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MASTER THESIS

**“Performing statistical data analysis on historical sales data for an Online Travel
Agency - The case of Winedering”**

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ABSTRACT

Wine tourism has emerged as a significant component of the wine industry, bolstering the economic development of wine regions while safeguarding cultural heritage. The COVID-19 pandemic has accelerated the digitalization of travel experiences, leading to the rise of online wine travel agencies. This shift underscores a knowledge gap in wine tourism, particularly regarding consumer experience and behavior. The absence of primary data and the difficulty in gathering it hinder understanding wine tourism demographics and preferences. Online travel agencies, such as Winedering, could have access to a larger scale of sales data, including booking dates, booking creation dates, money spent per booking, and the number of visitors per booking. They, therefore, can address this by collecting and analyzing this data, gaining important information for their operations, offering valuable insights to partners, and enhancing the sector's development. This paper reviews data historically collected through sales by Winedering over recent years. It aims to bridge the knowledge gap/ understand the potential benefits by analyzing the data to identify apparent trends and patterns. The findings are expected to provide valuable insights into consumer preferences in the online wine tourism sector, contributing to Winedering's optimization of resources and the overall industry's understanding and development.

Keywords:

Online travel agencies, digitalisation, wine tourism experience, consumer preferences, statistical data analysis.

LIST OF ABBREVIATIONS:

OTA: Online Travel Agency

B2B: Business-To-Business

B2C: Business-To-Consumer

CRM: Customer Relationship Management

SEO: Search Engine Optimization

API: Application Programming Interface

DISCLAIMER

This work was developed during a 600-hour work-study internship at Winedering as part of the International Master on Wine Tourism Innovation (WINTOUR) joint master's degree program. The project was conducted under the Erasmus Mundus Master in Wine Tourism Innovation (WINTOUR), with financial support from the European Commission. The author, Alejandra Cuevas, received an Erasmus+ Scholarship through the WINTOUR program. The opinions expressed in this publication are solely those of the author, and the European Commission is not responsible for any use of the information contained herein. For privacy reasons, the dataset has been kept private, with only percentage fractions shown to illustrate the conclusions and support the findings.

INTRODUCTION

Wine tourism has become a significant element of the wine industry, contributing to the economic development of wine regions while preserving cultural heritage. This sector, part of the global tourism industry, is expected to grow substantially, with revenue reaching US\$85,145.2 million by the end of 2023 and potentially expanding to around US\$292,538.4 million by 2033, according to Future Market Insights.

Driven by a growing fascination for wine and unique travel experiences, this trend is evident in traditional wine-producing areas like France, Italy, Spain, and the United States, as well as emerging wine regions. Key features of the sector include vineyard tours, wine tastings, festivals, and workshops. This expanding industry stimulates the economy through job creation and local business growth, promoting sustainability and education. Despite the impact of the COVID-19 pandemic, it is projected to regain momentum as travel restrictions ease (Website 1, Website 2, year).

The dynamics of wine tourism have rapidly changed with the rise of digital platforms, such as online travel agencies. This transformation has led to the emergence of specialized online travel agencies for this sector. These platforms leverage technology to streamline the process of exploring and booking wine tourism experiences (Hwang & Lockshin, 2021). They offer comprehensive information about wine regions, wineries, and unique experiences, enabling wine enthusiasts to plan their trips easily (Dolnicar & Ring, 2014). Moreover, they allow visitors to book wine tourism experiences from the comfort of their homes. In addition, these online travel agencies often provide customer reviews and ratings, contributing to a more informed decision-making process (Xiang, Du, Ma, & Fan, 2017). They also offer wineries a platform to extend their reach beyond their physical location, thus increasing their potential customer base (Szolnoki et al., 2018). As the digital landscape of the tourism industry continues to evolve, online travel agencies for wine tourism are expected to play an increasingly vital role in shaping the industry.

The primary aim of this study is to explore the potential implications and benefits of analyzing sales data from an OTA specializing in wine tourism for both the company and its partners. Additionally, the author aims to suggest strategies for developing tools that will enable the company to leverage cutting-edge machine-learning technologies, such as developing predictive models to forecast consumer behavior or implementing recommendation systems to personalize the user experience in the future.

For this study, the author conducted statistical data analysis on the data generated by the host company through sales on their website. This data included booking dates, booking

creation dates, money spent per booking, and the number of visitors per booking. The analysis was performed using the Python programming language, a widely-used language in data analysis, and its specialized libraries, such as Pandas for data manipulation and analysis, Matplotlib for data visualization, and Excel for further data processing and visualization. The data was first cleaned and organized to ensure its quality and consistency. Then, various statistical techniques were applied to identify the data's patterns, trends, and correlations. The results were then interpreted and presented in a clear and concise manner.

The work is structured as follows: Firstly, a comprehensive overview of the host company is presented. It encompasses the operational context, historical trajectory, organizational structure, the author's internship experience, and the specific activities undertaken during the internship. The subsequent section is devoted to the literature review, which serves as the foundation for the study and offers a synthesis of recent and pertinent contributions from global authors. This encompasses an exploration of trends, consumer segments, and motivations within the realm of wine tourism, as well as an analysis of the pandemic's impact and its role in driving the digital transformation of wine tourism. Additionally, it investigates OTA business models and underscores the significance of data-driven decision-making and statistical data analysis. The methodology section outlines the data collection, processing, and analysis approach. The final part is dedicated to presenting the results of the conducted analysis, discussing its implications for managers, and proposing directions for future research in online travel agencies in wine tourism and data analysis.

INTERNSHIP

Overview of the host company

Located in Ascoli Piceno, Italy, Winedering.com is a pioneering online travel agency and tour operator specializing in wine tourism. Founded in 2016 by Denis Seghetti and Stefano Tulli, Winedering has established a unique digital marketplace that offers wine tourism experiences. Its mission is to assist suppliers in selling captivating wine experiences online through data-driven digital features. The platform empowers wineries, tour operators, and local guides to provide wine-related tourism experiences, including tastings, half-day and full-day tours, as well as multi-day wine weekends. Recently, Winedering has expanded its offerings to include other beverages and gastronomic products related to wine, such as beer and brewery tours, distilleries and liqueurs, and olive oil tastings, as well as gastronomic workshops like cooking classes, cultural activities, and walking tours. Winedering's innovative

approach and its role in the digital transformation of wine tourism are a testament to its commitment to the industry's growth and success. (Winedering, n.d.)

Denis Seghetti, adept at developing customized digital systems and e-commerce platforms, oversees IT, digital marketing, and overall technical operations at Winedering. His proficiency in devising personalized digital solutions has been instrumental in building the robust, user-friendly online marketplace powering Winedering's services. Stefano Tulli, with extensive experience as an international tour operator, manages partnerships and tourism-related activities. His industry knowledge ensures that Winedering targets and delivers high-quality, immersive experiences tailored to the needs of wine tourists. (Winedering, n.d.)

