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Master Degree Program in  
Data-Driven Marketing

## THE IMPACT OF COVID-19 ON 5-STAR HOTELS' CUSTOMER PRIORITIES

Kevin Bueno Cabral

Dissertation presented as partial requirement for obtaining  
the master's degree in data-Driven Marketing, with  
specialization in Marketing Intelligence

NOVA Information Management School  
Instituto Superior de Estatística e Gestão de Informação  
Universidade Nova de Lisboa

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## **ABSTRACT**

This study investigates user-generated reviews in the high-end hotel industry in the city of Lisbon, London, and Paris to identify important attributes to guests and the sentiment behind them. The goals are to discover if the COVID-19 pandemic affected guest priorities, expectations, and perceptions before, during, and after it. In total 222,679 reviews from 281 five-star hotels were retrieved, organized, and analyzed through different text mining techniques and sentiment analysis. The results show that during that because of the pandemic, guests started prioritizing more the quality of service and interaction they had with the hotel staff over any other attributes. When comparing the three distinct locations guests had similar changes in priority. Insights from this study can help hotel managers better plan and prepare their services during and after pandemics.

## KEY WORDS

Pandemic, COVID-19, user-generated content, reviews, hotels, tourism, text mining, sentiment analysis, competitive importance analysis, Lisbon, Paris, London.

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# 1 INTRODUCTION

On March 11, 2020, the World Health Organization (WHO) declared the COVID-19 outbreak a pandemic (Cucinotta & Vanelli, 2020), forcing countries to close their borders and put their citizens in a lockdown state (Sherman et al., 2021). COVID-19 has not been the first pandemic to put the world, or parts of it, in lockdown. Three major pandemics have happened in the world in the twentieth century: (Sucheran, 2021): the Spanish flu (1918-1919); the Asian flu, H2N2 (1957); and the Hong Kong flu (1968). And in the twenty-first century - as far as 2023 - five major pandemics (Sucheran, 2021) have made us realize time again how fragile human race is: Severe Acute Respiratory Syndrome, SARS (2002); Bird flu (2009); Middle East Respiratory Syndrome, MERS (2012); Ebola (2013-2014); and COVID-19, coronavirus (2020). As international trade and travel become more common, the increase of pandemics comes as no surprise.

Regarding the death count, COVID-19 is the worst pandemic in the United States of America (McKeever, 2021). This new pandemic has had a high number of deaths in every country in the world. It had over 8.86 million confirmed infections in four months and 465,000 deaths globally (WHO, 2020). Besides many victims, COVID-19 has caused more damage to the economy worldwide than any other before (R. Sucheran, 2021). In tourism only, The United Nations World Tourism Organization (UNWTO) estimated a loss of \$1.1 trillion worldwide. A direct result of the large decrease in hotels' room occupation rate, which was of only 10% to 20% in Europe (António & Rita, 2020) and worldwide.

Travel and tourism are highly connected with pandemics since they are a significant contributor to the spreading of such diseases all over the world. Thus, it also becomes one of its main victims (Monterrubio, 2010). During COVID-19, many hotels had to close or change their business strategy and develop creative ideas and safety measures to stay open during these difficult times. Nevertheless, that was still not enough; many hotels had to depend on government aid to keep the lights on as they were not getting enough customers to cover all their bills (AHLA, 2020).

Previous literature has examined areas and ways hotels can change and adapt to overcome the challenges presented by COVID-19 (e.g., Bonfanti et al., 2021; Garrido-Moreno et al., 2021; Japutra and Sitmorang, 2021). Studies have analyzed the economic impact pandemics have on the tourism industry (e.g., Monterrubio, 2010; Sucheran, 2021). While these studies focus on tourism's business and its monetary side, they ignore the pandemic's impact on travelers and how that affects their habits moving forward.

Some literature has used user-generated content (UGC) to measure how pandemics affect hotel guest preferences and behaviors (e.g., HU et al., 2021; Peres et al., 2021; Kim et al., 2012). They do that by analyzing online reviews about hotels' services, goods, and quality. With this data, they identify meaningful attributes related to hospitality and tourism through the eyes of the customers and, at the same time, gain knowledge of their habits and see possible trends. It is important to notice that even though this is a growing area of study, previous research has not established a consensus on the relevance and level of quality of hotels' attributes (Peres and Paladini, 2021).

Furthermore, each study only focuses on one specific geographical area, such as South Korea (Bae and Chang, 2021), Spain (Garrido-Moreno et al., 2021), China (Guo, Barners, and Jia, 2017), but never on groups of countries. The studies also differ in the types of hotels they analyze and platforms they choose to collect their data from. The main reason behind these differences is the cultural difference

in each region (Ma, Du, and Wang, 2021), both from the hotel's perspective and the clientele they attract. How each country deals with COVID-19 also plays a big part in why they choose to research isolated countries. The impact on the tourism sector will be different according to the safety policies for COVID-19 each country has decided to follow (Sucheran, 2021).

This study's main focus was to use UGC to detect possible changes in hotels' guests' preferences, priorities, and behaviors caused by the pandemic in the Lisbon, Portugal, area. As far as we know, no previous research has investigated the specific area of Lisbon to date. As mentioned earlier, most studies in this field are done within a particular geographic region, and their results do not represent those of other areas. That is why it is important to understand the type of customer that visits Lisbon. With that in mind, three research questions were formed to help guide this study.

1. How did the COVID-19 pandemic affect hotels guests' priorities?
2. How COVID-19 affected guests' perception of services?
3. Which new marketing trends can hotels apply moving forward?

During the analysis process a large number of user-generated reviews (UGR) from Lisbon, and also from London and Paris, were used. The goal was to, not only find the changes in Lisbon, but to also identify similar patterns in attributes and sentiments from guests in other regions. That allowed to gauge which changes were unique reactions to Lisbon, and which ones were of a more general nature - meaning, changes that happened in every hotel, despite their location, because of COVID-19. At the same time, the data collected was also used to find possible new trends in the hotel industry and how they could be applied to help hotels' marketing and business strategy move forward.

The remainder of this study is organized as follows: Literature review reviews other studies and their key findings on how pandemics affect the hotel industry and customer behavior. Methodology describes the process of collecting and analyzing data. Results and discussion present main research findings. Conclusion has the main insights of the study, how the key findings can be applied to business, and describes the study's limitations and topics for future research.

## 2 LITERATURE REVIEW

### 2.1 CHANGE IN CUSTOMER BEHAVIOR

The COVID-19 pandemic has caused a most significant impact on the world. It had severe implications for the global economy, businesses, and employment. As a result, it also affects the consumer, the individual—their daily lives, activities, and how they spend their money (Kohli, Fabius, and Veranen, 2020). Therefore, consumers have become more mindful of how and where they use their money. Previous studies pointed out that many countries reported that people were not only losing their jobs but also were having a decrease in income during the pandemic. Forty-eight percent of consumers in Italy reported a decrease in income, 45% in Spain, 43% in the United Kingdom, 34% in France, and 27% in Germany (Bhargava et al., 2020).

With that in mind, some studies used quantitative research to explore how individuals were using their money during the pandemic. In a survey of 12,000 consumers worldwide, two-thirds answered that all their future purchases would be influenced by how brands respond to the pandemic (Kirk and Rifkin, 2020). With less money and an uncertain future, consumers are putting more thought into every purchase. Not only are they focusing their spending only on essentials (Bhargava et al., 2020), but they are also developing the habit of “doing it yourself” to fulfill their utilitarian needs (Kirk and Rifkin, 2020), since it is usually cheaper to make something than to buy it. In other words, because of the pandemic, consumers are becoming more parsimonious.

Another change caused by the pandemic is that people are staying more at home and leaving only when necessary, making it harder for them to consider, both for safety and monetary reasons, the possibility of traveling and staying at hotels. That happened because of the social distance rules and the move to digital. Online delivery and e-commerce have seen a major increase; telemedicine had an increase of over ten times, remote working of 20 times, online entertainment subscriptions skyrocketed, and in just two weeks, China had over 250 million citizens subscribe to online learning (Kohli, Fabius, and Veranen, 2020). Over 70% of consumers worldwide did not engage in out-of-home activities in 2020 (Bhargava et al., 2020). Signs of that could be seen in the hotel industry as 69% of leisure travelers said they would take fewer trips, 55% postponed their travels, and 42% canceled any plans they had (AHLA, 2021).

“Cocooning”, term designated to describe the people who were staying at the hotels, but who would “cocoon” in their rooms to avoid person-to-person contact (Hu et al., 2021), was, yet another behavior that became more evident for those few that kept traveling. A behavior that only appears during a pandemic crisis. They only leave their rooms when needed; otherwise, they stay in, which made their necessities and expectations for the hotel different from just a regular trip, since guests wanted more social distance from one another and the staff. These new priorities are also reflected in their reviews, since they are evaluating whether the hotel was able to provide a safe and comfortable experience for them.

### 2.2 NEW TRENDS IN CUSTOMER INTERACTION

With these new behaviors and the recommendations from the WHO to use masks, social distancing, hand sanitizers, temperature checks, and other safety measures (WHO, 2020), hotels had to change how they interact with their guests. Other studies in this field have explored some options without the

use of UGRs hotels can do to provide a safer environment and a more pleasant experience for their guests during a pandemic.

To follow the protocols established by WHO, hotels had to increase the health and safety measures for both the guests and the employees and ensure that both were well informed of those changes (Japutra and Situmorang, 2021). Some of these new measures were, and can be, reworking the work structure introducing new standards and protocols for cleaning and interacting with the guests; remodeling spaces to better fit the social distance; reducing waiting time for any service; and providing adequate staff training (Bonfanti et al., 2021).

Social distance, less interaction with people and reducing waiting time, in other words, contactless service with guests, is possible through the implementation of new technologies and digital services (Japutra and Situmorang, 2021). These tools are mobile apps for check-in, check-out, room key, and service order; chatbots for communication; self-service kiosks; in-room technologies for entertainment; and digital payments (Garrido-Moreno et al., 2021). All this new technology had the goal of changing the perspective the guests had about the service and environment the hotel was providing them.

Another study highlighted that during the middle of the pandemic, 2020, most people preferred to interact with robots at the front desk and room service than to interact with an actual person (Kim et al., 2021). It also mentioned that this preference was caused by the crisis and danger of COVID-19 and the fear the guests had of contracting it. However, the study also pointed out that once the pandemic is over, guests will again prefer human interaction rather than machine interaction. That is not the case with technologies, like the mobile app, which most customers would prefer to use even after the pandemic is over (Bonfanti et al., 2021; Japutra and Situmorang, 2021), thus creating a new behavior/trend for hotel customers.

