- Charters, S. and Ali-Knight, J. (2002), "Who is the wine tourist?", *Tourism Management*, Vol. 23 No. 3, pp. 311-319.
- Colombini, D.C. (2015), "Wine tourism in Italy", *International Journal of Wine Research*, Vol. 7, pp. 29-35.
- Croce, E. and Perri, G. (2017), *Food and Wine Tourism*, Cabi.

- Filieri, R., Alguezai, S. and McLeay, F. (2015), "Why do travelers trust TripAdvisor? Antecedents of trust towards consumer-generated media and its influence on recommendation adoption and word of mouth", *Tourism Management*, Vol. 51, pp. 174-185.
- Garibaldi, R., Stone, M.J., Wolf, E. and Pozzi, A. (2017), "Wine travel in the United States: a profile of wine travellers and wine tours", *Tourism Management Perspectives*, Vol. 23, pp. 53-57.
- Getz, D. and Brown, G. (2006), "Critical success factors for wine regions: a demand analysis", *Tourism Management*, Vol. 27 No. 1, pp. 146-158.
- Griffin, T.O.N.Y. and Loersch, A. (2006), "The determinants of quality experiences in an emerging wine region", *Global Wine Tourism: Research, Management and Marketing*, pp. 80-91.
- Higuchi, K. (2016), *KH Coder 3 Reference Manual*, Kioto (Japan): Ritsumeikan University.
- Huang, S., Hsu, C.H. and Chan, A. (2010), "Tour guide performance and tourist satisfaction: a study of the package tours in shanghai", *Journal of Hospitality and Tourism Research*, Vol. 34 No. 1, pp. 3-33.
- Johnson, R. and Bruwer, J. (2007), "Regional brand image and perceived wine quality: the consumer perspective", *International Journal of Wine Business Research*, Vol. 19 No. 4.
- Kastenholz, E., Cunha, D., Eletxigerra, A., Carvalho, M. and Silva, I. (2020), "Exploring wine terroir experiences: a social media analysis", In *International Conference on Tourism, Technology and Systems*, (pp. 401-420). Springer, Singapore.
- Lai, L.S. and To, W.M. (2015), "Content analysis of social media: a grounded theory approach", *Journal of Electronic Commerce Research*, Vol. 16 No. 2, p. 138.
- Lee, J., Benjamin, S. and Childs, M. (2020), "Unpacking the emotions behind TripAdvisor travel reviews: the case study of Gatlinburg, Tennessee", *International Journal of Hospitality and Tourism Administration*, pp. 1-18.
- Maguire, J.S., Frost, W., Frost, J. and Strickland, P. (2020), "Seeking a competitive advantage in wine tourism: heritage and storytelling at the cellar-door", *International Journal of Hospitality Management*, Vol. 87, p. 102460.
- Neuendorf, K.A. (2002), *The Content Analysis Guidebook*, CA, Thousand Oaks: Sage Publications.
- Nielsen, F.Å. (2011), "A new ANEW: evaluation of a word list for sentiment analysis in microblogs", arXiv preprint arXiv:1103.2903.
- O'connor, P. (2010), "Managing a hotel's image on TripAdvisor", *Journal of Hospitality Marketing and Management*, Vol. 19 No. 7, pp. 754-772.
- Petrick, J.F. (2002), "Development of a multi-dimensional scale for measuring the perceived value of a service", *Journal of Leisure Research*, Vol. 34 No. 2, pp. 119-134.
- Quintal, V.A., Thomas, B. and Phau, I. (2015), "Incorporating the winescape into the theory of planned behaviour: examining 'new world' wineries", *Tourism Management*, Vol. 46, pp. 596-609.
- Quiroga, I. (1990), "Characteristics of package tours in Europe", *Annals of Tourism Research*, Vol. 17 No. 2, pp. 185-207.
- Rabotic, B. (2010), "Tourist guides in contemporary tourism", *International Conference on Tourism and Environment, Sarajevo*, March, 4-5.
- Rose, S., Engel, D., Cramer, N. and Cowley, W. (2010), "Automatic keyword extraction from individual documents", *Text Mining: applications and Theory*, Vol. 1, pp. 1-20.
- Sacchelli, S., Fabbri, S. and Menghini, S. (2016), "Climate change effects and adaptation strategies in the wine sector: a quantitative literature review", *Wine Economics and Policy*, Vol. 5 No. 2, pp. 114-126.
- Schuckert, M., Liu, X. and Law, R. (2015), "Hospitality and tourism online reviews: recent trends and future directions", *Journal of Travel and Tourism Marketing*, Vol. 32 No. 5, pp. 608-621.
- Terziyska, I. and Damyanova, R. (2020), "Winescape through the lens of organized travel—a netnography study", *International Journal of Wine Business Research*, Vol. 32 No. 4.

- Thanh, T.V. and Kirova, V. (2018), "Wine tourism experience: a netnography study", *Journal of Business Research*, Vol. 83, pp. 30-37.
- Thomas, B., Quintal, V.A. and Phau, I. (2018), "Wine tourist engagement with the winescape: scale development and validation", *Journal of Hospitality and Tourism Research*, Vol. 42 No. 5, pp. 793-828.
- Tourism Research Australia (2014), "Food and wine tourism in Western Australia",
- Wang, X., Tang, L.R. and Kim, E. (2019), "More than words: do emotional content and linguistic style matching matter on restaurant review helpfulness?", *International Journal of Hospitality Management*, Vol. 77, pp. 438-447.
- Wargenau, A. and Che, D. (2006), "Wine tourism development and marketing strategies in southwest Michigan", *International Journal of Wine Marketing*, Vol. 18 No. 1.
- Wilk, V., Soutar, G.N. and Harrigan, P. (2019), "Tackling social media data analysis: comparing and contrasting QSR NVivo and leximancer", *Qualitative Market Research: An International Journal*, Vol. 22 No. 2.
- World Food Travel Association (2016), *The American Culinary Traveler: Profiles, Behaviors, and Attitudes*, Portland, OR: World Food Travel Association
- World Tourism Organization (2012), *Global Report on Food Tourism*, Madrid: UNWTO
- Zhu, D. and Xu, H. (2021), "Guides' handling of multiple roles in interactions with tourists: the prism of impression management", *Tourism Management*, Vol. 85, p. 104306.
- Zuheros, C., Martínez-Cámara, E., Herrera-Viedma, E. and Herrera, F. (2021), "Sentiment analysis based multi-person multi-criteria decision making methodology using natural language processing and deep learning for smarter decision aid. Case study of restaurant choice using TripAdvisor reviews", *Information Fusion*, Vol. 68, pp. 22-36.

Corresponding author

Iacopo Bernetti can be contacted at: iacopo.bernetti@unifi.it