Amid the COVID-19 pandemic, Winedering secured a grant from the Italian ComoNext incubator and partnered with Smartbox to counteract the setbacks posed by the lockdown and the pandemic on worldwide travel and tourism. Additionally, Winedering developed a business model based on consulting services for wineries to increase cash flow, diversifying their business model. (Winedering, n.d.)

In 2021, Winedering SRL was officially established after securing €125,000 in investments. The company launched extensive SEO optimization campaigns, leading to significant growth. The company experienced remarkable growth and became Italy's most visited wine tourism marketplace for Italian and English-speaking users. Winedering saw a 796% increase in users, a 340% surge in sales, and a substantial decrease in customer acquisition costs, surpassing Tripadvisor's Google visibility rankings. (Winedering, n.d.)

Winedering's small yet efficient core team, comprising the founders and full-time employee Federica Pagnoni, has played a pivotal role in managing IT, digital marketing, partnerships, content, and customer support. Pagnoni, responsible for content management and supplier support, ensures the seamless integration and presentation of the numerous wine experiences on the platform. By 2022, the company's success led to its selection for the Runway Innovation Hub acceleration program in Silicon Valley and the ARGO Tourism and Travel tech projects accelerator. (Winedering, n.d.)

With over 1,200 wine experiences from over 700 suppliers in 2021, Winedering remains Italy's leading wine tourism marketplace, offering personalized tours and unique wine and food experiences. Even in challenging times, the platform's ability to adapt and thrive

underscores its commitment to enhancing wine tourism through innovative digital solutions. (Winedering, n.d.)

The company's current setup

Winedering.com, which is now Italy's largest marketplace for wine experiences, recently unveiled a B2B marketplace of experiences in November 2023. The company has successfully secured €573,000 in funding, with €250,000 coming from a US angel investor and €323,000 from Italy's Smart & Start initiative. This investment will enable the company to improve its platform, expand its offerings, and enter new European markets. Winedering.com is on track to achieve nearly 1 million GMV by the year's end and double its turnover for the second consecutive year, showcasing robust growth and user loyalty. The funds will support AI content development, Business Intelligence tools, and an expanded sales team.

Winedering is a fully remote company based in Italy. This structure allows them to leverage the latest technologies and methodologies to enhance team productivity. The team consists of the two founders, four content editors/customer success managers serving their key markets: Italy, France, Germany, and Spain, two interns assisting with onboarding, two full-stack developers, and two management and finance advisors. The multiculturalism of the team that integrates the company contributes to its global expansion by targeting different markets with native speakers. The company uses Slack for integrated team communications and relies on the Odoo platform for customer relationship management.

Company's future directions

Co-founders Denis Seghetti and Stefano Tulli have set their sights on scaling the business and fully harnessing the digital potential of wine tourism. By prioritizing the delivery of authentic experiences, Winedering.com is positioned to become a premier destination for global wine enthusiasts keen on exploring wine culture.

In 2024, Winedering's primary objectives in terms of expansion and scalability include the introduction of the following features:

1. Showcase experiences on the suppliers' websites: Partners will be able to showcase experiences on their websites using a white label widget, allowing their customers to search, view, and book a wine experience on their website without realizing that they are booking through Winedering.com.

2. Use of Winedering's Application Programming Interface (API): Partners seeking to deeply integrate Winedering's experiences into their processes and user experience will be able to utilize Winedering's API to access the complete catalog, interact with it, apply filters, and create, update, delete, or view the bookings they have made.

The platform is also currently focused on expanding its influence from the Italian market to the French and Spanish markets, as they are both essential tourist destinations and wine-producing regions.

Internship activities

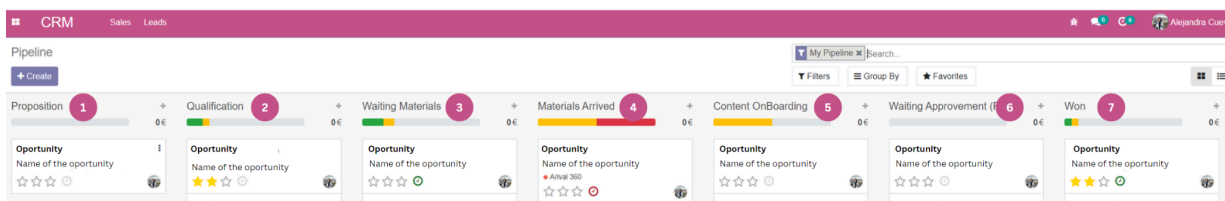
The author worked mainly with the Onboarding team during the internship, which took place from early February to late June. The internship supervisor primarily assigned the author opportunities related to the Spanish market, but it would assist in opportunities from different markets when required. The author's primary responsibilities included uploading new experiences to the platform and assisting partners with onboarding: registering as suppliers to the platform and sending their experiences.

Overview of the onboarding process

Before describing the author's activities during the internship, it is necessary to understand Winedering's onboarding process. Below is a brief description of the stages that integrate this workflow:

1. Proposition: The potential partner or supplier is scouted and selected through previous research or direct contact at events. Here, Winedering's team evaluates the compatibility of the potential partner and its offerings with the platform through information displayed online or through direct conversations with potential partners. Contact details are collected during this stage and integrated into the CRM platform.
 - a. Based on the author's interpretation, there needs to be a visual display or dashboard to visualize the comprehensive state of content within the platform. For instance, the onboarding team faces challenges in identifying the distribution of available experiences across different destinations within the platform.

2. Qualification: This stage comprises an email marketing campaign that aims to convince the prospective supplier to sign up on the Winedering platform. The process involves automated or personalized emails.
3. Waiting for Materials: Once the supplier registers on Winedering, the platform awaits their input to upload their travel experiences.
4. Materials Arrived: The process moves to this stage when the supplier uploads an experience. The onboarding team reviews the information collected in the forms.
5. Content Onboarding: The onboarding team edits the content submitted by the supplier to ensure it is optimized for SEO. This stage also ensures that all information is clear and complete to prevent customer inquiries during the busy travel season.
6. Waiting for Approval: The draft of the experience is sent back to the supplier for approval of the final version that will go online.
7. Won: Once the supplier approves the content/ newly created experience, the opportunity is displayed online on the platform and marked as won. If the supplier does not reply, this will happen automatically after seven days of the experience being ready.



As part of the Onboarding team, the author engaged in various tasks that provided a comprehensive understanding of the company's operations. The upcoming paragraphs will provide a detailed breakdown of the activities, categorized by nature.

Proposition - participation in the wine tourism trade shows

During the prospecting stage, the company consistently participates in the most significant wine tourism and wine trade fairs, leading to the acquisition of leads and opportunities.

