Identifying Attributes of Wineries that Increase Visitor Satisfaction and Dissatisfaction: Applying an Aspect Extraction Approach to Online Reviews

Abstract

This study analyzes the satisfiers and dissatisfiers of wineries to identify potential asymmetric relationships between winery attributes and visitor satisfaction. By using aspect extraction and a regression approach, a sample of 9,376 reviews corresponding to 524 wineries in Spain, from February 2010 to April 2021, is examined; the main results being that asymmetric effects are found for different attributes. Among the identified six attributes, three ("Wine-related," "Overall experience," and "Staff service") were identified as satisfiers and one ("Cost") as a dissatisfier. An important theoretical contribution is the non-linear nature of the two- and three-factor theories on customer satisfaction in a winery context.

Keywords: wine tourism; satisfaction; sentiment scores; attributes; online reviews.

1. Introduction

In the hospitality and tourism industry, wineries have been one of the major attractions. As wine tourism is being adopted as a strategic plan in many destinations due to its sustainability (Grimstad, 2011) and profitability (Dodd & Bigotte, 1997), wineries—one of the critical elements of wine tourism—are increasingly established across continents. The number of wineries has gradually grown over the past decade in Australia, Europe, and the United States (US) (Conway, 2021; Statista, 2021b). Moreover, the increased interest of tourists in outdoor activities, driven by the aftermath of COVID-19, has accelerated the popularity of wineries (Redacción, 2021). According to a current survey, while the tourists' interests in indoor attractions (e.g., a museum, gallery, or theater) have decreased over 50%, those in outdoor attractions (e.g., a garden, park, or vineyard) have increased about 20% (STR, 2020). Nowadays, ways of providing a satisfying winery experience is an important question not limited to Bordeaux in France or the Napa Valley in the US.

There are multiple winery attributes that contribute to its visitors' satisfaction, including wines, staff service, activities, and associated restaurants or hotels (Getz & Brown, 2006). Numerous researchers have identified the attributes that winery visitors deem important, including the friendliness of the winery staff (Hashimoto & Telfer, 2003), learning experience at wineries (Charters & Ali-Knight, 2002), or the existence of a wine festival (Houghton, 2001). While previous studies have provided useful guidelines for winery managers, most of them do not consider its visitors' perspectives, and the nonlinear nature of satisfaction when identifying critical winery attributes.

On the one hand, given the importance of customer-centric marketing strategies in the service industry, reflecting the customers' inputs when finding key product attributes is essential (Oliver, 2014). Because a significant difference may exist between what service providers and consumers think is important, the attributes that are seriously considered by consumers are difficult to be found without considering their opinions (Lockyer, 2005; Parasuraman et al., 1985). However, most previous studies on winery attributes have primarily relied on the subjective insights of its managers (Carmichael, 2005; Dodd & Bigotte, 1997; Dodd & Gustafson, 1997; O'Neill & Charters, 2000).

On the other hand, with their different functions, winery attributes may not equally elicit its visitors' satisfaction; while some attributes (i.e., satisfiers) make visitors feel satisfied when their performance is high, but the good performance of others (i.e., dissatisfiers) prevents visitors from being disappointed (O'Neill et al., 2002). Such asymmetrical effects of attributes on satisfaction, which are grounded in the two-factor theory of Herzberg et al. (1959b), have to be explained to provide further insights into winery management. However, the asymmetrical relationship between product attributes and customer satisfaction has been overlooked in the winery context (Thomas et al., 2018), while being examined and in other contexts, such as cellar doors (Charters & O'Neill, 2001; O'Neill & Charters, 2000; O'Neill et al., 2002) or wine festivals (Velikova et al., 2017).

These two limitations have stunted our understanding of winery attributes and their effects on visitor satisfaction. This research aims to identify both satisfiers and dissatisfiers of a winery by examining the asymmetrical relationship between winery attributes and visitor satisfaction. In other words, this research investigates how each winery attribute affects visitor satisfaction (i.e., whether the attribute increases satisfaction or dissatisfaction) to find the attributes that make winery visitors satisfied and those dissatisfied; moreover, by way of refinement, we further analyze whether receiving a lower-than-expected performance has a greater effect on satisfaction than receiving a higher-than-expected performance. To achieve the research goal, this study analyzes online reviews for wineries using aspect extraction and a regression approach. With the examination of the asymmetrical relationship between

winery attributes and visitor satisfaction, the results show which of the attributes significantly increase satisfaction and dissatisfaction. By filling the research gap, this research contributes to the literature on a winery by underpinning its visitor satisfaction and dissatisfaction. Practically, the results can develop into specific guidelines for winery management: deploying limited resources to increase satisfaction or decrease dissatisfaction.

2. Literature Review

2.1. Customer satisfaction and two-factor theory

Customer satisfaction is defined as "the customer's subjective evaluation of a consumption experience, based on some relationship between the customer's perceptions and objective attributes of the product" (Klaus, 1985, p. 21). As a critical determinant of tourists' revisits and word-of-mouth recommendations, satisfaction has been recognized as of great importance in the hospitality and tourism literature (Ekinci et al., 2008). The positive impact of satisfaction on tourists' post-purchase behavior has been examined in a variety of contexts, including restaurants (Han & Ryu, 2009), hotels (Choi & Chu, 2001), museums (Harrison & Shaw, 2004), airlines (Park, 2019), festivals (Tanford & Jung, 2017), among others.