At the same time, it is essential to notice that while guests may like and welcome these new high-tech services, these new technologies are not a priority for guests' satisfaction. Studies have shown that staff attitude and quality of service, the "human touch" of hospitality, has a greater influence in the hotel experience than any great high-tech service, even during the pandemic's time (Arica, Çakir, and Sesliokuyucu, 2021).

### **2.3 REVIEWS PATTERNS**

Another critical point to look at is the data previous UGRs studies have collected. A complete list of findings can be seen on table 1. Research using text mining noticed that customer satisfaction is highly influenced by the following areas: epidemic prevention, consumption emotion, convenience, perceived value, price, service, and target group (customers traveling in a group, such as family or friends). While the environment, facility, and catering tend to have a lesser and more of a negative effect on customer satisfaction (Wang et al., 2021).

In the same line with that study, another research found that attributes like "room", "parking", and "reservation" were more predominantly present in negative reviews. While attributes such as "location", "ambiance", "staff", "breakfast", and "cost-benefit" were more present in positive reviews (Peres and Paladini, 2021). As mentioned before, because of pandemics, more guests are "cocooning" inside their rooms, so more than ever, hotels must pay closer attention to their rooms and if they are

fulfilling their guests' needs. Also, while the price attribute is another significant factor for a good review, the target group has more weight in customer satisfaction than any other attribute (Wang et al., 2021). That shows hotels should strive to know what type of guests they attract, like people on a business trip or family vacation, and focus their service and marketing on that specific group.

Using UGRs, a study identified 16 emerging trends of hotel features consumers want. These features were evaluated as “need improvement”, “doesn’t have”, or “ideal”. These features are club, lounge, river, pool, service, dinner, food, view, price, street, taxi, bathroom, park, clean, bed, and location (Li et al., 2015). It is important to notice that some of these trends are things that a hotel cannot simply add but that new owners need to consider when choosing a location, or they should use these new trends to create unique and specific marketing strategies (Garrido-Moreno, 2021). Also, most facility complaints come from reviews in lower-end hotels; in high-end hotels guests have high expectations for their service quality over their facilities (Hu et al., 2021).

Understanding reviewers' behavior can help marketers and hotel managers improve service options and quality to enhance customer satisfaction (Gunasekar et al., 2021). Other UGRs studies have also found interesting patterns about the reviewers themselves. One of them found that domestic reviewers usually leave more positive reviews than foreigners. At the same time, while international guests focus more on what the room and other amenities hotels have and do not have, local guests focus their reviews on the quality of the service and how they were treated on a personal, emotional level (Ma, Du, and Wang, 2021).

Another study went beyond UGRs from one place, it investigated several reviews left for different hotels by each research volunteer. The result was that people have patterns and habits when leaving reviews. If their past reviews were positive and mostly liked, their future reviews will also be positive. The same goes if they leave negative reviews or reviews contrary to the majority's opinion (Gao, Hu, and Bose, 2017). Concurrently, people tend to copy the opinion of the masses. So, if most of the reviews are positive, there is a high chance that the new consumer will also leave a positive review (Karimi and Wang, 2017).

While new and high-tech services help improve the overall experience, they are not a priority when a customer is rating the hotel and neither do they have a substantial weight in the positive reviews. This holds even during the pandemic when guests evaluate the COVID-19 protection measures. Studies show that positive reviews during the pandemic are influenced mainly by measures taken in the food and beverages services and the level of compliance to pandemic measures by the staff and other guests (Arica, Çakir, and Sesliokuyucu, 2021), which means that if other guests are not following the COVID-19 prevention rules, and the hotel staff does nothing to make sure people are complying with it, then that could lead to negative reviews from customers.

Table 1 – Literature Main Points

<b>Authors</b>	<b>Data Source</b>	<b>Country</b>	<b>Main Findings</b>
<b>Arica, Çakir, and Sesliokuyucu (2021)</b>	1,119 hotel reviews	Turkey	Certifying that all the guests follow COVID-19 rules positively affects reviews.
<b>Bae and Chang (2021)</b>	877 questionnaires	South Korea	Pandemic caused anxiety about safety and emotional concerns in travelers.
<b>Bhargava et al. (2020)</b>	Consumer surveys in 45 countries	USA, UK, France, India, Japan...	Consumers are focusing their spending on essentials only, and they are given preference to low-contact services.
<b>Bonfanti, Vigolo, and Yfantidou (2021)</b>	14 hotel managers interviews	USA, UK, New Zealand, China, Italy, Thailand...	There were seven areas that all hotels changed/updated during the pandemic to create a safer customer experience.
<b>Davari et al. (2021)</b>	595 hotel reviews	Amsterdam, London, Paris...	Staff attitude is more important to a guest than high technology services.
<b>Gao, Hu, and Bose (2017)</b>	8,676 hotels reviews	USA	Consumers tend to leave similar reviews for everything.
<b>Garrido-Moreno, et al. (2021)</b>	237 questionnaires	Spain	Hotels need to implement specific crisis management plans for nine specific departments during and after the pandemic.
<b>Gunasekar et al. (2021)</b>	143,803 hotel reviews	India	Reviewers that are domestic, experienced, and popular tend to leave more positive reviews.
<b>Guo, Barnes, and Jia (2017)</b>	266,544 hotel reviews	China	There are 24 areas that most customers focus on when evaluating their stay at the hotel.
<b>Hu, F et al. (2021)</b>	98,163 hotel reviews	China	The cocooning effect extends to the period after COVID-19.
<b>Hu, N et al. (2018)</b>	27,864 hotel reviews	USA	Most complaints at lower-end hotels are related to facility problems and cleanliness. In contrast, high-end hotels are service failures and overpricing.
<b>Japutra and Situmorang (2021)</b>	13 hotel managers interviews	Indonesia	Hotels had to increase their health and safety measures while developing new services and offerings to attract customers.
<b>Karimi and Wang (2017)</b>	2,178 app reviews	USA	The Reviewer's profile pic, text length, and ratings are important factors when considering whether the reviews are helpful.
<b>Peres, and Paladini (2021)</b>	68,558 hotel managers interviews	Brazil	Attributes with the most negative reviews: room, parking, reservation. Attributes with the most positive reviews: location, ambiance, staff, breakfast, and cost-benefit.

<b>Kim and Tanford (2020)</b>	296 participants	USA	A hedonic add-on item is more attractive when a small discount is provided. In comparison, utilitarian products must have a more significant discount.
<b>Kim et al. (2021)</b>	134 participants	USA	During COVID-19, many people prefer to have robots as hotel staff.
<b>Kirk and Rifkin (2020)</b>	50+ articles	USA	Because of the pandemic consumers are more mindful of how they spent, and the service given
<b>Kohli, Fabius, and Veranen (2020)</b>	McKinsey & Company database	USA	Consumers changed the "how," "what," and "where" they purchased.
<b>Li et al. (2015)</b>	118,300 hotel reviews	China, Thailand, Singapore...	Sixteen emerging trends of hotel features travelers are looking for. Some with a higher growth rate are clubs, lounges, pools, service, and food.
<b>Ma, Du, and Wang (2021)</b>	525,738 hotel reviews	China	Chinese and European reviewers discuss the same topics but focus on different details.
<b>Shin et al. (2021)</b>	6 hotels observations	USA	Corporate Social Responsibility does have an impact on booking behavior.
<b>J. Wang et al. (2021)</b>	36,936 hotel reviews	China	Customer satisfaction is highly affected by consumption emotion, perceived value, epidemic prevention, target group, and convenience.
<b>Yang et al. (2021)</b>	754 Meituan app reviews and 16 restaurants managers interviews	China	One-way hotels can adapt during and after the pandemic by adding Online-to-Offline service to their restaurants.

### 3 METHODOLOGY

Following the example of past studies (Hu et al., 2021; C. Kaveski Peres et al., 2021; G. Li et al., 2015), this research investigated guests' preferences, perceptions, and habits concerning hotel attributes by looking into UGRs in the TripAdvisor platform. Figure 1 shows the framework of the data collection and analysis process.

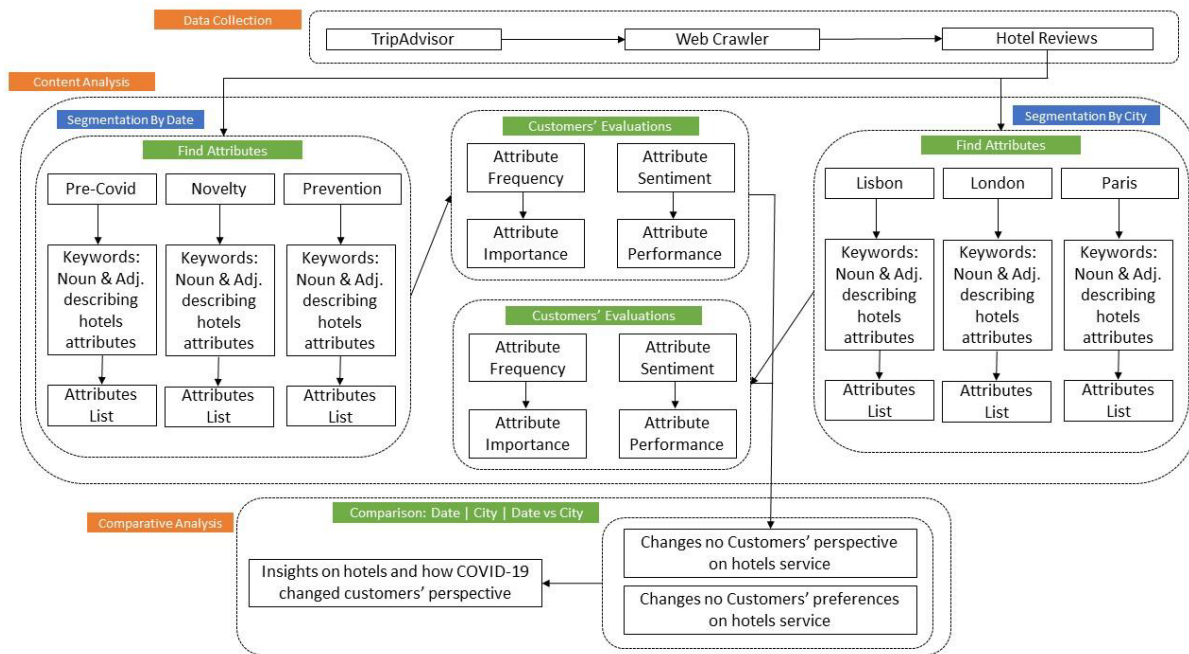


Figure 1– Research data collection and analysis process

#### 3.1 DATA COLLECTION

Lisbon is the focus of this study since little information about the topic is known. Besides that, despite the pandemic's lockdowns, its reputation did have considerable growth in 2020 and 2021, getting the attention of many people worldwide not only for tourism but also for business and as a place to live. Lisbon is going up in ranks in categories like "The best cities in the world" (Oliver and Medina, 2021), "Quality of Life" (Lusa, 2021), "Best countries for road trips in Europe" (Statista, 2021), and "Preferred European countries for the next trip among European travelers" (Statista, 2021). As mentioned before, differently from other researchers, this study examined places besides Lisbon to better understand guests' behaviors and COVID effects on it. For that reason, two main European destinations were chosen, London and Paris. Both ranked first and second in the "Leading European city tourism destinations in 2019 and 2020, by the number of bed nights" (Statista, 2021). After their 2020 lockdowns, many European countries had a large decrease in visitors (Visit Britain, 2021). London had an increase of 67% in tourists in 2021 (Bridgett, 2021), while Paris had a 30% increase (Hospitality On, 2022). Both cities were in Europe's top five most visited cities in 2021 (Condor Ferries, 2021), making them ideal choices to be part of this study.