Trade shows are a valuable tool for wine producers to expand their sales. Traditionally, they have been dedicated to distributors, wine educators, and producers. However, wine tourism has also become a prominent feature in recent years. Nowadays, specific trade shows focus on the experiential market, such as the Fine Tourism marketplace, Arrival 360, and IWINETEC. While the author could not attend the latter, she participated in two of the most

important wine trade shows: PROWEIN in Dusseldorf, Germany, and VINITALY in Verona, Italy.

These trade shows present valuable opportunities for the company to connect with potential prospects and partners. Engaging in direct interactions is a more effective way to clearly articulate the benefits and persuade partners to join the platform. Additionally, these events offer beneficial team-building exercises and training opportunities, allowing the team to better understand the complexities of selling wine tourism products to potential suppliers and analyzing wineries' responses to the proposals. As for the author's perceptions, in many cases, wineries were open to collaboration, and some even observed a decrease in distribution activity. It was evident that wineries with established tourism operations expressed a strong interest in integrating into the platform from the author's perspective.

Qualification of the leads and onboarding

Once the project was pitched and accepted by potential partners, a significant portion of the author's daily responsibilities involved communicating with them to share relevant information regarding the subscription to the platform and address inquiries and concerns. This communication primarily occurred via email, using the CRM platform integrated into the company's internal data management system. In some cases, phone calls and online meetings were arranged upon request from potential partners to discuss partnership details further. This task was of utmost significance and required considerable time, as it played a crucial role in acquiring new partners for the platform. In some cases, communication with suppliers was prolonged.

Content creation and setting experiences online

As the company continues to grow and expand to other markets and tourism becomes more digitalized, an increasing number of wineries and tour operators are submitting their wine tourism experiences. A crucial part of this process is processing the information received from the suppliers to develop new experiences to be featured online. This activity was the author's primary focus throughout her internship as it is the most crucial step and time-consuming in Winedering's pipeline.

After confirming a partnership with a supplier, an established procedure includes an automated email system to manage communications and follow-ups regarding the submission of experience materials. Occasionally, the author customizes these emails based on the supplier's responsiveness or if they have any questions.

Suppliers send these materials in varying amounts of time, from a few days to a few weeks, depending on the size of the project. Suppliers upload the materials through a form with specific fields they fill out through their control panel. Upon receipt of the materials, the author created the experience within the platform's backend.

The workflow for creating experiences is detailed in the following bullet points:

- Preliminary checks: Before creating a new experience to integrate into the platform, it is necessary to assess the quality of the materials shared by partners. This assessment is essential for efficient resource allocation, as creating a new experience is a labor-intensive and time-consuming task in the company's workflow. The author would examine the content to ensure all necessary information was clear and detailed enough to create a seamless experience. Additionally, the assessment would gauge the proposed activity's relevance and alignment with the platform's interests and standards.
 - If the experience matches the platform well but needs more information, the author initiates direct communication with suppliers via email to request clarification or missing details. Alternatively, some information can be retrieved directly from the supplier's websites or social media.
 - The opportunity is discarded if the experience is not considered a good match.
- In some cases, the author negotiates with suppliers to adjust certain features of the experience to align with the platform's interests.
- Once all details are correct and sufficient, the author uploads the content to the platform's backend, focusing on maintaining a specific format to keep the user experience smooth while optimizing search engine visibility. In this stage, the experience is created as a draft.
- After completion, the new experience changes from draft to ready. A confirmation of the ready experience is sent to the supplier for revision.
 - If no modifications are requested, the experience is published online.
 - Occasionally, specific information or photos are requested, but this process generally follows the standard procedure. Experiences can be online with internal notes for future improvement.
 - In the event of no reply from the supplier, the experience is automatically published online after seven days of being set ready.

In addition to creating content, the author's responsibilities also involved assisting suppliers with updating their experience content when needed. This included adjusting pricing, calendars, and content to keep the catalog current and ensure a smooth experience for travelers and partners. While some tasks needed management by the Winederings team for control, others could be handled by the suppliers themselves. The platform offers partners

tutorials and a user-friendly interface to manage their experiences, calendars, and data. However, some partners still needed extra help, which is common in the hospitality and experience industry. The time it took for a supplier to get used to the platform varied, but the platform's design aimed to make the adaptation process more effortless.

Introduction to the problem

The internship was mainly dedicated to reviewing and editing content for the partner projects to upload experiences into the platform. The host company expressed a clear interest in analyzing the data they have been gathering to optimize this process by identifying the features that make experiences more competitive, thus optimizing this essential process to the company's workflow. The company aims to strengthen its experience database to have an ample catalog. However, this must be done while keeping an eye on quality experiences that are attractive to customers through their channels. Additionally, the company seeks to enhance its B2B relationships by providing valuable insights that can help partners improve their operations. Before diving into the analysis of features inherent to wine tourism experiences, it is important to understand general consumer preferences and behavior regarding spatiality, meaning when and where they are booking and how much they are willing to spend.

RESEARCH GOALS AND OBJECTIVES

This research aims to optimize Winederings operations in a stage in which the company is expanding and experiencing rapid growth through different channels. The primary objectives of this study are listed as follow:

- Develop a framework to analyze the data collected through sales.
- Identify consumer booking preferences by analyzing data obtained through online sales.

LITERATURE REVIEW

Wine Tourism: Definition, trends, and challenges

Definition

In recent years, wine tourism has gained increasing attention and popularity (Ishak et al., 2023). Wine tourism has been defined in various ways, with one of the most widely

embraced definitions originating from Hall et al. in the year 2000. According to their definition, wine tourism involves visiting vineyards, wineries, wine festivals, and wine shows, where grape wine tasting and experiencing the characteristics of a grape wine region are the primary reasons for visitors (Hall et al., 2000). Moreover, Madeira et al. highlights the importance of wine-related activities and experiences in wine tourism (Madeira et al., 2019). They emphasize that wine tourism is about visiting wineries and tasting wines and includes activities such as wine tours, vineyard walks, gourmet dinners, and wine pairing events. These activities offer tourists a holistic experience that encompasses not only the taste of the wine but also the cultural and historical significance of the wine region. (Madeira et al., 2019) Furthermore, wine tourism is characterized by its connection to lifestyle and the idea of experiencing the heritage and traditions associated with winemaking (Santos et al., 2021) in a particular region (Madeira et al., 2019). Additionally, wine tourism has been recognized as a form of cultural tourism, as it showcases a specific wine region's cultural heritage and traditions. (Andrade-Suárez & Caamaño-Franco, 2020)

While Charters and Ali-Knight view wine tourism as travel focused on experiencing wineries and wine regions, including aspects linked to lifestyle, service provision, and destination marketing. Hall emphasizes the cultural experiences of wine tourism, relating it to the heritage of the place where wine is part of the ancestral roots, combining culture, territory, and lifestyle in rural and urban settings. Furthermore, Getz and Brown suggest considering wine tourism from three angles: consumer behavior, regional development strategy, and an opportunity for wineries to sell products directly to consumers.