Together with its consequences, the antecedents of customer satisfaction have been an important focus of researchers. Based on the assumption that satisfaction with a hospitality service is a sum total of satisfaction with the attributes that customers consider important (Pizam & Ellis, 1999), previous studies have attempted to identify the attributes that affect customer satisfaction. In the restaurant context, Liu and Jang (2009) examined which attributes influence customer satisfaction and suggested that food quality, service reliability, and environmental cleanliness are pivotal to making customers satisfied. Choi and Chu (2001) addressed a similar problem in the hotel context and found three important hotel attributes that determine its customers' overall satisfaction: staff service quality, room qualities, and value. Shin and Elliott (2001) applied the multi-attributes model to airline service and identified six critical service attributes: bagging handling, oversales handling, delay notice, check-in service, staff's interest in dealing with customers' problems, and in understanding customers' needs. The museum and festival experience were also investigated, and a list of attributes was examined as having a significant impact on visitors' overall satisfaction: facilities, exhibition experience, and staff services for museums (Huo & Miller, 2007); programs, amenities, and entertainment for festivals (Cole & Chancellor, 2009).

While these identifications have enhanced our understanding of the multi-attribute model of customer satisfaction, another stream of research has pointed to the need of considering its non-linear nature. Customer satisfaction is a function of performance on different attributes, but it does not necessarily mean that the improved performance on every attribute leads to a corresponding increase in the satisfaction (Anderson & Mittal, 2000). This line of literature has shown that each attribute affects satisfaction or dissatisfaction in a different manner (Mittal et al., 1998). After being originally established as the two-factor theory (Herzberg et al., 1959a), the literature has distinguished attributes into i) satisfiers, which are attributes that are not normally expected by consumers, in which even if they are not provided, they might not adversely affect satisfaction. However, their good performance stands as a positive surprise to consumers; and ii) dissatisfiers, which are attributes that are taken for granted by consumers, wherein their fair performance might not significantly increase satisfaction, but if they are poor, consumers would be extremely dissatisfied. The literature have applied the theory to different contexts, and identified the satisfiers and dissatisfiers of various tourism products, such as hotels (Zhou et al., 2014), restaurants (Johnston, 1995), airlines (Park et al., 2020) or airport services (Bogicevic et al., 2013), ski resorts (Faullant et al., 2008), casinos (Back & Lee, 2015), festivals (Harrington et al., 2017),

shopping (Lee & Choi, 2020), or honeymoon tourism (Lee et al., 2020). Furthermore, some researchers elaborated on the theory by finding various types of attributes, establishing the three-factor theory (Kano, 1984), namely: i) Hybrids: These attributes have symmetrical effects; thus, their higher (lower) performance leads to (dis)satisfaction; ii) Indifferent: These attributes are not related to satisfaction or dissatisfaction; thus, their performance does not significantly increase or decrease (dis)satisfaction; and iii) Reverse: These attributes increase dissatisfaction when they are available and vice-versa.

Together with the multi-attribute model, the non-linear nature has been an important aspect of customer satisfaction in the hospitality and tourism literature (Slevitch & Oh, 2010). However, this aspect has not been taken into account in a winery context, and this limitation has impeded our understanding of the winery visitors' satisfaction.

2.2. Asymmetrical effects of winery attributes on satisfaction

A winery is one of the primary elements of wine tourism, as indicated in its definition, "visitations to vineyards, wineries, wine festivals, and wine shows for which grape wine tasting and/or experiencing the attributes of a grape wine region are the prime motivating factors for visitors" (Hall et al., 2009a, p. 3). A winery can be defined as a business that provides visitors wines, related activities (e.g., wine-tastings, wine making), and other amenities based on different types of facilities, including vine yards, production plants, cellar doors, restaurants, shops, and hotels (Dodd & Beverland, 2001). A winery is usually built beyond metropolitan areas, where grape-growing and wine production are possible. Thus, if it gains prominence in the eyes of consumers, its economic (e.g., business growth, employment generation) and social benefits (e.g., regional development, tourism or corporate investment) may be felt throughout the whole rural area (Hall et al., 2009b). As a profitable rural tourism product, wineries are still rapidly growing in popularity in many regions, not only rural but also urban areas, if their climate is suitable (Getz, 2000). In the US, the total number of wineries has continuously increased by over 50% from 2009 to 2021 (Conway, 2021). In Europe, about 60% of the wine market revenue is normally generated as out-of-home sales (e.g., wineries or wine stores), and the shares are estimated to grow (Statista, 2021a).

Nowadays, a winery involves more than showcasing or selling wines (O'Neill et al., 2002). In the past, most wineries focused on wine production (e.g., selling to passers-by or local stores, creating mailing lists), and thus offered only rudimentary facilities (e.g., vine yards, production plants) with little interest in other amenities (e.g., gift shops, restaurants, hotels) (Dodd & Beverland, 2001; Macionis, 1998). However, as they begun to try to provide added value elements to attract more visitors, wineries have expanded on the experiential aspects. The way a winery advertises itself also changed from a focus on wine products to a wider focus on other experiences, such as the surrounding environment, wine-tastings or tours, dining, and accommodation (Williams, 2001). In response to such changes, a winery visitor's interest has now extended beyond the wine quality or price, to encompassing the characteristics or attitudes of the staff, the tasting room atmosphere, and attractiveness of the site (Carmichael, 2005).

As wineries become a bundle of services and activities that constitute a holistic experience (Bruwer & Lesschaeve, 2012; Stergiou et al., 2018), researchers have started to identify the critical attributes that drive visitor satisfaction (Griffin & Loersch, 2006). In the early stages, researchers argued that the visitor's perception is affected by three attributes: wine (taste, quality, aroma, etc.), winery environment (pleasant environment, attractiveness of winery, displays, and so on), and service (friendliness, courteousness, knowledge of the personnel, and so on) (Byrd et al., 2016; Dodd & Bigotte, 1997; Dodd, 1995; Dodd & Gustafson, 1997). Numerous studies have built on the early findings by either adding new or specifying the existing attributes.