Only reviews from 5-star hotels were used in this study. According to previous studies reviewers are more critical and nitpick when evaluating high-end hotels over lower-end ones (Hu et al., 2018; Peres and Paladini, 2021; J. Wang et al., 2021). For this reason, it was decided that collecting reviews from

5-star hotels would be more beneficial, since it had a higher probability of complaints from the guests. The reviews were collected in the period of fall-2021 to end of summer 2022 from the TripAdvisor platform by using the Octoparse software, which allows scraping specific content from any website without the need to write or do any line of coding, and which is also faster than using Python for web scrapping (Pandian, 2022). In total 222,679 reviews were collected from 281 5-star hotels listed on TripAdvisor from Lisbon, London, and Paris.

The TripAdvisor platform was chosen because it is the world's largest aggregator of UGRs of tourist products. It is visited monthly by 460 million users, with over 830 million reviews on 8.6 million accommodations, restaurants, attractions, tours, airlines, and cruises. TripAdvisor is present in 49 markets in 28 languages (TripAdvisor, 2020). Another benefit of this platform is that it has been used in several other research, allowing result comparison between studies. In addition, the platform is continually policing its systems to avoid false reviews and bots. Studies show TripAdvisor has the best data quality compared to Expedia and Yelp (Xiang et al., 2017).

## **3.2 DATA SEGMENTATION**

### **3.2.1 By Date**

COVID-19 was recognized as a pandemic in 2020 (WHO, 2020). For that reason, reviews collected from late 2017 to the end of 2019 were assigned as the *Pre-COVID* period. Reviews from 2020 are assigned as a *Novelty* period because, at the time, there were not many measures to protect travelers, countries were in lockdown, and health supplies were sold out. COVID-19 vaccines became more widely distributed in January 2021 (AJMC, 2021). Most European lockdowns were lifted by June 2021 (BBC, 2021) and hotels implemented protocols to prevent the spread of the disease. For these reasons, reviews from 2021 and 2022 were assigned as the “Prevention” period. At this point, the reviews from all 281 hotels were together and were set apart by date only. This allowed us to see if hotel attribute varies by period of time alone and not by location. Enabling the comparison between before, during, and after the COVID-19 crisis in a more general way.

### **3.2.2 By City**

The majority of UGR’s studies, especially those related to COVID-19 (Bae and So Young, 2021; Gopalakrishan et al., 2020; Hao et al., 2020, Hu et al., 2021), tend to focus on one single region, like a country, state, or city. The reason for that is cultural similarity (Li et al., 2015) and how that specific region handles the COVID-19 pandemic. One of the goals of this study was to find out if the pandemic has affected hotels’ guest priorities notwithstanding their cultural preferences (Ma, Du, and Wang, 2021) or COVID prevention measures (Bonfanti et al., 2021). While it was expected to find different results between Lisbon, London, and Paris, there was the prospect that, if the pandemic has affected customers, then it would be possible to find similar attributes between these three cities (Bhargava et al., 2020).

## **3.3 CONTENT ANALYSIS**

The data collected using Python and the Natural Language Toolkit (NLTK) was cleaned from stop words (words without semantic value), unnecessary terms, special characters, affixes, and punctuation. Also, tokenization was applied, which means that the reviews were divided into sentences better to digest

the information and sentiment of the review. Besides that, the data was also organized and standardized to better work with machine learning algorithms. This process aimed to remove unnecessary content, improving processing time and performance (Peres and Paladini, 2021).

With the data cleaned and organized, it was possible to identify the most used words in each segment by counting their use frequency and then giving them a rank. The more a word is used, the higher it ranks. According to other studies and discussions, the frequency of a word, or topic, indicates the importance that the guests give this attribute (Hu et al., 2021). Following this principle, this study also based its attribute list on frequency rank. That was possible by using Latent Dirichlet Allocation (LDA) algorithm in Python to perform topic modeling. This algorithm aims to analyze the data and find a mix of words associated with each topic (Silge and Robison, 2017), helping find the main topics discussed in the reviews and any hidden patterns.

The next step was to do sentiment analysis, which is the process of understanding the emotional intent of words to deduce if the text is negative or positive, and even do a more specific characterization to show if it is the sentiment of, for example, surprise or disgust (Robison and Silge, 2022). This study used the lexicon Valence Aware Dictionary and sEntiment Reasoner (VADER) in Python to help identify the sentiment, positive or negative, behind each one of the reviews. For example, in the data set, there was the following: “luxury room with comfortable beds and good pillows” this showed as a positive sentiment; “it took them 3 hours to check us in, and they were incredibly rude and treated us in a racist manner” this showed as a negative sentiment. With this tool it is possible to measure if the top-rank attributes have a positive or negative sentiment and also, with it, better understand what the reviewers wanted to express.

### **3.4 COMPARATIVE ANALYSIS**

With the data set of each cleaned, organized, and analyzed, there will be more than one list of attributes and topics and their sentiment about them. Once we put these filtered data sets side by side, will it be possible to see any trend, pattern, or relationship between the attributes? Once we put these filtered data sets side by side, it will be possible to see trends, patterns and relationships between the attributes. The comparisons will be based on whether there is a difference between the three time periods and whether there are any similarities between the cities concerning COVID-19 and marketing.

Also, the importance-performance analysis (IPA), otherwise called “action grid analysis”, developed by Martilla and James (1977), will be used as well. This tool consists of a two-dimensional grid, importance and performance, divided into four quadrants (see figure 2). Each quadrant represents a different marketing strategy, “Q1 Concentration”, “Q2 Keep Up”, “Q3 Low Priority”, and “Q4 Overkill”. The goal was to determine which attributes fall into Q1, as those are the ones guests prioritize but have a low performance by the hotels. Based on the IPA, decision-makers can move resources from attributes in Q3 and Q4, for example, to Q1, improving the guests' experience.

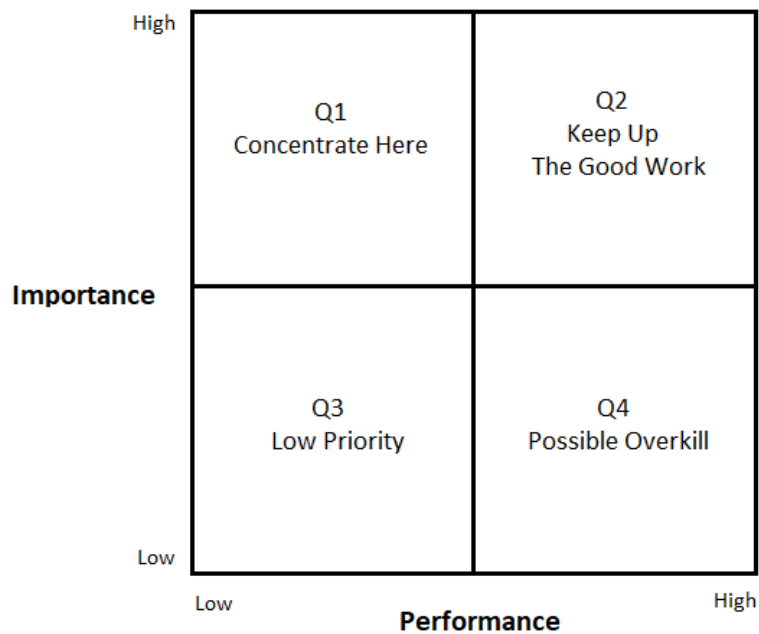


Figure 2 – CIPA Model

Academicians and practitioners have widely adopted the IPA method through the years (Hu et al., 2021; Lai and Hitchcock, 2016; Martilla and James, 1977; Ormanovic et al., 2017; Pan, 2014; Taplin, 2011; Wu et al., 2010). This method analyses customer sentiment towards a service, product, or attributes, and helps practitioners know what and where to prioritize and improve the quality of their services, making it an effective and essential tool. Throughout the years, different studies have applied IPA and changed this method to better fit their needs.

This study used a similar revised method—competitive importance analysis (CIPA)—as from other literature (Hu F et al., 2021; Taplin, 2011). CIPA reasons that service attributes should be improved according to their importance and performance in terms of competitors, not customer sentiment. This was the case for this situation, where the hotel attributes performance was compared between three different periods, in other words, competitors.

## 4 RESULTS AND DISCUSSION

Using the LDA method, it was possible to visualize the most relevant terms used in the reviews. Then, a list of hotels' most talked about attributes was created by gathering similar terms together; this list can be seen in Appendices A. Table 2 shows the top 10 most frequent attributes in the three different periods; see Appendices B for more details.

Table 2 – Top 10 most used attributes in URGs by period (A) and city (B)

A			B		
Pre-Covid	Novelty	Prevention	Paris	London	Lisbon
room	room	room	Room	room	room
staff	staff	staff	staff	staff	staff
service	breakfast	service	location	service	stay
location	location	breakfast	service	location	breakfast
breakfast	bar	location	breakfast	breakfast	service
restaurant	food	front desk	restaurant	bar	restaurant
bar	front desk	bar	front desk	food	location
front desk	restaurant	food	bar	tea	front desk
food	tea	restaurant	concierge	restaurant	walk
bed	bed	tea	bathroom	bed	pool

The results show that the main topics are room, food, service, and location. Even when adding the top 10 from each city, table 2 and Appendix C, it is noticeable that there is little variation between the attributes. This result was within expectations since other studies have shown that those are the most common topics discussed in hotel reviews (Antonio et al., 2018; Peres and Paladin, 2021; Hu et al., 2021). But there was one attribute that did stand out. In the London list, there is “tea”, which can be safely assumed is there because of the British culture of drinking it and holding afternoon tea meals. That can be assigned to the cultural topic (Ma, Du, and Wang, 2021), and its importance comes from locals who expected the hotels to offer it and foreign tourists who want to experience this tradition.