These definitions highlight the multifaceted nature of wine tourism, which encompasses cultural, economic, and experiential dimensions (Madeira et al., 2019). The literature on wine tourism also outlines the guests' motivation to travel and the experiences hosts offer at the destination as central elements of wine tourism.

Trends

Wine tourism is a rapidly growing sector in the travel and hospitality industry, attracting a wide range of tourists interested in experiencing wine-related activities and exploring wine regions (Festa et al., 2020). It offers wine producers and tourism destinations unique opportunities to showcase their products and attract visitors. The wine tourism industry was estimated to be worth around 8 billion euros in 2020. Despite the challenges posed by the COVID-19 pandemic, the market size is expected to grow significantly, with forecasts predicting it to reach nearly 29.6 billion euros by 2030 (Statista, 2023). This growth reflects the increasing popularity of wine tourism as a leisure activity and its importance to the global tourism industry. Wine tourism presents various business model extension opportunities for

wineries (Dreßler & Paunović, 2021). These opportunities include engaging in tourism and hospitality, creating online sales platforms, and focusing on sustainability. Wine tourism development significantly impacts national and regional economies through economic growth, capital investment, and regional/rural development opportunities. Wine tourism provides wineries with opportunities for communication, distribution, and growth and is a primary source of business value, particularly for small wineries (Festa et al., 2020).

Challenges

Despite the growing popularity of wine tourism, there is a lack of comprehensive research on the topic, particularly from the perspective of online travel agencies (Santos et al., 2021). Furthermore, Loredana Maria Talpoş and Cristina Bolog highlight in "Theoretical Approach to the Profile of Tourists Visiting Urban Travel Destinations" that Destination Management Organizations are focused on creating detailed profiles of tourists. This task is facilitated by the vast amount of data now available online, thanks to the content shared by tourists themselves (Talpoş & Bolog, 2020). However, the challenge lies in effectively collecting, analyzing, and utilizing this data to tailor wine tourism offerings to meet the specific preferences of these segmented groups. This represents a research opportunity to explore the impact of online travel agencies in promoting and facilitating wine tourism (Festa et al., 2020). By the operational nature of OTAs, they pose an inherent opportunity to study their specific role and impact in promoting and facilitating wine tourism and collecting and analyzing data on consumer behavior for the sector.

Consumer Behavior in the Context of Wine Tourism

Consumer behavior in the context of wine tourism is a complex area that requires careful study and understanding (Santos et al., 2021). Many factors influence consumer behavior in the context of wine tourism, including personal preferences, cultural influences, and social dynamics.

Wine Tourism Motivations

It is essential to understand the motivations behind travel decisions and tourism consumption to effectively market tourism destinations (Fodness, 1994; Goossens, 2000; Nicolau & Mas, 2006). Motivation is described as a "need-induced tension" (Schiffman et al., 2011) that compels individuals to take action to alleviate this tension (Goossens, 2000) and forms the foundation of basic motivation theory (Fodness, 1994). In the specific context of wine

tourism, consumer behavior is influenced by factors such as the desire for unique and authentic experiences, the appreciation of wine culture and heritage, the pursuit of leisure and relaxation, and the aspiration to learn about wine production and tasting. Tourists' hedonic motives are consistent with environmental stimulation. It should also be noted that not all wine tourists are wine consumers and, hence, have wine-related incentives. Aside from tasting and purchasing wine, additional drivers include learning about wine, mingling, being amused, traveling in a rural area, relaxing, and so on that flesh out the experience (Bruwer, 2002). Consumer behavior in the context of wine tourism is influenced by various factors, including personal preferences, cultural influences, and social dynamics (Bruwer & Alant, 2009).

Quintal et al. (2022) provided an overview of the motivations behind wine tourist behaviors and suggested that they can be organized according to the push and pull attributes of the winescape. They considered as pull attributes the winescape setting, its wine quality, perceived value, and staff, while push attributes included the experience and bonding motivations. Based on this conceptualization, these authors identified four main segments of wine tourists, "Inspired, Self-Driven, Market-Driven, and Inert," demonstrating that the differences in motivations explain their behavioral intentions.

Recently, Gaetjens et al. (2023) suggest that wine involvement is associated with wine-specific motivations. These include push motivations such as tasting or buying wine, enjoying wine-related activities with friends, or meeting winemakers and wine producers. At the same time, pull factors include culture, heritage, and variety of wineries and their settings. Gaetjens et al. (2023) also suggest that wine knowledge is associated with broader hedonic and experiential motivations. These are mostly pull factors, such as festivals, events, and activities related to leisure, therapy, sports, and landmarks, to name but a few. However, they identified the new, unique, and different experiences as determinants of push motivations for this segment.

Wine Tourism Segments

Wine tourism's success hinges on the industry's capacity to meet the diverse expectations of different tourist segments, as consumer satisfaction largely relies on the perceived value of the wine tourism experience, which varies among tourists (Santos et al., 2021). The segmentation of wine tourists has traditionally involved categorizing visitors based on demographic and psychographic characteristics such as age, gender, nationality, attitudes, lifestyle, and wine product involvement (Dawson et al., 2011). Seminal research by Hall and Johnson (1997), for instance, yielded three market segments: "wine lovers," "wine interested," and "curious," based on observations from vineyard managers. This was further

expanded by Charters and Ali-Knight (2002), who added "wine novices" (limited interest), and Pratt (2011), who introduced the "disinterested tourist" segment (not interested). Santos et al.'s (2020) study on Porto wine cellar visitors also identified three clusters of wine tourists based on their involvement levels, concluding with three segments showing high, medium, and low wine product involvement levels.

However, these existing segmentation methods may be limited, as they often overlook modern tourists' changing preferences and behaviors and the diversity within demographic groups (Madeira et al., 2019). The wine tourism market is continuously evolving, with emerging trends such as sustainable and eco-friendly tourism practices, a demand for personalized and authentic experiences, and the incorporation of technology in the tourism experience. As such, there is a growing need for more sophisticated and updated segmentation approaches that accurately reflect the current market state, incorporating demographics and psychographic factors like attitudes and behaviors toward wine, travel preferences, and interests (Madeira et al., 2019).

Digital transformation on the wine tourism industry: The rise of Online Travel Agencies

Impact of COVID-19 on digital transformation

The COVID-19 pandemic has significantly impacted the wine tourism industry, leading to a rapid digital transformation in how wine experiences are marketed and consumed. Online travel agencies have played a crucial role in adapting to these changes and driving the digitalization of wine tourism. The shift towards online platforms for wine tourism has allowed wineries and wine regions to reach a wider audience and maintain engagement during travel restrictions (Santos et al., 2021) and social distancing measures.