On the one hand, a stream of literature added new attributes, which are significant in affecting visitor satisfaction, not captured in the early studies. Ali-Knight and Charters (1999) suggested adding a wine education experience (e.g., learning how to make or taste wines) as another primary attribute. This suggestion was supported by findings that a learning experience is one of the major motivations to visit wineries (Alant & Bruwer, 2004; Asero & Patti, 2011; Bruwer, 2003; Charters & Ali-Knight, 2002). Through Galloway et al. (2008), two more attributes were proposed, together with a learning experience, namely, reputation of a winery or its region and value for money (e.g., price of wines or cost of wine tastings). By exploring the differences in destination selection criteria between wine and non-wine tourists, Williams and Kelly (2001) argued the importance of leisure attributes in driving winery experience. Cohen and Ben-Nun (2009) supported the argument by finding that tourists' decision to visit a winery is shaped by their willingness to experience leisure activities or attractions during the visit. Among the leisure attributes, the impacts of wine festivals upon the wine tourists' expectations were particularly emphasized in some studies (Dodd et al., 2006; Houghton, 2001; Yuan et al., 2005). By emphasizing the importance of providing a convenient experience to first-time visitors for wineries in emerging regions, Griffin and Loersch (2006) suggested a convenience attribute (e.g., easy-to-find signage, adequate parking, or convenient opening times). A winery's website operation was examined by Getz and Brown (2006) as an important attribute to be assessed based on the importance of online marketing.

On the other hand, another stream expanded on the previous studies by taking one of the existing attributes and creating different sub-attributes. Nowak and Newton (2006) subdivided a wine attribute into two sub-attributes: product quality and pricing. As for the service attribute, most studies used the established service quality measurement, such as SERVQUAL or SERVPERF, to suggest its sub-attributes (e.g., responsiveness, assurance, or empathy) (Carmichael, 2005; O'Neill & Charters, 2000; O'Neill et al., 2002). Contrary to the previous studies binding all the activities into a single attribute, Quadri-Felitti and Fiore (2012) subdivided it into four sub-attributes: entertainment (e.g., cellar concerts, music in vineyard), educational (e.g., wine-tastings, wine making seminars), esthetics (e.g., staying in a unique lodging, art fairs at wineries), and escapist (e.g., vineyard hiking, riding a grape picker). In the study of Pan et al. (2008), a winery atmosphere attribute was investigated and its five sub-attributes were examined as influencing the visitor's purchasing behavior (i.e., exterior, interior, design, display and layout, and participant). Some researchers have studied more specific attributes. Shapiro and Gómez (2014) focused on a wine tasting room and found the significant effects of its five sub-attributes on visitor satisfaction (i.e., ambience, service, tasting protocol, tasting experience, and retail execution). While Charters et al. (2009) also studied a wine tasting room, they proposed different sub-attributes, such as the aesthetics of the room, service encounter, and sales and charging of tasting. In case of Yuan and Jang (2008) study, a wine festival experience was focused and three sub-attributes were suggested, which were facilities (e.g., entertaining music, ideal location, convenient parking), wine (e.g., variety of wine, multiple winery participants), and organization (e.g., short waiting lines, reasonable admission price).

Although these studies have provided valuable insights into winery visitor satisfaction by identifying the critical antecedents, two major limitations have restricted the understanding of which and how winery attributes lead visitors to be satisfied. First, in many instances, the customer's perspective has not been considered. Considering that satisfaction is based on a customer's judgement about the overall experience, it is important to reflect their opinion for identifying the critical drivers of its satisfaction (Oliver, 2014). However, when generating a list of winery attributes to be examined in terms of their effects on visitor satisfaction, numerous early studies have only conducted an interview with winery managers or experts (Carmichael, 2005; Dodd & Bigotte, 1997; Dodd & Gustafson, 1997; O'Neill &

Charters, 2000), and the list has been frequently used as the primary reference for subsequent studies (Shapiro & Gómez, 2014; Thomas et al., 2018). Given the significant gap between what companies and customers think is important in product evaluation in the service industry, the existing studies could miss the attributes that winery visitors value, or overemphasize those that they do not seriously consider (Lockyer, 2005; Parasuraman et al., 1985).

Second, most previous studies have not considered the asymmetrical effects of attributes on satisfaction. The non-linear nature has been an essential framework for understanding customer satisfaction in the hospitality and tourism literature (Slevitch & Oh, 2010). By examining that even the higher performance of complementary products (e.g., local products other than wines) does not lead to winery visitors' positive perception, Quintal et al. (2015) indicated the need to examine the asymmetrical effects of winery attributes on the satisfaction. However, previous research has primarily focused on the linear relationship between winery attributes and its vistor satisfaction (Byrd et al., 2016; Dodd & Gustafson, 1997; Griffin & Loersch, 2006; Nowak & Newton, 2006). It has rarely discussed which winery attributes are important particularly for increasing the satisfaction or for decreasing the dissatisfaction.

The guidelines derived from these findings could mislead winery managers to generate sub-optimal decisions about how much resources to allocate to each attribute. To further our knowledge about winery visitor satisfaction and provide a valid guideline for managers in terms of strategic resource allocation, there is a need to identify the attributes that a visitor, rather than a manager, deems critical in evaluating her or his experience, and to examine their asymmetrical, rather than linear, relationship with satisfaction.