Another difference is that the word “pool” only appears in the top nine attributes in Lisbon. According to AAA and Hotelstars Union, a hotel does not need a pool to be awarded the five stars rating (May 2022). In the lists of hotels scrapped for this study, only 14% have a pool in London, 18% in Paris, and 43% in Lisbon. Having more hotels with pools than the other two helped increase the frequency of this attribute. This should not come as a surprise, as another research demonstrated that between these three locations, Lisbon attracts more tourists interested in aquatic activities, such as pools, beaches, and rivers, than the other two cities (Owen, 2022; Tigar and McMurray, 2022). This means that hotel guests cared more for this specific attribute in Lisbon than those who visited Paris or London.

It is essential to know that the attributes “food” and “breakfast” were kept separated because reviews used the former to talk about the food served at the hotel in general, regardless of where it came from, be it from the restaurant, bar, or room service. In contrast, the latter was used to talk about the experience as a whole, including the food, facility, and service. Moreover, according to another study, breakfast was in second place among the most critical attributes of guests when choosing a hotel to stay at (Leite-Pereira, Brandão, and Costa, 2022).

Figure 3 shows the frequency of some of the most used attributes during the three periods. Over the years, the mention of “bed” and “walk”, which is used to talk about the distance between the hotel to public transport or other key tourist locations, has declined. Reviewers mentioned those attributes less and less, and a reason for that is that they might just be adding those to the attribute’s “location” and “room” as they talk about everything in a more generalized way instead of nitpicking everything individually.

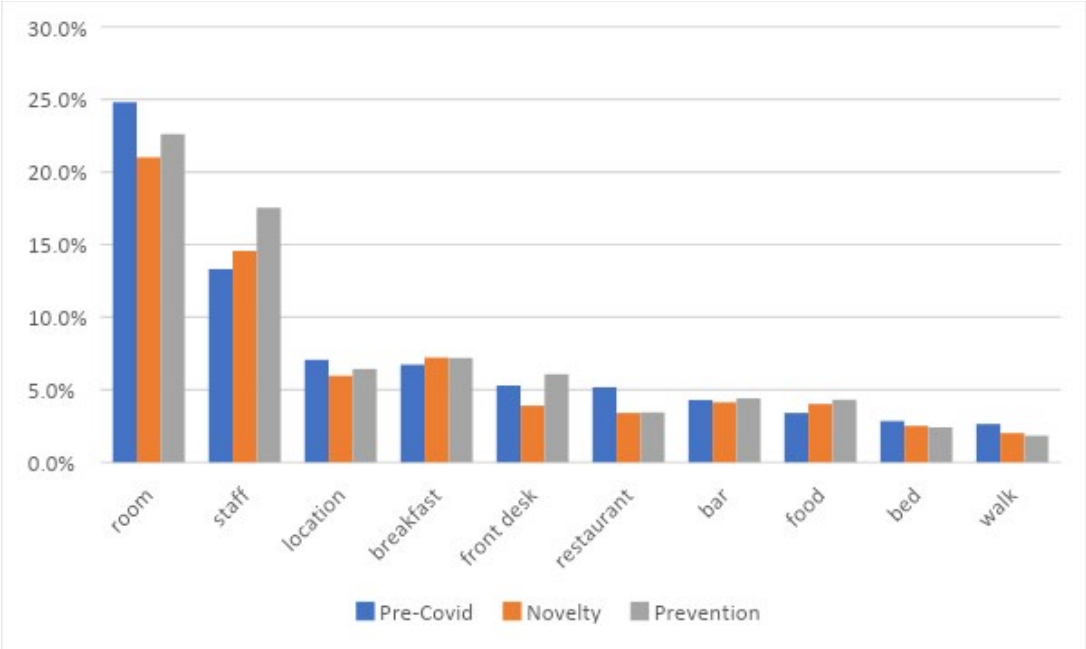


Figure 3 – How often attributes appear in reviews during the three different time periods

The attribute “restaurant” has seen a significant drop; because of COVID-19, many hotels had to close or reduce the service of their restaurants, which explains the lower amount of mentions during the *Novelty* period. Nevertheless, the number stayed the same even during the *Prevention* period. That could be explained by the fact that hotels had not yet fully opened their restaurants, offering just a partial service or reduced hours (AHLA, 2021).

While the attribute “restaurant” stays at the lower end, “food” has steadily increased over the years. While the UGRs do not give one specific reason for this increase, it would not be too wrong to assume that because of COVID-19, more guests opt to stay and eat at the hotel than to go outside to eat. Backing this assumption is one of the studies mentioned previously in the literature review section, in which they state that the pandemic created the cocooning effect, where guests stay longer inside their rooms, boosting room service sales (Bae and Chang, 2021).

Two significant changes occurred during these three periods. First, the noteworthy drop on the attribute “room” during the *Novelty* period. As it was said before, it was during this time that most guests spent more time inside their rooms than in the previous period. Not only that, but because of the pandemic, there were more rules and protocols to be followed, and people were more attentive to the cleanliness and safety of their environment (Bonfanti, Vigolo, and Yfantidou, 2021). For those reasons, it was expected to see this attribute grow and become more predominant during this period, but the opposite happened. It presented the most significant drop, 3.8%, the biggest from all

attributes. Reviewers were talking less about the rooms, but they kept their reviews positive and, instead, started talking more about the staff and food.

That is the second big change that happened. The attributes involving personnel significantly increased during the *Novelty* and *Prevention* periods. This makes sense since COVID-19 guests were more worried about having contact with other people, including staff, and everyone following the safety and cleaning protocols. Also, with social distancing and customers staying more time in their rooms, they were more dependent on hotel staff than before. Naturally, 5-star hotels tend to have a higher-level service since that is one of the criteria they are judged on (May 2022), and something people have high expectations of when staying at one of them. Thus, it is not strange for reviewers to mention the staff more often in these reviews. Nevertheless, between the *Pre-Covid* and *Prevention* period, there was a growth of 4.3% for the “staff”, the most considerable growth of all attributes. Showing that hotel guests are now, more than ever, paying more attention to the hotel personnel and wanting better service quality. Be it from following safety protocols, being helpful, or being pleasant.

While those attributes went up, “front desk” actually had a drop during the *Novelty* period. This matches previous studies seeing that this was the phase where hotels applied technology to make the front desk experience contactless (Bonfanti, Vigolo, and Yfantidou, 2021). This way, they managed to obey the social distance rules and create a safer and more comfortable experience for the guests. This was not the only attribute to see a decline, the attribute “conciierge” had a similar result, with a small drop during the *Novelty* season and back up again during the *Prevention* one.

**4.1 HOW COVID-19 AFFECTED GUESTS’ SENTIMENT**

After defining the main attributes used during UGRs, they were checked for the sentiment behind the use of each of them, as shown in figure 4. One would anticipate the increase in term frequency, especially during the *Novelty* and *Prevention* periods, to be aligned to negative reviews, people complaining of poor service, and safety protocols not being followed (Hu, N et al., 2018).

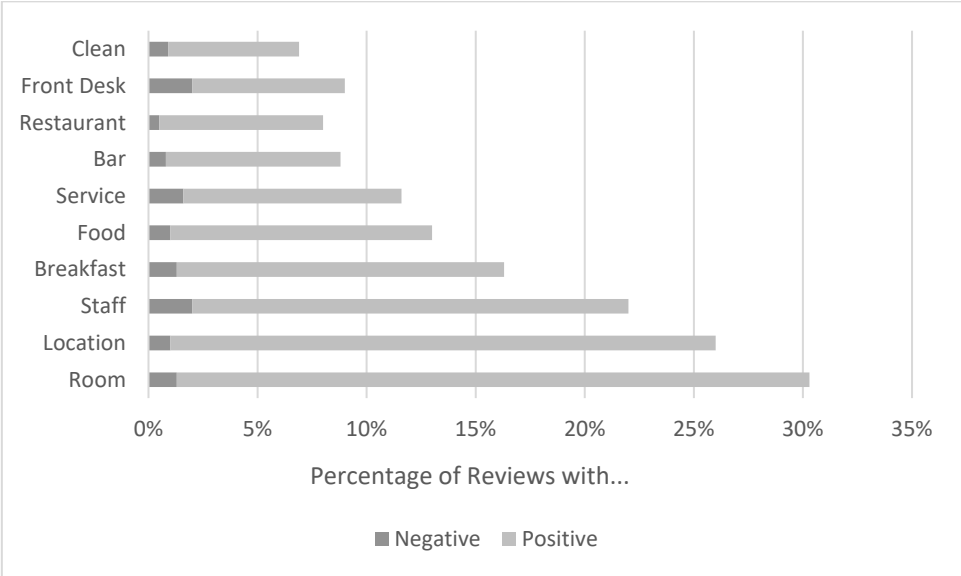


Figure 4 – Reviews’ sentiment for each one of the top 10 attributes

However, as the figure above shows, that was not the case in this scenario. Negative reviews are very few in every single attribute, not only for the main ones, but overall, as shown in figure 4. The one with the highest number of negative reviews was the “Front Desk” attribute. This is to be expected since most problems and complaints are dealt with at the front desk, and if a guest is unsatisfied with the result, they take it on them. Nevertheless, even this attribute still has a small number of negative reviews, which can be seen as an individual and unfortunate case rather than a real issue the hotel has.

Even when looking at the overall sentiment for each segment, figure 5 shows that the UGRs are predominantly positive. The biggest number of negative reviews was during the 2021-2022 period, with 4.5%, while the rest stayed below 3%. Moreover, as figure 3 above showed, those few complaints are sprinkled in different attributes, revealing a lack of a common area or a bigger problem that can be found.