Shift to Online Marketplaces for Tourism Experiences

As the wine tourism industry continues to recover from the impact of the pandemic, OTAs will likely play a vital role in shaping the future landscape of wine tourism through digital innovation. The digital transformation of wine tourism, driven partly by the influence of OTAs, is reshaping how wine enthusiasts interact with and consume wine-related experiences. By embracing digital innovation and leveraging consumer insights, OTAs can continue supporting wine tourism's evolution and resilience in a post-pandemic landscape. (Bruwer & Alant, 2009).

The digital shift in wine tourism has prompted online travel agencies to integrate e-commerce functionalities and streamlined booking platforms into their websites. This integration enables consumers to purchase wine products, event tickets, and tour packages directly through the OTA's platform. OTAs enhance convenience and accessibility for consumers while supporting wineries in generating revenue during challenging times. The rise of OTAs signifies the growing importance of digital platforms in the wine tourism industry, facilitating wider access, convenience, and engagement for wine enthusiasts around the globe.

The Role of Online Travel Agencies in Promoting and Facilitating Wine Tourism

1 (Wine Tourism Market, 2023)

2(On, 2024)

3 (Ferrigno, 2023)

4 (Vinetur, 2023)

5 (Tacticinvestcom, 2023)

6

7 (Festa et al., 2023)

8(Potevin, 2020)

The digital transformation in the wine tourism industry has opened up new opportunities for online travel agencies to promote and facilitate wine tourism (Wine Tourism Market, 2023; Alebaki et al., 2022). By transitioning to online marketplaces for these experiences, OTAs have enabled consumers to engage with wine tourism from the comfort of their homes, maintaining interest and enthusiasm for wine-related activities despite the limitations on physical travel. (Tacticinvestcom, 2023) OTAs bridge wine tourism destinations and potential visitors, offering a platform for marketing and selling wine-related travel experiences. (Vinetur, 2023 ; Potevin, 2020)

Additionally, they can provide valuable insights into consumer behavior through data collection and analysis, which can inform targeted marketing strategies for wine tourism (Wine Tourism Market, 2023). Online travel agencies can enhance the promotion of wine tourism by leveraging their platforms to highlight diverse and authentic wine experiences, collaborating with wineries and vineyards to curate exclusive travel packages, and utilizing data-driven insights to target and attract potential wine tourists (Festa et al., 2023 ; Vinetur, 2023). Furthermore, OTAs can provide comprehensive information about wine regions, including vineyards, wineries, and cellar doors, allowing potential visitors to make informed decisions about their wine tourism itinerary. This approach enhances the consumer's experience and contributes to the wine tourism industry's overall growth and sustainability (Festa et al., 2023).

The role of online travel agencies in promoting and facilitating wine tourism is integral to the growth and sustainability of this niche within the travel and hospitality industry. Through strategic partnerships and an understanding of consumer behavior, OTAs can significantly contribute to the expansion and success of wine tourism experiences(Vinetur, 2023).

Enhanced Digital Marketing Campaigns

Moreover, digital transformation has revolutionized marketing tactics in the wine tourism industry. OTAs now leverage consumer data and analytics to create personalized digital marketing campaigns targeting wine enthusiasts. By harnessing consumer insights and behavior patterns, OTAs can tailor their promotional content and recommendations to individual preferences, increasing engagement and conversion rates. OTAs play a pivotal role in driving the growth of wine tourism by showcasing diverse wine experiences, cultivating a sense of community, and stimulating interest in visiting specific wineries or wine regions (On, 2024; *Wine Tourism Market*, 2023; Ferrigno, 2023).

Data and business analytics opportunities in Online Travel marketplaces for wine tourism

Statistical Data Analysis in Business Management

Statistics is a branch of science that involves gathering, arranging, and analyzing data, as well as making conclusions about the entire population based on sample data. (Winters R, Winters A, Amedee RG. *Statistics: A brief overview* Ochsner J. 2010;10:213–6). Statistical analysis assigns meaning to numerical data, transforming raw information into valuable insights. Precise application of statistical tests is essential for obtaining accurate results and drawing sound conclusions. (Shi et al., 2023)

Basic statistical tools in research and data analysis can provide valuable insights into patterns, trends, and relationships within the data. For businesses, these insights can help managers better understand some factors that influence wine tourism, such as consumer preferences, booking patterns, and market trends.

Descriptive statistics in Wine Tourism

The analysis of statistical data in wine tourism can provide valuable insights into consumer behavior, market trends, and the effectiveness of marketing initiatives. These insights can inform decision-making processes and help shape strategic initiatives to enhance business management. To take advantage of the opportunities presented by OTAs and digital

platforms, wineries and vineyards can use statistical data analysis to gain insights into consumer behavior patterns, such as preferences for certain wine types or regions, booking trends, and demographic information. This information can then be used to tailor marketing efforts and create targeted promotional campaigns that resonate with specific consumer segments.

Leveraging Data for Strategic Partnerships

As online travel agencies collect and analyze consumer data, they can identify trends and preferences that guide strategic partnerships with wineries, local tour operators, and accommodation providers. By understanding consumer demand and behavior, OTAs can curate bundled packages that combine wine experiences with complementary activities, accommodations, and dining options, offering comprehensive and enticing tourism opportunities to prospective travelers.

The surge in digitalization and the rise of online travel agencies present an opportunity for wineries and wine regions to expand their reach, diversify their consumer base, and adapt to the evolving landscape of wine tourism. Embracing digital platforms and collaborating with OTAs can enable these entities to remain resilient and relevant in the face of disruptions while engaging with both existing and new audiences in innovative ways.

The digitalization of wine tourism not only addresses the immediate challenges brought about by the pandemic but also sets a precedent for a more interconnected and tech-savvy approach to promoting wine tourism in the post-pandemic era. As consumer behaviors continue to evolve, online travel agencies will play a pivotal role in reshaping the wine tourism experience, fostering accessibility, and driving sustained interest in wine-related activities.

Utilization of Data and Business Analytics in Wine Tourism

The use of data and business analytics has become increasingly important for OTAs in understanding and responding to changing consumer behaviors in the wake of the pandemic. By analyzing consumer data, OTAs can identify shifting preferences, emerging trends in online wine consumption, and the effectiveness of virtual experiences. This insight allows them to tailor their marketing strategies, develop new offerings, and enhance the overall digital wine tourism experience.