3. Research Objective

This research seeks to identify the critical winery attributes from the visitor's point of view by analyzing online reviews. Online reviews are generally considered to be unfiltered and candid opinions of consumers because they write the reviews voluntarily based on their actual experience, and are free to write whatever they feel about the experience (Hennig-Thurau et al., 2004). By placing consumers in a central role, online reviews are recognized as more effective sources than pre-designed survey data in representing why consumers are satisfied or dissatisfied (Liu et al., 2017; O'connor, 2010). When writing an online review, consumers might focus on the attributes that are important for their evaluation; they are unlikely to frequently mention the counterparts (i.e., attributes which were not seriously considered and difficult to evaluate precisely), because uncertain or abstract information could make their reviews less reliable (Li et al., 2013; Shin et al., 2019). In this regard, we extract the words related to winery attributes from the online review text, which are frequently mentioned or emphasized by reviewers, through an aspect extraction approach to identify critical attributes.

The interface design of a popular online review website (e.g., TripAdvisor) induces users to make an overall assessment first, then explain their evaluation: a rating section is placed above a text box. If consumers provide a higher (lower) rating, they might try to explain it by focusing on the attributes that increased their (dis)satisfaction, because the explanations about the other attributes irrelevant to the (dis)satisfaction could render their reviews unnecessarily long and inconsistent (Fink et al., 2018; Huang et al., 2015). If words related to a certain attribute (e.g., additional services: restaurants, accommodations, gift shops) are frequently mentioned in the text of a higher-rated review, but rarely in that of a lower-rating one (i.e., a positive relationship between frequency of attribute words and overall rating), such an attribute is likely to be the satisfier and vice-versa. In this regard, we measure the relationship between

frequency of words about a specific attribute and overall rating to examine the focal attribute's asymmetrical effect on satisfaction. Specifically, we conduct a regression analysis by treating a single online review as a unit of analysis, with its overall rating being an independent variable, and the frequency of attribute words as a dependent variable.

In conclusion, this research aims to show which winery attributes have a significant impact on satisfaction (i.e., satisfiers) and dissatisfaction (i.e., dissatisfiers) by analyzing online reviews about wineries through an aspect extraction and a regression approach. To extend the analysis of asymmetrical non-linear effects and further contribute to this research gap, we introduce prospect theory (Kahneman & Tversky, 1979). According to this theory, reference-dependent assessments take place every time people has to make the comparison between the outcome of a service and their expectations of that outcome. In this context, loss aversion emerges as a critical property through which *losses* (receiving a lower-than-expected performance) has a greater effect on satisfaction than *gains* (receiving a higher-than-expected performance). In our context, in line with this principle of loss aversion, the higher- or lower-than-expected performance of a winery—and the satisfaction thereof—would bring about a higher or lower number of mentions depending on the character of the attribute.

4. Methodology

4.1. Data collection

To collect online reviews about wineries, we used one of the leading online review communities, namely, TripAdvisor. As for wineries, all wineries in Spain that are searchable on TripAdvisor were targeted. Spain is one of the traditional wine growing areas and was ranked second in terms of wine export, third in production, and eighth in consumption in 2020 (The International Organisation of Vine and Wine, 2017). Despite its established popularity as a wine-related region, Spain has received little attention in the literature on wine tourism, and specifically in terms of the winery visitor satisfaction (Molina et al., 2015; Thomas et al., 2018). Every English-written review about all wineries in Spain registered on TripAdvisor was collected through a web scraping program (i.e., WebHarvy) on May 1, 2021. While 718 wineries were retrieved, 190 were disregarded because they did not have an English-written review; moreover, following the literature, we excluded excessively short reviews (i.e., lower than ten words in the text) because they are difficult to include significant information (Gao et al., 2018). A total of 9,376 reviews were collected from 524 wineries, and the observation period spanned from February 2010 to April 2021.

4.2. Variables development

As for dependent variables, we measured how much certain winery attributes are mentioned in the text of each online review. First, through an aspect-extraction approach, we identified the words related to winery attributes that were frequently mentioned or emphasized. As an essential step of opinion-mining, aspect extraction is a technique that extracts words about aspects of a focal entity. For instance, if it applies to online reviews about smartphones, the results show what specific attributes are evaluated by presenting a list of words related to the attributes. As it extracts the aspect-level words based on their weight, which is usually indicated by their frequency, aspect extraction is effective in identifying the aspects of an entity, on which a writer focuses (Hu & Liu, 2004). Thus, we adopted this technique to identify the winery attributes that visitors deem important for their evaluation. After aggregating the text of all collected reviews, we pre-processed the corpus through tokenization (i.e., splitting text into words or sentences), stop word removal (i.e., removing unnecessary words in terms of meaning), and lemmatization (i.e., converting a word to its base form). After the pre-processing, we used the Apache OpenNLP MaxEnt PoS tagger to tag parts of speech (PoS) (Toutanova et al., 2003). Then, we collected

all nouns or noun phrases and calculated their support values (i.e., the total number of appearances of a noun or phrase, divided by the total number of online reviews). According to a rule of thumb, we defined all nouns or phrases whose support values were higher than 1% as frequent, and thus as important attribute words (Bagheri et al., 2013).

While frequency is a valid indication of the importance of a noun or phrase, even the important aspect-level words can be mentioned only once or twice. To capture such cases, we used another detecting method, which is syntax: the adjectival relationship between sentiment and aspect-level words. Specifically, we extracted the nouns or phrases that had an adjectival relationship with the important winery attribute words identified in the previous step, and defined them as possible winey attribute words of interest. For example, in our data set, the word "staff" was extracted as an important attribute word. Through the syntax-based detecting method, the word "information" was examined as having an adjective relationship with "staff". By scanning the raw text data, we found that the pre-lemmatized word of "information", which is 'informative', is frequently mentioned with the word 'staff'. Such words ("friendly" or "knowledgeable") were also identified as important attribute words. Through the K-means clustering and elbow method, we found that all extracted winey attribute words can be clustered into six groups. Each group was categorized as "Wine-related", "Overall experience", "Additional attraction", "Food", "Cost", and "Staff service" (Table 1).