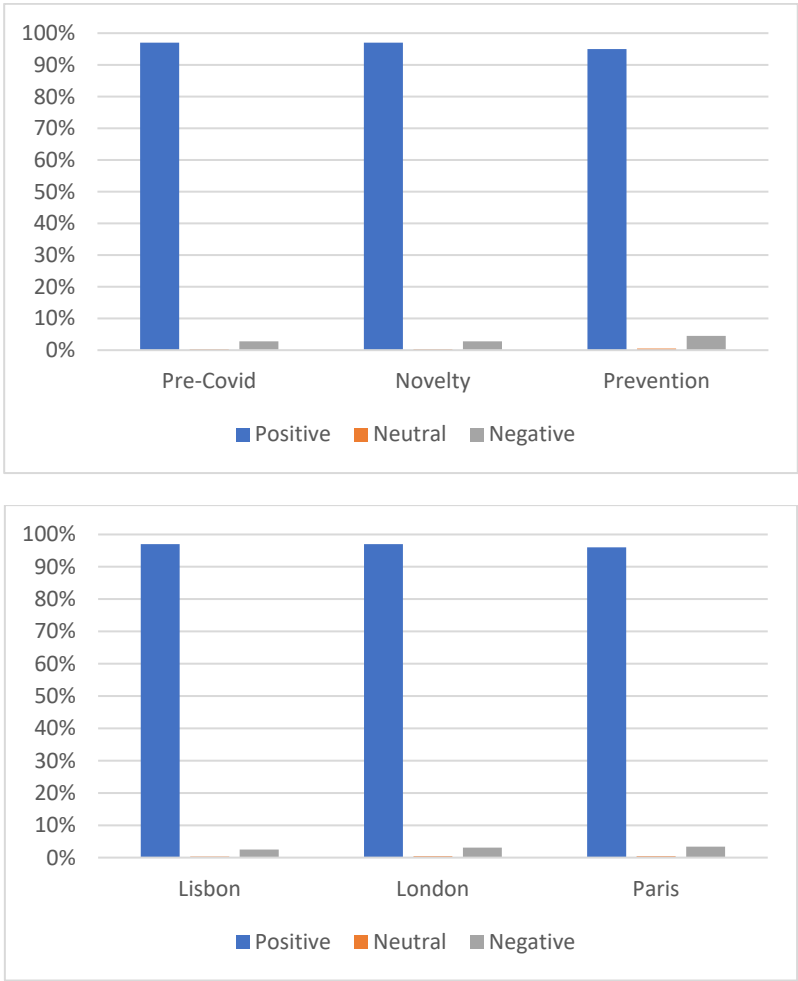


Figure 5 – Overall sentiment of UGRs by period (above) and city (below)

The same can be said about the positive reviews. They stayed at the same level throughout all segmentations. Attributes like “Room”, “Location”, and “Staff” got most of the positive reviews and also showed that COVID-19, new safety rules and protocols, and the use of new technology did not have a negative effect on hotels’ guests’ experience.

Table 3 shows some of the terms used to classify the attribute as something positive or negative during the UGR. Some of them had a very near identical list, so they were kept together. This helped me gain a better understanding of what the guests want, or in other words, what they value the most when talking about these attributes.

Table 3 – List of positive and negative terms used for each attributes

Attribute	Associate Terms	
	Positive Sentiment	Negative Sentiment
<b>Room</b>	clean, view, beautiful, comfortable, large, bed, shower, decoration, fancy	dirty, old, smell, small, dusty, mold, broken, noisy, cigarette, cold, hot
<b>Location</b>	transport, walking, shopping, center, historic, supermarket, airport, parking, restaurants	traffic, busy, far, uphill, street, structure, dark, isolated, old, hidden, time
<b>Staff, Service, Front Desk</b>	attentive, helpful, sympathetic, kind, agility, cordial, class, excellent, welcoming, friendly, knowledgeable	rude, unhelpful, late, wrong, indifferent, slow, untrained, distracted
<b>Breakfast, Food, Bar, Restaurant</b>	variety, quality, flavor, fresh, clean, buffet, space, fast, creative, beautiful, coffee	price, table, dirty, cold, stale, simple, slow, small, wait, busy

For the attribute “Room”, customers want a comfortable and clean place, well designed, with a nice view and with good amenities that work. When their room has a bad smell, or something is broken, or they can hear every sound from outside, or they cannot control the room's temperature, the guests become dissatisfied with it.

For “Location”, the hotel needs to be close to public transportation, restaurants, bars, historic sites, shopping places, and other important locations to please the guest. Being in a faraway place, or a place that is difficult to reach by walking or public transport, or that is in a neighborhood where people do not feel safe walking at night, leaves a negative impression on the guest.

For “Staff, Service, and Front Desk”, guests are happy when the person assisting them is kind, sympathetic, friendly, knowledgeable, educated, and agile. Overall, they want someone who is helpful, who will solve their problems, or who will make their stay easier. Anything contrary to that will generate complaints and an unpleasant experience.

For “Breakfast, Food, Bar, and Restaurant”, they want a large area with good tables, a clean environment, a large variety of fresh food, high-quality ingredients, and new and different plates. They want to be served fast and with no mistakes in their orders. Cold food, lack of options, and high prices are some things that displease the guests.

## 4.2 HOW COVID-19 AFFECTED GUESTS' PRIORITIES

With the data set collected in this research, the difference between periods may not have been as notorious as in some other studies where attributes like “breakfast, location, surrounding, front desk, experience, etc...” had a clear difference in the last couple of years (e.g., Hu et al., 2021; Peres and Paladini, 2021). Nonetheless, even this smaller sample size research detected a change in hotel guests' priority during the pandemic in 2020.

Figure 6 shows how often some critical attributes, expected to have the most changes, appeared in reviews over the years. No surprise, “room” is the most mentioned, given it is why people go to hotels. As mentioned before, “staff” had a large growth, starting before the pandemic but had a significant burst in the prevention period; all the while, the frequency of “room” had a large drop.

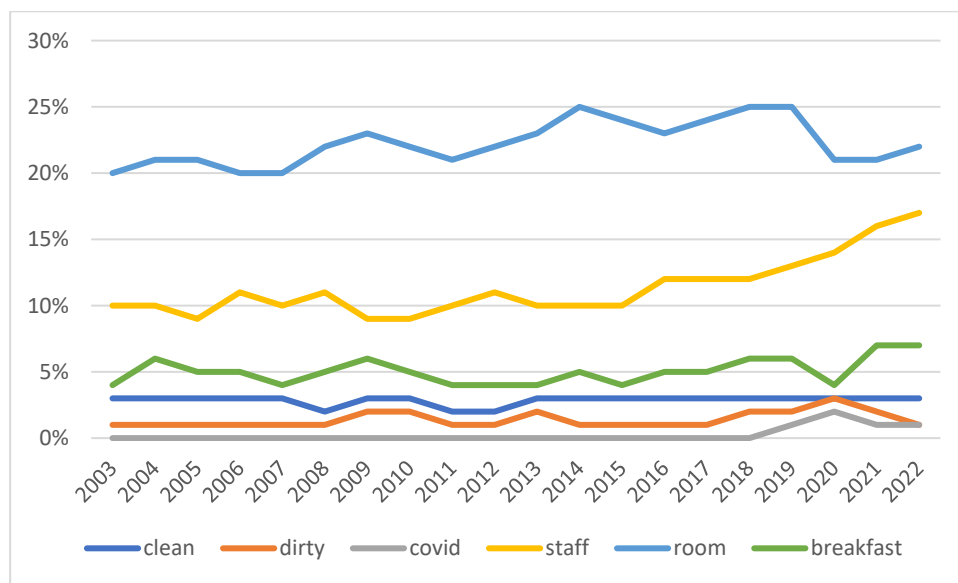


Figure 6 – Attributes performance during the years

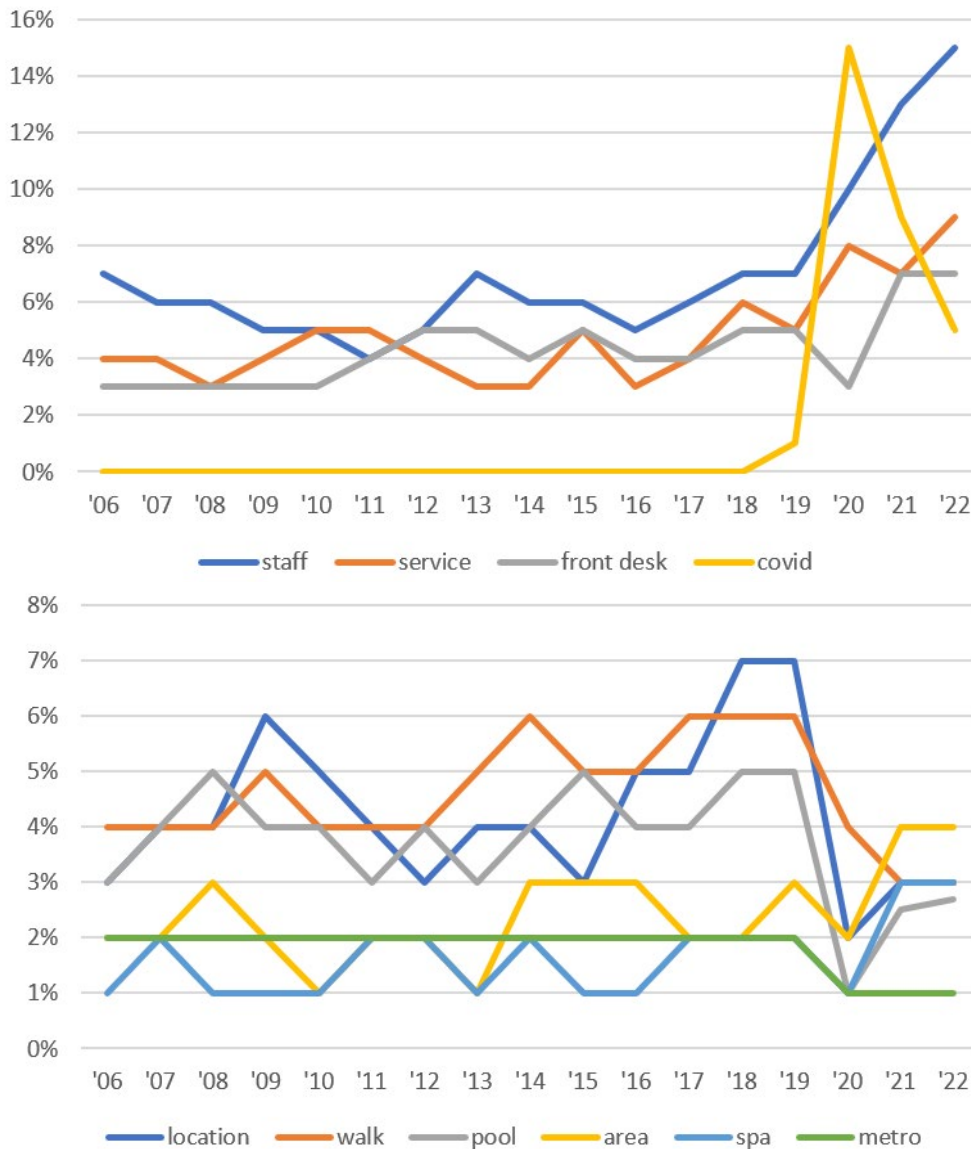
This shows how the guests' and consumers' mindsets have changed these past few years. They are giving more importance to the human side of the business, the staff attitude: how they engage, help, facilitate and improve the stay and experience of the guest. It became more apparent that even during the peak of the pandemic, and after it, hotel guests still held the interaction with the staff members as something crucial for their experience (Davari et al., 2021; J. Wang et al., 2021). This is one trend that will stay, and its relevance will keep growing since the need for better human interaction is something that the pandemic has imbued on consumers (Kirk and Rifkin, 2020; Kohli, Fabius, and Veranen, 2020).