For wine tourism to grow and adapt, it is necessary to overcome data collection and analysis challenges. By leveraging the information provided by tourists and integrating insights from market research, wine tourism managers can develop targeted strategies to meet the unique

demands of various consumer segments, ultimately enhancing the overall wine tourism experience and supporting the industry's development. Collaboration between OTAs and wine tourism stakeholders, such as vineyards, wineries, and local tourism organizations, is crucial for the successful implementation of digital transformation initiatives in wine tourism. By building partnerships and leveraging their technological expertise, OTAs can work with wineries and vineyards to develop exclusive wine tourism packages, and create interactive online platforms that showcase the unique aspects of different wine regions. These collaborative efforts can help attract and engage a wider audience of wine enthusiasts, provide valuable marketing and distribution channels for wineries, and ultimately contribute to the sustainable growth of the wine tourism industry. The digital transformation of wine tourism through the influence of OTAs presents significant opportunities for enhancing the accessibility, convenience, and overall experience of wine tourism.

Additionally, the data collected through bookings made on OTAs can provide valuable insights into consumer preferences and behavior, allowing wineries and vineyards to tailor their offerings and marketing strategies accordingly. By partnering with OTAs, wineries gain access to a larger customer base and benefit from the marketing and distribution capabilities of these online platforms. Moreover, the use of online channels and intermediaries allows wineries to reach a segment of customers that may not be accessible through direct means. Incorporating OTAs into a winery's distribution strategy can greatly expand their reach and drive more bookings in the wine tourism sector. Furthermore, the integration of technology and digital platforms can also improve the overall visitor experience in wine tourism. This can be achieved through the use of online booking systems, interactive maps and personalized recommendations based on consumer preferences. The integration of OTAs and digital platforms in wine tourism presents significant opportunities for the industry's growth and development.

METHODOLOGY

The following section discusses the research methodology employed for this study. Initially, it provides an overview of the procedures used for data collection and management. Subsequently, it details the techniques used for carrying out the analysis and finally it outlines the key statistical findings.

Data collection

The original dataset was collected directly from the company's database by the CTO, Denis Seghetti. For privacy policies sensible data was hidden and the author had no interaction with the original database but rather made a specific query for fields of potential interest.

Data cleaning

After receiving the data set the author went through the task of cleaning the data. Data cleaning, also known as data cleansing, is an important step in the data analysis process. It involves carefully examining the data for mistakes and discrepancies, and then correcting or eliminating them. This step is crucial for guaranteeing the accuracy and reliability of the data, which is necessary for obtaining accurate and meaningful results from the analysis. (Data Camp, 2024)

	Frequency	%
Country		
Italy	15533	95.21
Portugal	304	1.86
Spain	261	1.60
France	143	0.88
Greece	21	0.13
Austria	14	0.09
Australia	11	0.07
Slovenia	6	0.04
New Zealand	5	0.03
Argentina	4	0.02
Republic of South Africa	4	0.02
United Kingdom	3	0.02
Germany	3	0.02
Belgium	1	0.01
United States of America	1	0.01

Table 1. Composition of the dataset

Data set

The following table details the fields of the dataset:

Variable Name	Variable Type	Description
Experience Code	Numerical	A single progressive number assigned to each experience available in the platform.
Created At	Ordinal $\Rightarrow$ Quantitative	Refers to the date where the booking of the experience was created.
Created At Dow *	Categorical	Specifies which day of the week was the booking generated.
Created At Month *	Categorical	specifies in which month was the booking created.
Total	Numerical $\Rightarrow$ Continuous	The total cost of the booking.
Total per pax	Numerical $\Rightarrow$ Continuos	The cost of the booking per guest, obtained by dividing the total cost of the booking between the number of guests in it.
Company Name	Categorical	The partner providing the experience booked.
Pax	Numerical $\Rightarrow$ Discrete	Refers to the numbers of guests in the booking.
Country	Categorical	Country where the experience takes place.
Region	Categorical	Specific wine region of the experience sold.
Province	Categorical	Specific wine province of the experience sold.
Booking Status	Categorical	Referring to the status: accepted, pending or rejected.
Booking Date	Ordinal $\Rightarrow$ Quantitative	Date where the experience takes place.
Booking Dow*	Categorical	Day of the week where the experience takes place.
Booking month*	Categorical	Month where the experience takes place.

* These variables were extracted from the original dataset. Variables that do not display this symbol “*” were included in the original extraction. "Variable" refers to a trait that differs from one member of a population to another.

Data analysis

After cleaning the dataset, the data analysis was carried out. Exploratory analysis is utilized to comprehend the primary characteristics of a dataset and is commonly employed at the outset of a data analysis process to outline the key aspects of the data, identify missing data, and test assumptions. This technique incorporates visual methods such as scatter plots, histograms, and box plots, as well as the application of statistical or mathematical techniques to uncover patterns, relationships, or trends within the data. The analyses were carried out using Python, leveraging the pandas library to effectively manage and organize the data.

Descriptive analysis, as the name implies, summarizes raw data, making it more interpretable. It entails examining historical data to comprehend past occurrences and is utilized to recognize patterns and trends over time. For the provided dataset, the following descriptive analyses were conducted.

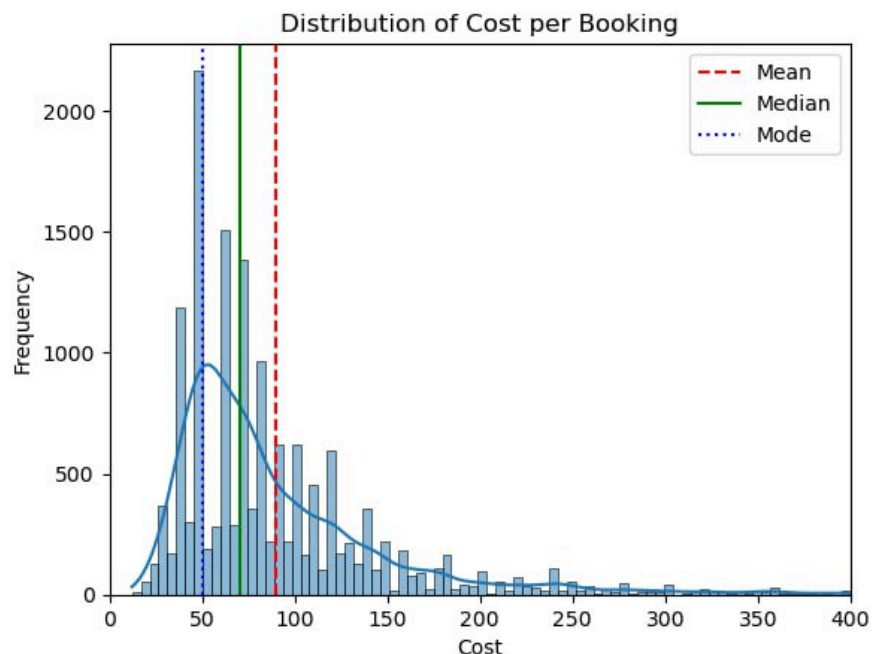
Summary Statistics

Central Tendency ⇒ Calculate the minimum, maximum, mean, median, and mode for:

Total cost

Count	15,219
Mean	89.9541
Std	58.1975
Min	12
25%	50
50%	70
75%	110
Max	400

Table 2. Summary statistics of total cost



Cost per person

Count	15,219
Mean	35.665
Std	19.0635
Min	10
25%	25
50%	30
75%	40
Max	200

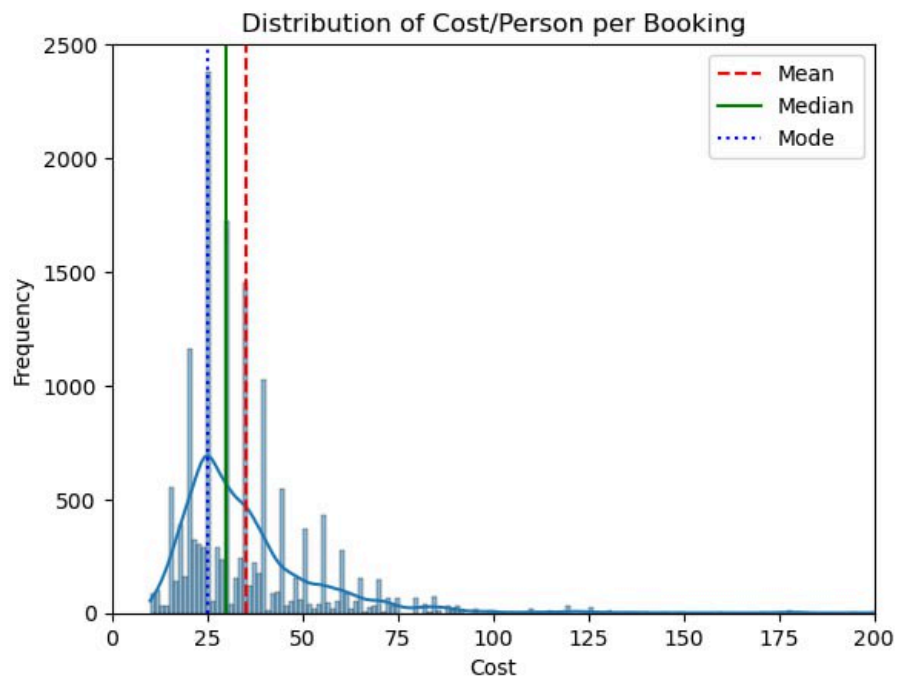


Table 3. Summary statistics of cost per person

Figure 2. Distribution of Cost per person per Booking

Advance purchase

Count	15,219
Mean	15.2123
Std	26.9096
Min	0
25%	2
50%	5
75%	16
Max	260

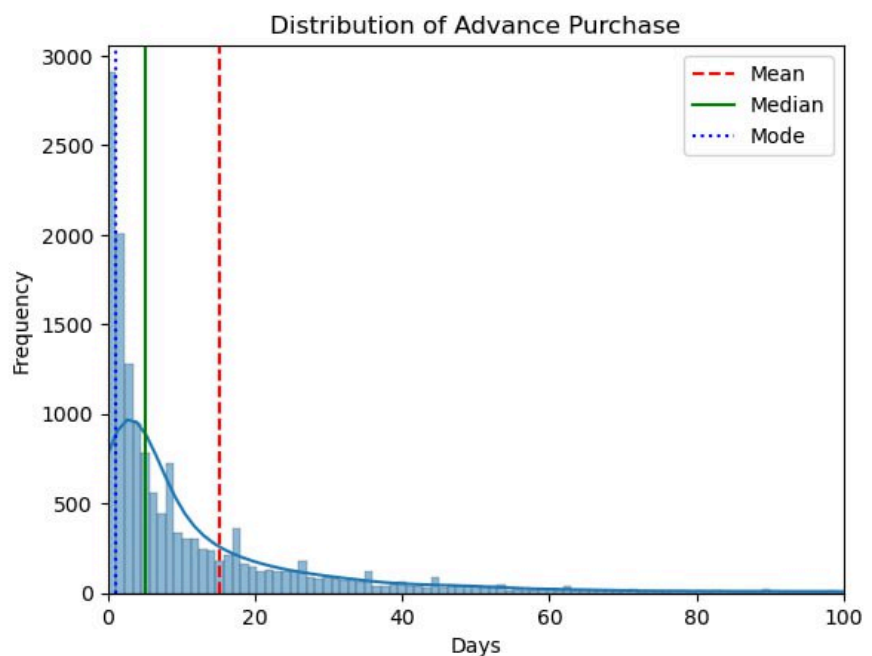