For each online review, we counted the number of mentions of the attribute words included in the categories "Wine-related", "Overall experience", "Additional attraction", "Food", "Cost", and "Staff service". These six values were used as dependent variables for further analysis. The entire process was conducted through the R statistical package.

Table 1. Winery attribute words in different groups

Wine-related	Overall experience	Additional attraction	Food	Cost	Staff service
Wine	Visit	Taste	Tapas	Worth	Informative (staff)
Sherry	Winery	Guide	Food	Euro	Staff
Bodega	Time	History	Lunch	Price	Friendly (staff)
Barrel	Place	Museum	Restaurant	Money	Knowledgeable (staff)
Vineyard	Experience	Shop	Bar	Cost	Service
Glass	Trip	Tour	Brandy	Free of charge	
List	Area	Gift		Expensive	
Bottle		Hotel		Value	
Cellar door		Walk			

As for an independent variable, the overall rating was used as a proxy for the level of customer satisfaction; the higher the rating, the higher the satisfaction level. The 1 to 5-star scale of TripAdvisor was used as a continuous variable.

As for control variables, among the information components available in each online review, we used those that were examined as having a significant relationship with the overall rating: the points that a reviewer has accumulated by making different contributions (e.g., writing a review, leaving a rating, uploading a photo, asking a question in TripAdvisor forum) (reviewer contribution) (Pu et al., 2018), the

number of words written in review text (review length) (Shin et al., 2021), sentiment (review sentiment), and readability of review text (review readability) (Cruz & Lee, 2016; Xiang et al., 2017). The "emotional tone" score of LIWC was used for measuring review sentiment (0: negative; 100: positive) (Tausczik & Pennebaker, 2010), and the Flesch-Kincaid score for review readability (0: hard to read; 100: easy to read) (Flesch, 1948).

The descriptive statistics of these variables are shown in Table 2. The mean values for "Wine-related", "Overall experience", "Additional attraction", "Food", "Cost", and "Staff service" indicate that the attribute words of each category are mentioned on average 4.39, 1.93, 1.99, 0.61, 0.52, and 0.46 times per a review respectively.

Table 2. Descriptive statistics.

Variable	Mean	Std. error	Min.	Max.
Overall rating	4.57	0.84	1	5
Wine-related	4.39	3.78	0	55
Overall experience	1.93	1.88	0	30
Additional attraction	1.99	1.98	0	51
Food	0.61	1.02	0	13
Cost	0.52	0.94	0	16
Staff service	0.46	0.74	0	5
Reviewer contribution	326.13	5255.34	1	482,002
Review length	88.21	68.08	11	1,773
Review sentiment	87.32	20.57	1	99
Review readability	9.64	5.16	0.37	96.47

4.3. Model development

To conduct a regression analysis, we used a negative binomial count-data model. This model is appropriate when a dependent variable follows a Poisson distribution and its mean and variance are unequal. All six dependent variables fulfilled both conditions (Figure 1) (Table 2). Following Gurmu & Trivedi (1996), the model is specified as

$$P(y_t) = \frac{\Gamma(\alpha^{-1} + y_t)}{\Gamma(\alpha^{-1})\Gamma(y_t + 1)}\left(\frac{\alpha^{-1}}{\alpha^{-1} + e^{\sum_{k=1}^{K}\beta_k x_{tk}}}\right)^{\alpha^{-1}}\left(\frac{e^{\sum_{k=1}^{K}\beta_k x_{tk}}}{\alpha^{-1} + e^{\sum_{k=1}^{K}\beta_k x_{tk}}}\right)^{y_t} \forall y_t = (\text{Aaker \& Lee, 2001...})$$

where y_t is the number of times a word is mentioned, Γ is the Gamma function, x_{tk} includes the ratings and the control variables (k) of online review t, β_k is the set of parameters to be estimated, and α captures the dispersion, in which that

$$E(y_t) = e^{\sum_{k=1}^{K}\beta_k x_{tk}} = \lambda_t \text{ and } V(y_t) = e^{\sum_{k=1}^{K}\beta_k x_{tk}} + \alpha \cdot e^{2\sum_{k=1}^{K}\beta_k x_{tk}} = \lambda_t + \alpha \cdot \lambda_t^2.$$

To verify that the Negative Binomial model is superior to the Poisson model, we can test the null hypothesis $\alpha=0$ by using a t test. If this hypothesis cannot be rejected, then it would indicate that E(yt)=V(yt), which means that the Poisson model is a particular case of the Negative Binomial when $\alpha=0$ (Gurmu & Trivedi, 1996). To remove multi-collinearity issues, centralization was applied to all variables

and their variance inflation factors were below 10. All regression analyses were conducted through the R statistical package.
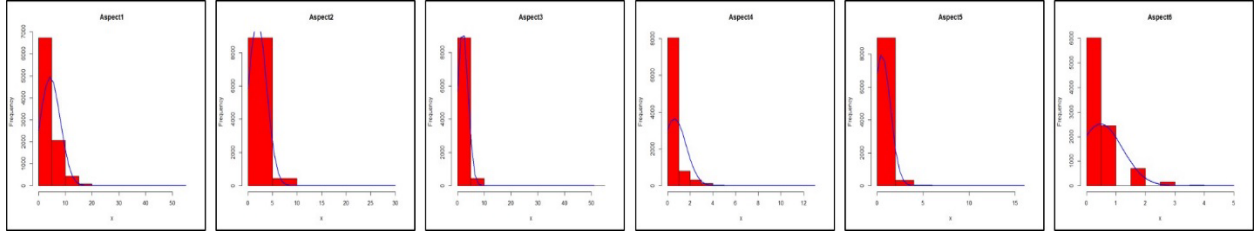

Figure 1. Poisson distribution of six dependent variables (From left: "Wine-related," "Overall experience," "Additional attraction," "Food," "Cost," and "Staff service").