Another noticeable trend is the drop of the attribute “dirty” and the steady “clean” through the years. It is important to remember that this dataset is based on 5-star hotels, which means that this trend is based on hotels with a higher standard of service and cleanliness than others. It is no surprise that the frequency of the attribute “clean” stayed the same for several years since UGRs would just ignore something that could be seen as normal, or expected, or that had only a few mentions by guests who wanted to highlight that the room or hotel was indeed very clean. In this, the attribute “dirty” would be the outlier, with few guests having a bad, unexpected experience, finding the place dirty during their stay. However, the interesting point was during 2020, when the frequency went to an all-time high of 3%. Since this was during the middle of the COVID pandemic, it could be explained as people

being less merciful and pickier about cleaning standards (Hu, N et al., 2018), as also guests feeling that the hotel was not following health and safety measures. Nevertheless, even then, it was a small part of the reviewers.

The last one worth mentioning is the attribute “breakfast”, which had a significant drop during the *Novelty* period, and then went to its highest numbers ever during the *Prevention* period. That could be related with what other studies have pointed out, that some hotels, during the pandemic, canceled or had restricted breakfast service (Arica, Çakir, and Sesliokuyucu, 2021; Bonfati, Vigolo, and Yfantidou, 2021; Hu, F et al., 2021). Since people were not partaking of such service, they did not mention it during their reviews, but once the service went back to normal, they started talking about it again. Moreover, as mentioned in an earlier paragraph, this is one attribute for which other studies have also seen a positive change after the pandemic.

### 4.3 HOW COVID-19 AFFECTED GUESTS’ PRIORITIES IN LISBON



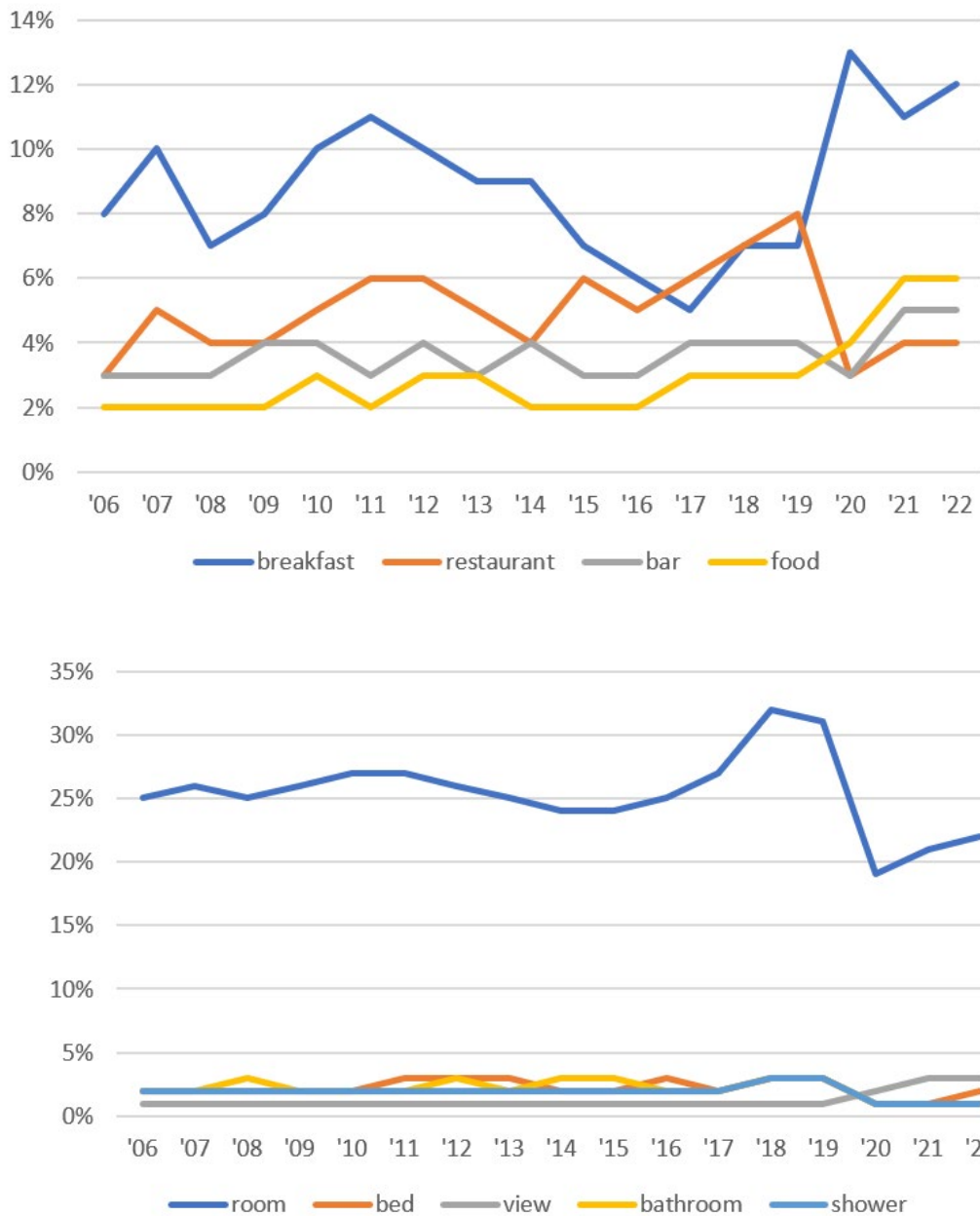


Figure 7 – Key attributes performance in Lisbon over the years

The focus of this study was to see how COVID-19 impacts guests' priorities in Lisbon. Figure 6 shows the top attributes of the city over the years. Overall, it shows the same pattern as described earlier. Attributes related to "room" or "location" had a considerable drop during the *Novelty* period and stayed low during *Prevention*. In contrast, attributes related to "staff" and services provided by the hotel were lower during *pre-Covid* but increased during the *Prevention* period.

Attributes "location, walk, and metro" had a stable frequency of use during the year before, but with the pandemic, their numbers dropped. One can guess that because of health and safety restrictions, guests were avoiding public and crowded environments, which may have continued in 2021 and 2022. Similar attributes that grew later were "area, pool, and spa". Again, guests stayed more at the hotel

during *Novelty* and *Prevention* periods than before (Hu et al.,2021), which explains why they started paying more attention to hotel amenities and services.

According to this dataset, the attribute “location” was used to describe what is around the hotel. When UGRs said “ideal location”, they meant that it had public transportation, restaurants, tourist spots, and other similar places at a walk-by distance or somewhat close to the hotel. While “area”, was used to define the place where the hotel is or places that can be easily accessed. Here are some examples from the reviews, “Very historic area, steps from the Castelo Sao Jorge, as well as a block from the tram stop which we took to other areas often”, “it was quick to go to Sintra, Sesimbra, Cascais/Cabo de Roca areas.”

The former is used to describe things around the hotel, while the latter is used to describe regions of the city. This is important to understand because it shows that the guests’ priorities went from what is close by and practical to “can I easily get to where I want to go.” Previous research showed that location was important for people because they were looking for bars, clubs, restaurants, and so forth, near the hotel (Li et al., 2015), but now, research is starting to show the opposite. Guests are giving more priority to easy access to the places they want to go instead of what is nearby.

One trend that became very apparent during this study was a new focus on staff and human services over other areas. That has been true in every way the dataset was analyzed whether through region or date; all of them showed an increase in the frequency for attributes like “staff, front desk, service, waiter”, and so on. In Lisbon, the attribute “staff” increased by 5%, Paris by 7%, and London by 8%, making it the “attribute” with the most extensive growth in the *Prevention* period, and with the biggest positive change overall, not only in Lisbon but in all three locations.

On the other hand, the attribute “room” dropped 12% during the *Novelty* period and only grew 3% during the *Prevention* period, staying below the numbers it had during the *pre-Covid* era. This is an unexpected and interesting result, because the main point of going to a hotel is to use a room, and yet, (but) many reviewers decided not to talk about it specifically but instead they generalize the experience by using attributes like “stay”, which was the third most used one in Lisbon. Just like with the more descriptive attributes “view, shower, bathroom, and bed”, that guests tend to use only when they had an out-of-the-ordinary experience with it, positive or negative, “room” seems to be slowly becoming one of them—only being used when something unexpected happens. This means that as long as their room experience goes according to their expectations, their priorities during reviews will focus on other areas while generalizing this main attribute.

Another interesting trend was the attribute “breakfast”, which showed a spike of 6% only in Lisbon during the *Novelty* period, later, it had a small drop, but it still stayed higher than *pre-covid*. As mentioned in the previous section, guests may have been giving it a higher priority, once new health and safety measures forced hotels to change the way they served breakfast, limited their service, or even canceled it altogether. With only 3% of UGRs talking negatively about this attribute, it shows that reviewers were happy with how breakfast was being handled during the pandemic; which left in them a strong and positive impression of the hotel.

There was also a change in the priority of where to eat. The attribute “restaurant” dropped 5% while only recovering 1% during the *Prevention* period. At the same time, “bar” had an increase of 2%, and “food”, which is also strongly related to room service, had an increase of 3%. This shows that guests



that the guests started giving more importance to it than before, since this is one of the hotel services guests started to prefer after COVID.

The “Breakfast” attribute stayed in Q3 for all three periods. Since this is a dataset from 5-star hotels only, it could mean that guests are already expecting a high-quality breakfast service, so they do not need to worry much about it. Nevertheless, during the last period, the attribute “food” in Q3 moved to Q1, and “restaurant” moved from Q2 to Q1. During this time, guests started spending more time and consuming more inside the hotel, which encouraged an increase in priority for the food services provided.