In order to analyze the loss aversion phenomenon, we introduce Kahneman and Tversky (1979) basic tenets in our model. Thus, by using the dependent variable $Mentions_i$ as the number of times an attribute is mentioned in a review, we define the variable $Gain_i$ which is equal to the difference $Actual$ $Rating_i$ - $Expected$ $Rating_i$ if that difference is positive and zero otherwise; and the variable $Loss_i$ which is equal to the difference $Actual$ $Rating_i$ - $Expected$ $Rating_i$ if that difference is negative and zero otherwise. The variable $Actual$ $Rating_i$ is obtained as indicated earlier, and the $Expected$ $Rating_i$ is obtained through the mean value of ratings for a specific winery. The resulting model is as follows:

$$Mentions_i = \alpha + \beta \cdot Gain_i + \gamma \cdot Loss_i + \sum_{j=1}^{J} \delta_j \cdot CV_{ij}$$

where CV_{ij} are J control variables and the parameters α, β, γ and δ_j are to be estimated.

5. Results

Table 1 shows the results of the identification of winery attributes that visitors deem important in their evaluation. A total of 44 words were extracted, which indicated six attributes: "Wine-related," "Overall experience," "Additional attraction," "Food," "Cost," and "Staff service."

Table 3 shows the results of the examination of the asymmetrical relationship between each winery attribute and satisfaction. The likelihood ratio (LR) chi-square has shown that all six regression models have significantly higher exploratory power compared to the models without any independent variables—Model 1 (Dependent variable: Frequency of words about "Wine-related"): LR x^2 = 8.088, $p <$ 0.05; Model 2 (Dependent variable: Frequency of words about "Overall experience"): LR x^2 = 14.366, $p <$ 0.001; Model 3 (Dependent variable: Frequency of words about "Additional attraction"): LR x^2 = 21.139, $p < 0.001$; Model 4 (Dependent variable: Frequency of words about "Food"): LR x^2 = 7.725, $p < 0.05$; Model 5 (Dependent variable: Frequency of words about "Cost"): LR x^2 = 74.029, $p < 0.001$; Model 6 (Dependent variable: Frequency of words about "Staff service"): LR x^2 = 12.729, $p < 0.001$.

As for the asymmetrical relationship, three attributes ("Wine-related," "Overall experience," and "Staff service") were examined as having a positive relationship with overall rating, which meant that winery visitors tend to mention the words about those attributes frequently when explaining their satisfactory experience, but less when it is the opposite ("Wine-related": $b = 0.0822$, $p < 0.001$; "Overall experience": $b = 0.1101$, $p < 0.001$; "Staff service": $b = 0.0650$, $p < 0.001$). On the contrary, the relationship between the "Cost" attribute and overall rating was significantly negative, indicating that winery visitors tend to mention the words about the attribute frequently when explaining disappointing

experiences, but they mention it less when it is the opposite ("Cost": $b = -0.1386$, $p < 0.001$). The other two attributes were not significantly related to overall rating ("Additional attraction": $b = -0.0143$; "Food": $b = -0.0200$). According to the two-factor theory (Herzberg et al., 1959a), "Winery-related", "Overall experience", and "Staff service" can be categorized as satisfiers, and "Cost" as a dissatisfier.

Table 3. Asymmetrical relationship between each winery attribute and satisfaction.

Coefficient	Model 1 ("Wine-related")	Model 2 ("Overall experience")	Model 3 ("Additional attraction")	Model 4 ("Food")	Model 5 ("Cost")	Model 6 ("Staff service")
Overall rating	0.0822[a]	0.1101[a]	-0.0143	-0.0200	-0.1386[a]	0.0650[a]
Reviewer contribution	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Review length	0.0065[a]	0.0055[a]	0.0057[a]	0.0062[a]	0.0058[a]	0.0023[a]
Review sentiment	0.0000	-0.0001	-0.0009	0.0013	0.0018	0.0029[c]
Review readability	0.0062[a]	0.0089[a]	0.0046[a]	0.0009	0.0048	0.0025
LR x^2	8.088[c]	14.366[a]	21.139[a]	7.725[c]	74.029[a]	12.729[a]
Efron's pseudo R^2	0.093	0.070	0.077	0.042	0.040	0.008

[a] = $p < 0.001$; [b] = $p < 0.01$; [c] = $p < 0.05$

While "Additional attraction" and "Food" did not exhibit a significant relationship with overall rating, they could have the U-shaped (inverted U) relationship. If so, then they need to be categorized as hybrids (indifferent), according to the three-factor theory (Kano, 1984), because it means that they are more (less) mentioned by winery visitors when discussing their satisfactory and dissatisfactory experience. Thus, we conducted a regression analysis for model 3 and 4 by including another independent variable, which is squared overall rating, and the findings are presented in Table 4. In both models, no significant U-shaped (inverted U) relationship was found, indicating that the words about the "Additional attraction" and "Food" attributes tend to be mentioned by winery visitors, regardless of whether they are satisfied or dissatisfied.

Table 4. U- or inverted U-shaped relationship between "Additional attraction" or "Food" and overall rating.