Along the same line, the attribute “drink”, from cocktails and other alcoholic beverages, was in Q1 during the *Pre-Covid* period, but it advanced to Q2 during the subsequent two periods. This can be a result of the hotels investing more resources in that area, or it can also be the result of guests spending more time in the hotel, therefore consuming more at the hotel bar, leading to better evaluations. A study from 2015 found that bars and clubs were two growing features travelers look for at a hotel (Li et al., 2015). While the attribute “drink” improved, “bar” dropped from Q2 to Q3. Showing that while the guests were satisfied with the product, the service and quality were not as memorable.

#### 4.5 MARKETING POTENTIAL

As described above, customer service, the human side of hospitality, is the crucial new growing trend after the COVID-19 pandemic. All the related attributes (e.g., service, staff, front desk, waiter) have been mentioned more often during UGRs and are becoming a higher priority. For that reason, hotels need to add to their marketing campaigns how their staff is not only highly trained and capable, but also how they have a strong attention to detail, care, and respect, showing that they can be helpful and give personalized service. This can be achieved through mentions on the hotel’s website and social media, short videos and testimonies.

Food is a trending social media topic that keeps growing year after year (Trifonova, 2022). People like to see new types of food, learn new recipes, or just look at something delicious. Promotional videos and photos showcasing how the food at the hotel is made, what type of food is served, how it is served, and what type of culinary experiences guests and customers can have, are great ways to attract new business and get the attention of future guests. As pointed out earlier, food and drink attributes are also becoming more relevant and important for guests, so capitalizing on the already existing trend and promoting hotel food on social media is a good way to stand out.

Another strategy, even though it may be more common practice, is offering package deals for in-house and out-house services. As the results have shown, after the *Novelty* period, guests are spending more time inside the hotel and prefer using in-house services, like spa and bar; therefore, offering package deals with room plus spa service, complimentary drinks, brunch, or any other type of service can bring better results. Offering deals with city tours, tourist spots, or transportation to nearby cities, making it easier and more convenient for guests to plan their trips is also another great strategy, as guests will feel they are being well taken care of by a hotel that has gone out of its way to make sure their guests have the best experience.

With this preference for staying in the hotel, adding more in-house events is another way to market it and even bring more business. Most hotels already host more traditional events, e.g., Valentine’s Day

dinner, Easter lunch, Christmas dinner, and New Year's party. But one can start increasing the number of in-house events, with simple ones, such as live music on the weekends, brunch during weekdays, and wine-tasting dinners; and grow to more complex ones, such as special dinner menus, offering plates from different countries, theme party dinners, dances, and the like. At the same time, guests can be offered special deals for these events, like early registration, discounts, and complimentary drinks or food. This way not only is the hotel offering more things for guests to do during their stay, but it also creates opportunities to bring walk-in customers to the hotel.

## 5 CONCLUSIONS

This study used UGRs in the high-end hotel industry of Lisbon, London, and Paris to identify the impact the COVID-19 pandemic had on guests' priorities, needs, and wants. Collecting reviews and dissecting them with text mining techniques, such as topic and sentiment analysis, made it possible to identify attributes and sentiments that were important to reviewers.

Most previous research in this field focused their investigation on just one geographical area while using diverse data collection techniques, analysis, and comparison. While this study used similar techniques, it had the novel idea of comparing different regions simultaneously using only UGRs. This way, it was possible to see that, independently of location, guests prioritized the quality of the service given by staff members, breakfast service, and food in general, and an increased interest in in-house services like spa, bar, and pool. Meanwhile, attributes like restaurant, location, view, and room have lost some importance because of the pandemic; during the middle of COVID-19, guests main concern was how well things were cleaned and how well the staff and other guests were following the health and safety protocols those worries yielded after the implementation of vaccines and the lax of govern restrictions.

This study was able to show the novel insight that even though they are three very different regions, they showed very similar results when compiling the list of attributes and changes between periods, contributing to the tourism literature, that states that although different geographic areas have diverse and unique cultures, habits, and trends, they can be evaluated and studied together with other regions. This way, a better understanding of the international tourism scenario present today can be gained. The results of the research found clear support for how similar the guests' priorities are independently of where they are from.

Also, this study supports and validates the usefulness of UGC and text mining as a source of data and analysis, both for research and professional use. Using the pre-processing, topical model, and sentiment analysis techniques can take confusing and poorly structured data from customer reviews and transform it into a rich and simple-to-view quantitative dataset. This method is a great tool for decision makers who need to evaluate what part of their business, or products, consumers are enjoying or not. As this study has shown, through this process hotel directors can know what areas of their hotel guests are satisfied with, and where they need to place more resources on to improve it. Also, the marketing team can use this clean data to create more accurate personas and develop advertising that will resonate with their target audience.

For example, this study has shown that, because of the pandemic, guests started to prioritize more (the) human interaction and quality of service. Through the CIPA method it was possible to clearly define that guests were satisfied with the service provided by the front desk and concierge, but that they felt that the service provided by other staff, like waiters, bartenders, bellhops, and others didn't meet their expectations, or wasn't good enough. Being provided with this knowledge, the hotel director can then use resources to perform evaluations, improve staff training, and review and update service standards. While the marketing team can promote the great and personal service their staff give to every guest.

Finally, through this research it was possible to learn how the COVID-19 pandemic affected hotel guests in Lisbon. When compared with the other two cities, they were the ones that talked less about

their rooms in the reviews, caring less for the location of the hotel, mentioned more about breakfast, and the food served at the hotel restaurant. They started giving much more emphasis, importance, to the way they were treated at the front desk in specific, and by the other hotel staff also, than ever before. Insights like these can be of high value to hotel managers in Lisbon to better welcome and improve the clients' experience during their stay.

This study had several limitations. For example, the dataset for this study was collected from one single source, TripAdvisor, while ignoring other popular websites like Booking.com. Also, only English reviews from five-star hotels were used for this study. Collecting reviews in different languages, expanding the types of hotels, and scraping from different sources, can reveal more differences between the three periods and help to better understand customers' priorities.

Region was another limitation. While the main goal was to understand the impact of the pandemic on guests' priorities in Lisbon, it could have been more beneficial to analyze a bigger geographical ratio. A future study that collects UGRs from hotels in different regions, or from all of Portugal, could grant a better and more practical result. Also, this study only dealt with data from one year after the pandemic crisis—when everything was still considered new, and hotels and guests were still adapting to the aftereffects of COVID-19 and its restrictions. Re-doing this study, including data of two or three years after pandemic, could more accurately show if the new trends found in this research still stand or if guest priorities have gone back to what they used to be.

Using UGRs means that the analysis is based on data after the trip. As a consequence, it is possible that after a customer had a good and safe trip, they would not focus their review on topics related to COVID-19. A study that researches the state of mind of someone who planned a trip during the pandemic period may show different insights on how it actually affected hotel guests.

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## APPENDICES

### APPENDIX A

List of terms for each Attribute

Attribute	Terms
<b>room</b>	room, rromm, roomrate, inroom, roomw, familyroom, doogyroom, roome, guestroom, rooms, rromm, roomrate,
<b>staff</b>	staff, waitstaff, understaff, staffs, cleaningstaff, staffed, stafft, bellstaff, unstaffed, stafff, staffa, servers, employees
<b>location</b>	location, locations
<b>service</b>	service, serviced, services, roomservice
<b>breakfast</b>	breakfast, breakfasts, breakfasting, breakdastw
<b>restaurant</b>	restaurant, restaurants, restaurante
<b>front desk</b>	front desk, frontdesk, front desks, help desk, reception, reception desk
<b>bar</b>	bar, bars, bartender, skybar, barman, barmen, rooftopbar, barkeep
<b>concierge</b>	concierge, congierges, concierged, conciergeries, conciergerie
<b>bathroom</b>	bathroom, bathrooms, washroom, washrooms, restroom, restrooms
<b>area</b>	area, areas, areal
<b>food</b>	food, foods, seafood, meal, fooding, barfood, snack, sancks
<b>bed</b>	bed, beds, sofabed, bunk, bunkbed, bunkbeds, bedsheets, beddings, bedding, extrabed, bedsprings, bedsheet, bedcover, bedspreads, bedlinen
<b>walk</b>	walk, walking, walkable, walked, walks, walkways, riverwalk, walkway, catwalks, walkin, walkability
<b>view</b>	view, views, overview, viewing, viewpoint, riverview, viewed, viewsmatched
<b>metro</b>	metro, subway
<b>shower</b>	shower, showers, showerhead, showering, showered, showerheads, showercap
<b>lobby</b>	lobby, lelobby, lobbying
<b>spa</b>	spa, spas, spa_, massage, massages
<b>coffee</b>	coffee, coffees
<b>tea</b>	tea, teabag, teabags, teahouse, teas, teapot, teachups, teaspoon, teapots, greentea, teacup, tearooms
<b>COVID</b>	covid, precovid, covidsafe, covid-19, coronavirus, coronavirus
<b>clean</b>	clean, cleaned, cleanliness, cleaning, cleanly, cleanlinessm cleansing, cleanup, spotless, immaculate
<b>unclean</b>	unclean, dirty, messy, filthy, unwashed, dusty, muddy

## APPENDIX B

### Top attributes and Adjectives by Date

#### 2003-2019

Attributes	Frequency	Weight	Frequency Overall	Adjectives	Frequency	Weight	Frequency Overall
room	271666	1.83	24.8%	great	100890	0.92	9.2%
staff	145676	1.33	13.3%	good	74283	0.68	6.8%
service	89593	0.82	8.2%	well	54977	0.5	5.0%
location	77354	0.71	7.1%	friendly	48654	0.44	4.4%
breakfast	73703	0.67	6.7%	excellent	45393	0.41	4.1%
front desk	57912	0.58	5.3%	helpful	42570	0.39	3.9%
restaurant	56706	0.46	5.2%	lovely	41928	0.38	3.8%
bar	46974	0.43	4.3%	comfortable	39776	0.36	3.6%
food	37248	0.34	3.4%	clean	33258	0.31	3.0%
bed	31131	0.28	2.8%	small	32288	0.29	2.9%
walk	28889	0.26	2.6%	best	31665	0.29	2.9%
bathroom	28647	0.26	2.6%	beautiful	31094	0.28	2.8%
area	27577	0.25	2.5%	amazing	30616	0.28	2.8%
tea	25861	0.24	2.4%	perfect	29154	0.27	2.7%
view	20751	0.19	1.9%	wonderful	28714	0.26	2.6%
concierge	19931	0.18	1.8%	fantastic	20914	0.19	1.9%
shower	18676	0.17	1.7%	quiet	18996	0.17	1.7%
station	17892	0.16	1.6%	large	18443	0.17	1.7%
spa	14630	0.13	1.3%	modern	17431	0.16	1.6%
pool	14248	0.13	1.3%	spacious	17115	0.16	1.6%