Coefficient (Std. error)	Additional attraction	Food
Overall rating squared	-0.004	-0.005
Reviewer contribution	0.000[a]	0.000[a]
Review length	0.007[a]	0.006[a]
Review sentiment	0.000	0.002
Review readability	0.004	0.000
LR x^2	1262.198[a]	746.474[a]
Efron's pseudo R^2	0.0610	0.0419

[a] = $p < 0.001$; [b] = $p < 0.01$; [c] = $p < 0.05$

Regarding the results of the reference dependence analysis (Table 5), we find that "Wine-related" and "Overall experience" have a negative and significant sign for gains (-0.156 and -0.124) and a positive and significant sign for losses (0.119 and 0.116), which means that people tend to mention wine-related attributes when their satisfaction is lower than expected. "Additional attraction", "Food" and "Staff service" present a gain parameter than is significantly higher than the loss parameter (0.127>0.040; 0.231>0.004; 0.144>0.036), which means that the number of mentions increases as satisfaction rises. Interestingly, "Cost" shows a positive and significant sign for gains (0.262) and a negative and significant sign for losses (-0.137), which means that people tend to mention cost-related attributes when their satisfaction is higher than expected. By looking at the text of the reviews that mention "Cost", it is noticeable that many of them implicitly emphasize the concept of value for money: they are satisfied with the winery, but they point out that the price paid was a bit high for the service received.

Table 5. Analysis of reference dependence in the relations between winery attributes and satisfaction.

Coefficient	Model 1 ("Wine-related")	Model 2 ("Overall experience")	Model 3 ("Additional attraction")	Model 4 ("Food")	Model 5 ("Cost")	Model 6 ("Staff service")
Gain	-0.156[a]	-0.124[a]	0.127[a]	0.231[a]	0.262[a]	0.144[c]
Loss	0.119[a]	0.116[a]	0.040[c]	0.004	-0.137[a]	0.036
Reviewer contribution	0.00005	-0.00005	-0.00006	-0.00002	-0.00004	-0.0002
Review length	0.006[a]	0.005[a]	0.006[a]	0.006[a]	0.006[a]	0.002[a]
Review sentiment	0.000	0.000	-0.002[a]	0.001	0.001	0.004[a]
Review readability	0.006a	0.009[a]	0.004[c]	0.001	0.004	0.003
Constant	0.775[a]	0.014	0.217[a]	-1.217[a]	-1.468[a]	-1.326[a]
LR statistic	10493.1[a]	3543.9[a]	4253.0[a]	1885.5[a]	1665.5[a]	234.6[a]

[a] = $p < 0.001$; [b] = $p < 0.01$; [c] = $p < 0.05$

6. Conclusion

As wine tourism is continuously growing in popularity in different areas, many regions have made investments toward building or developing wineries (Conway, 2021; Statista, 2021a). Nowadays, a way to provide a favorable winery experience is a question numerous destinations have to address. While a variety of attributes constitute a winery experience, not every attribute is equally considered by visitors. Thus, reflecting the visitor's opinion to identify critical winery attributes that drive its satisfaction is essential. Furthermore, because each attribute does not elicit satisfaction in a constant way, it is also important to explain how each affects satisfaction. By using online reviews about wineries in Spain, this research identified the winery attributes that visitors deem important, and examined how differently such attributes affect visitor satisfaction.

6.1. Theoretical implications

Regarding the theoretical implications, while many winery studies have identified the attributes critical for visitor satisfaction, a customer perspective has been overlooked. It is essential to reflect a customer perspective to identify the critical drivers of its satisfaction (Oliver, 2014). However, most previous studies have identified critical winery attributes primarily based on the manager's opinion

(Carmichael, 2005; Dodd & Bigotte, 1997; Dodd & Gustafson, 1997; O'Neill & Charters, 2000). This research addresses this limitation by using visitors' opinions as the main reference for the identification. Furthermore, this research supports the previous argument for the importance of considering a customer perspective in identifying critical attributes by finding the under-valued attribute from a manager perspective (O'Neill & Charters, 2000; O'Neill et al., 2002), which is a food-related attribute (Thomas et al., 2018). Its significant effect on visitor satisfaction confirms the previous propositions that food can be a core element of the winery experience (Stergiou, 2019).

Second, this research validated the application of the two-factor theory of Herzberg et al. (1959b) and the three-factor theory of Kano (1984) in the winery context. By applying the theories, many hospitality and tourism studies have emphasized the importance of considering the non-linear nature of customer satisfaction in various areas, hotels (Zhou et al., 2014), restaurants (Johnston, 1995), airlines (Park et al., 2020), ski resorts (Faullant et al., 2008), festivals (Harrington et al., 2017) and so on. However, the asymmetrical effects of attributes on customer satisfaction have not been considered in a winery context. By examining that winery attributes affect its visitor satisfaction or dissatisfaction in a different manner, this research confirms the importance of considering the non-linear nature of customer satisfaction in a winery context based on the two-factor and three-factor theory. This research provides an important implication for future winery studies by calling for a certain framework to be considered to further understand its attributes' effects on visitor satisfaction. As for the insignificant effects of "Additional attraction" and "Food" attributes, it can be explained by the structure of winery business in Spain. According to the report published by Foods & Wines From Spain (2017), small, domestic capital, and family-owned businesses accounted for the majority of a winery business in Spain. While there are a few large companies who operate several production centers in different regions and offers a variety of activities to visitors, most Spanish wineries focused on providing quality wines and developing greater grape varieties. Considering that visitors of Spanish wineries are not easy to enjoy additional facilities or amenities, the related attributes (e.g., restaurants, hotels, or museums) might be less critical for them to evaluate their experience.

Third, with regard to reference dependence, its introduction in the analysis of winery online reviews sheds additional light on the non-linear and asymmetric relationships between behavioral variables, such as satisfaction and mentions. Aligned with the previous studies testing the basic tenets of prospect theory via online reviews in the hotel context (Mellinas & Nicolau, 2020; Sharma et al., 2020), this research has confirmed reference dependence in the winery context. The findings indicate that for the analyst to have a comprehensive panoramic of the effect of satisfaction on elements of the content of reviews (such as number of mentions of key attributes), the basic tenet of prospect theory, i.e. reference dependence, must be considered. In the same vein, the examination of the influence of satisfaction on mentions should be complemented by the use of relative metrics apart from absolute measures. Thus, only through the use of reference points, studies can detect potential asymmetries. Absolute measures can certainly show the effect of satisfaction on mentions, but the inclusion of the principle of reference dependence provides richer information on this effect and better shows how people assess and write their online posts.

Lastly, in terms of methodological implications, this study is one of the few winery studies that use online review data. Through a huge number of studies, an online review has been recognized as a valuable source representing tourist's satisfaction (Schuckert et al., 2015). However, only a few recent winery studies have adopted online reviews as the main data sources (Gunasekar et al., 2021; Hsieh et al., 2019; Massa & Bédé, 2018). Most current winery studies still relied on survey data (Shapiro & Gómez,

2014; Thomas et al., 2018). Considering that such studies targeted a single or several wineries due to the difficulty in collecting survey data from multiple entities, adopting online reviews can be also effective in addressing the lower generalizability issue of existing winery studies. Accordingly, this research can be a benchmark for future winery researchers to improve their findings' validity and generalizability.

6.2. Practical implications

With regard to practical implications, this research provides winery managers with insights into what their customers seriously consider and how they evaluate their experience. To improve their products or services, winery managers should have a working knowledge of the critical attributes affecting their customer satisfaction (Bilgihan et al., 2018). Our findings indicated that managers of Spanish wineries should invest in keeping the quality of their wines high and educating their staff to increase visitor satisfaction.

If the specific words of the "Wine-related" attribute (e.g., "Sherry," "Bodega," "Barrel," or "Glass") are considered, our findings could enable the managers to identify particular areas in which additional supervision may be needed, such as a cellar where sherry wines are stored or a wine glass. As for those of the "Staff service" attribute (e.g., "Informative," "Knowledgeable"), this research might help the managers determine what specific skills need to be prioritized in staff training, such as a workshop that discusses a list of questions that visitors frequently ask. Considering that the key winery attributes proposed by previous studies were not primarily derived from the visitors' inputs, our findings will be more effective in establishing customer-centric marketing strategies.

Furthermore, winery managers need to take care of satisfaction and dissatisfaction because a successful performance can come not only from increasing the former, but also decreasing the latter (Kim et al., 2016). This research can be an opportunity for winery managers to fine-tune their resource allocation strategies depending on their different goals: the wineries aiming at increasing satisfaction should focus on "Wine-related," "Overall experience," and "Staff service" attributes, but those trying to decrease dissatisfaction would need to improve their "Cost" attribute.

Finally, this research provides guidance for a winery to utilize online reviews strategically. Other than measuring previous visitors' overall satisfaction or dealing with their complaints, wineries have not been aware of what other contributions online reviews could bring to their performance. Our findings indicated that winery managers can identify satisfiers, dissatisfiers, or hybrids by examining the relationship between frequency of attribute words and overall rating. From the perspective of cost-effectiveness, such methods can help avoid the cost in obtaining the winery visitor's assessment, thereby making it one of the best means of developing a tool for understanding what and how winery attributes may affect visitor satisfaction (Law et al., 2014). Furthermore, considering that collecting the data longitudinally is possible, this method could also be helpful to track and monitor the changes in customer's perception or expectation, which are driven by various causes, such as COVID-19.

6.3. Limitations and future research directions

However, this work has several limitations that require to be considered. First, we used only the online reviews about wineries in Spain. Because the findings are location-specific, they are difficult to be generalized to the wineries in other regions. For example, some of the attributes identified as critical 'new world' regions may not be the case in the 'old world' (Quintal et al., 2015). Future studies can extend to wineries located in other regions and assess how different key attributes are identified, or how they differently affect satisfaction. As we analyzed only English-written reviews, the local visitor's opinion might be less reflected in our findings.

Second, we did not consider visitors' mixed experiences with a winery, satisfied with certain attributes and not with others. We assumed that all the attributes written in a (lower-) higher-rated review are (negatively) positively evaluated. However, it may not be always the case. Even in higher-rated reviews, the visitors could talk about the attributes with which they were dissatisfied. As this research considered a review-level sentiment alone, such nuances were not captured. Future studies should adopt a qualitative or an elaborate opinion-mining approach, which can detect whether a single aspect-level word is positively or negatively described, such as aspect-based sentiment analysis (Thet et al., 2010).

Third, the mean of the overall rating in our sample was high (4.57 out of 5), making it difficult to examine the negative asymmetrical effects of attributes. As for this limitation, future studies can use the review text instead of its rating to assess the level of winery visitor satisfaction (Park & Kim, 2017). Fourth, we did not consider every potential factor that could affect the overall rating, such as the visitor's (e.g., nationality, age, expertise in wines) or winery's characteristics (e.g., location, reputation, service level), which should be further investigated by future studies.

Lastly, the sample size is another limitation. Considering that data-mining practices can yield more valid and correct results with larger samples, future research needs to expand the data size, possibly by collecting online reviews from multiple sources (e.g., Yelp, OpenTable, and so on).

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