#### 2020

Attributes	Frequency	Weight	Frequency Overall	Adjectives	Frequency	Weight	Frequency Overall
room	8695	1.61	21.0%	great	3903	0.94	9.4%
staff	6015	1.45	14.5%	good	2309	0.56	5.6%
breakfast	2985	0.72	7.2%	lovely	2107	0.51	5.1%
location	2464	0.6	6.0%	friendly	2081	0.5	5.0%
bar	1707	0.41	4.1%	well	1955	0.47	4.7%
food	1660	0.4	4.0%	amazing	1825	0.44	4.4%
front desk	1613	0.38	3.9%	nice	1765	0.43	4.3%
restaurant	1406	0.34	3.4%	excellent	1636	0.4	4.0%
tea	1188	0.29	2.9%	helpful	1541	0.37	3.7%
bed	1037	0.25	2.5%	comfortable	1415	0.34	3.4%
drinks	948	0.15	2.3%	like	1406	0.34	3.4%
covid	858	0.21	2.1%	best	1348	0.33	3.3%
walk	831	0.2	2.0%	special	1323	0.32	3.2%
area	800	0.19	1.9%	beautiful	1285	0.31	3.1%

<b>bathroom</b>	784	0.19	1.9%	<b>clean</b>	1276	0.31	3.1%
<b>view</b>	736	0.18	1.8%	<b>perfect</b>	1180	0.29	2.9%
<b>spa</b>	705	0.17	1.7%	<b>wonderfu</b> <b>l</b>	1174	0.28	2.8%
<b>concierge</b>	631	0.15	1.5%	<b>fantastic</b>	946	0.23	2.3%
<b>lounge</b>	583	0.14	1.4%	<b>small</b>	779	0.19	1.9%
<b>shower</b>	576	0.14	1.4%	<b>welcome</b>	759	0.18	1.8%

### 2021-2022

Attributes	Frequency	Weight	Frequency Overall	Adjectives	Frequency	Weight	Frequency Overall
<b>room</b>	34859	1.71	22.6%	<b>great</b>	14405	0.93	9.3%
<b>staff</b>	27064	1.54	17.6%	<b>good</b>	8099	0.53	5.3%
<b>service</b>	14288	0.93	9.3%	<b>friendly</b>	8067	0.52	5.2%
<b>breakfast</b>	11086	0.72	7.2%	<b>amazing</b>	7810	0.51	5.1%
<b>location</b>	9916	0.64	6.4%	<b>lovely</b>	7674	0.5	5.0%
<b>front desk</b>	9361	0.6	6.1%	<b>well</b>	6851	0.44	4.4%
<b>bar</b>	6793	0.44	4.4%	<b>nice</b>	6501	0.42	4.2%
<b>food</b>	6642	0.43	4.3%	<b>excellent</b>	6351	0.41	4.1%
<b>restaurant</b>	5300	0.34	3.4%	<b>helpful</b>	6300	0.41	4.1%
<b>tea</b>	3993	0.26	2.6%	<b>like</b>	5233	0.34	3.4%
<b>bed</b>	3717	0.24	2.4%	<b>beautiful</b>	5162	0.33	3.3%
<b>view</b>	3171	0.21	2.1%	<b>best</b>	5088	0.33	3.3%
<b>area</b>	3016	0.2	2.0%	<b>comfortabl</b> <b>e</b>	5013	0.33	3.3%
<b>walk</b>	2830	0.18	1.8%	<b>special</b>	4967	0.32	3.2%
<b>bathroom</b>	2811	0.18	1.8%	<b>clean</b>	4889	0.32	3.2%
<b>spa</b>	2621	0.17	1.7%	<b>wonderful</b>	4791	0.31	3.1%
<b>concierge</b>	2449	0.16	1.6%	<b>perfect</b>	4570	0.3	3.0%
<b>drinks</b>	2378	0.15	1.5%	<b>fantastic</b>	3521	0.23	2.3%
<b>shower</b>	2203	0.14	1.4%	<b>small</b>	3146	0.2	2.0%
<b>lounge</b>	1802	0.12	1.2%	<b>attentive</b>	2701	0.18	1.8%

## APPENDIX C

Top attributes and Adjectives by City

### Paris

Attributes	Frequency	Weight	Frequency Overall	Adjectives	Frequency	Weight	Frequency Overall
<b>room</b>	42211	1.88	25.8%	<b>great</b>	14381	0.88	8.8%
<b>staff</b>	21795	1.33	13.3%	<b>good</b>	9579	0.59	5.9%
<b>location</b>	16962	0.85	10.4%	<b>nice</b>	9056	0.55	5.5%
<b>service</b>	13362	0.82	8.2%	<b>helpful</b>	7395	0.45	4.5%
<b>breakfast</b>	11396	0.7	7.0%	<b>friendly</b>	6990	0.43	4.3%

<b>restaurant</b>	9751	0.36	6.0%	<b>small</b>	6290	0.38	3.8%
<b>front desk</b>	7894	0.35	4.8%	<b>excellent</b>	5918	0.36	3.6%
<b>bar</b>	5659	0.35	3.5%	<b>clean</b>	5898	0.36	3.6%
<b>concierge</b>	4971	0.3	3.0%	<b>beautiful</b>	5895	0.36	3.6%
<b>bathroom</b>	4553	0.28	2.8%	<b>like</b>	5670	0.35	3.5%
<b>area</b>	4060	0.25	2.5%	<b>comfortabl e</b>	5632	0.34	3.4%
<b>food</b>	4041	0.25	2.5%	<b>perfect</b>	5312	0.33	3.3%
<b>bed</b>	4016	0.25	2.5%	<b>best</b>	5014	0.31	3.1%
<b>walk</b>	3372	0.21	2.1%	<b>wonderful</b>	4955	0.3	3.0%
<b>view</b>	3332	0.2	2.0%	<b>amazing</b>	4653	0.28	2.8%
<b>metro</b>	3247	0.2	2.0%	<b>lovely</b>	4582	0.28	2.8%
<b>shower</b>	2945	0.18	1.8%	<b>quiet</b>	3417	0.21	2.1%
<b>lobby</b>	2502	0.15	1.5%	<b>little</b>	3161	0.19	1.9%
<b>spa</b>	2161	0.13	1.3%	<b>large</b>	2937	0.18	1.8%
<b>coffee</b>	2072	0.13	1.3%	<b>fantastic</b>	2568	0.16	1.6%

London

Attributes	Frequency	Weight	Frequency Overall	Adjectives	Frequency	Weight	Frequency Overall
<b>room</b>	217295	1.85	24.5%	<b>great</b>	81747	0.92	9.2%
<b>staff</b>	121133	1.37	13.7%	<b>good</b>	56071	0.63	6.3%
<b>service</b>	75267	0.85	8.5%	<b>nice</b>	41937	0.47	4.7%
<b>location</b>	58593	0.66	6.6%	<b>friendly</b>	40495	0.46	4.6%
<b>breakfast</b>	55802	0.63	6.3%	<b>lovely</b>	39457	0.45	4.5%
<b>bar</b>	40314	0.45	4.5%	<b>excellent</b>	36495	0.41	4.1%
<b>food</b>	33268	0.38	3.8%	<b>helpful</b>	32026	0.36	3.6%
<b>tea</b>	28368	0.32	3.2%	<b>comfortabl e</b>	31567	0.36	3.6%
<b>restauran t</b>	27414	0.31	3.1%	<b>like</b>	31072	0.35	3.5%
<b>bed</b>	25951	0.29	2.9%	<b>clean</b>	29769	0.33	3.4%
<b>bathroom</b>	21764	0.25	2.5%	<b>amazing</b>	28640	0.32	3.2%
<b>walk</b>	20791	0.23	2.3%	<b>best</b>	25423	0.29	2.9%
<b>reception</b>	18783	0.21	2.1%	<b>clean</b>	25052	0.28	2.8%
<b>park</b>	17220	0.19	1.9%	<b>beautiful</b>	22938	0.26	2.6%
<b>station</b>	16158	0.18	1.8%	<b>wonderful</b>	22861	0.26	2.6%
<b>street</b>	15323	0.17	1.7%	<b>small</b>	22633	0.26	2.6%
<b>view</b>	15209	0.17	1.7%	<b>perfect</b>	22593	0.25	2.5%
<b>lounge</b>	15136	0.17	1.7%	<b>fantastic</b>	18600	0.21	2.1%
<b>shower</b>	14589	0.16	1.6%	<b>little</b>	17370	0.2	2.0%
<b>concierge</b>	13528	0.15	1.5%	<b>quiet</b>	13963	0.16	1.6%

Lisbon

Attributes	Frequency	Weight	Frequency Overall	Adjectives	Frequency	Weight	Frequency Overall
room	33105	1,54	22,6%	great	14702	1	10,0%
staff	19831	1,36	13,6%	good	13322	0,91	9,1%
stay	18782	1,09	12,8%	nice	9608	0,66	6,6%
breakfast	13845	0,95	9,5%	well	7973	0,54	5,4%
service	10992	0,75	7,5%	friendly	7310	0,5	5,0%
restaurant	9622	0,43	6,6%	excellent	7265	0,5	5,0%
location	9534	0,65	6,5%	helpful	6894	0,47	4,7%
front desk	8449	0,4	5,8%	comfortable	5950	0,41	4,1%
walk	8202	0,6	5,6%	clean	5081	0,35	3,5%
pool	6250	0,43	4,3%	lovely	5066	0,35	3,5%
bar	6092	0,42	4,2%	beautiful	4980	0,34	3,4%
food	5455	0,37	3,7%	like	4288	0,29	2,9%
area	5062	0,35	3,5%	best	4157	0,28	2,8%
bed	3781	0,26	2,6%	amazing	4077	0,28	2,8%
view	3763	0,26	2,6%	wonderful	3945	0,27	2,7%
spa	3741	0,26	2,6%	small	3942	0,27	2,7%
bathroom	3578	0,24	2,4%	perfect	3610	0,25	2,5%
metro	2989	0,2	2,0%	spacious	2862	0,2	2,0%
shower	2441	0,17	1,7%	modern	2743	0,19	1,9%
buffet	2396	0,16	1,6%	fantastic	2687	0,18	1,8%