Table 4. Summary statistics Distribution of Advance purchase of advance purchase

Figure 3. Distribution of Advance purchase

Distributions

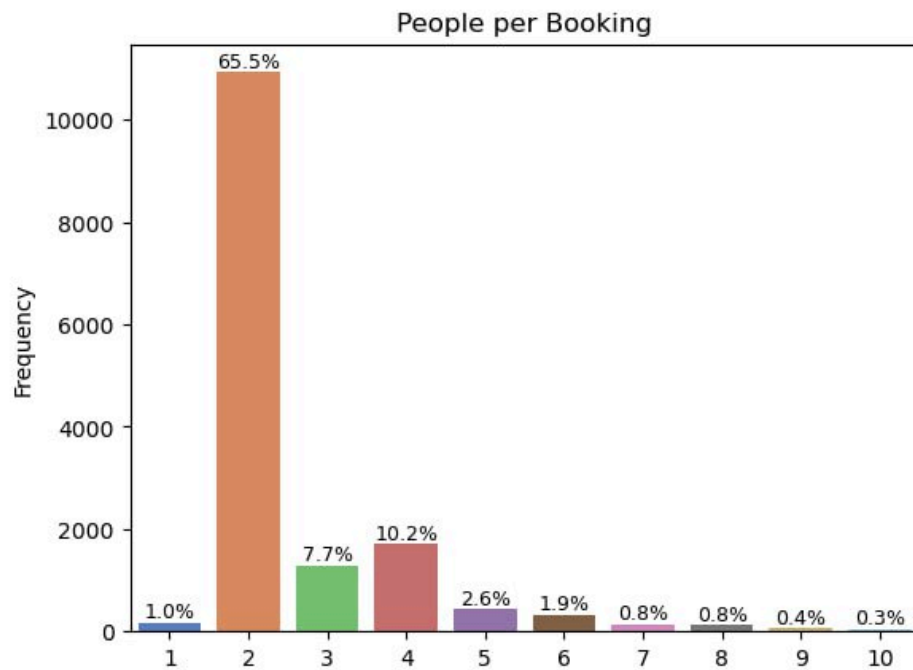


Figure 4. Frequency of no. of people per booking

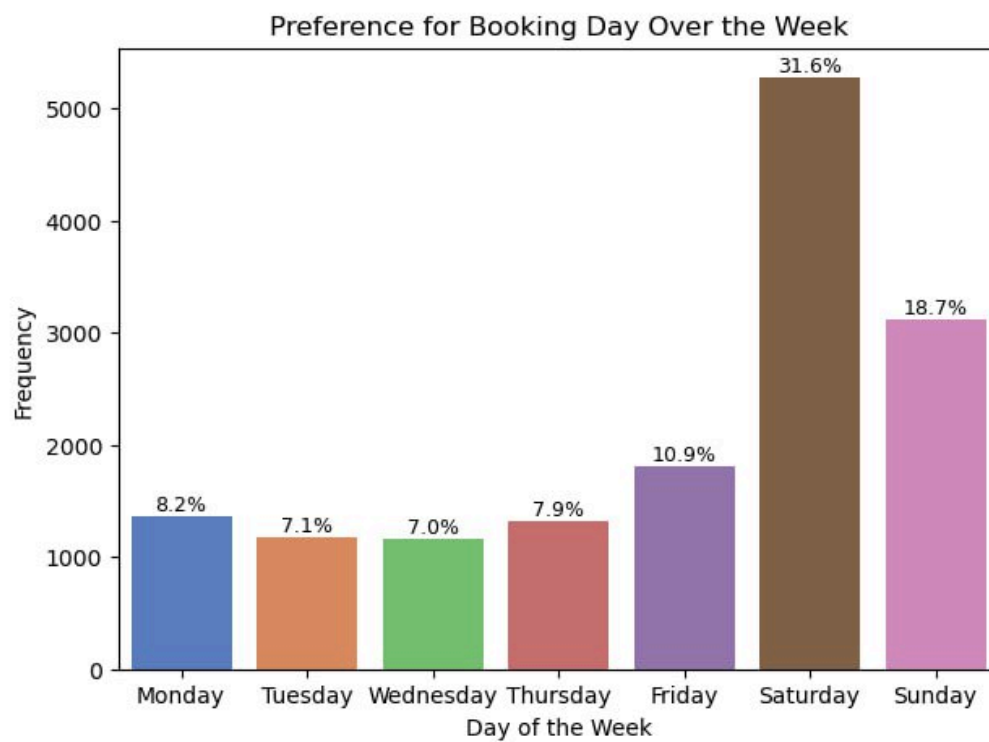


Figure 5. Preference for booking day over the week

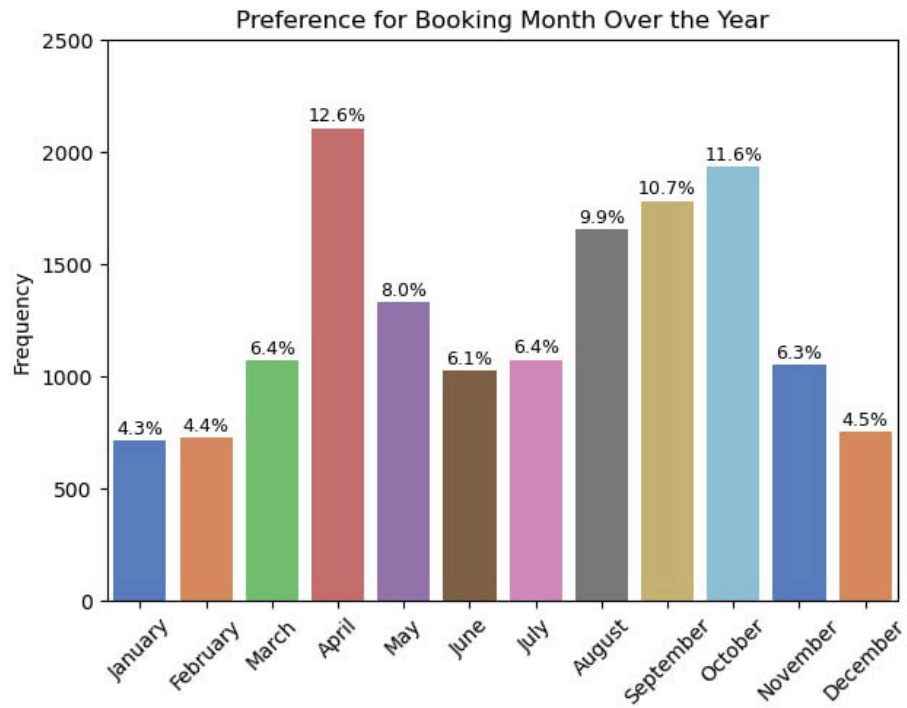


Figure 6. Preference of booking month over the year

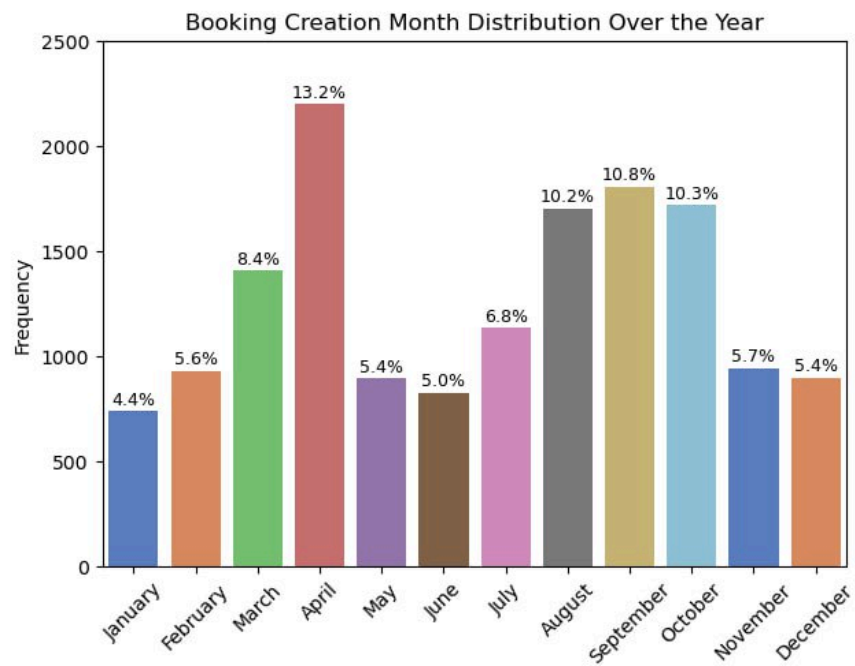


Figure 7. Booking creation month distribution over the year

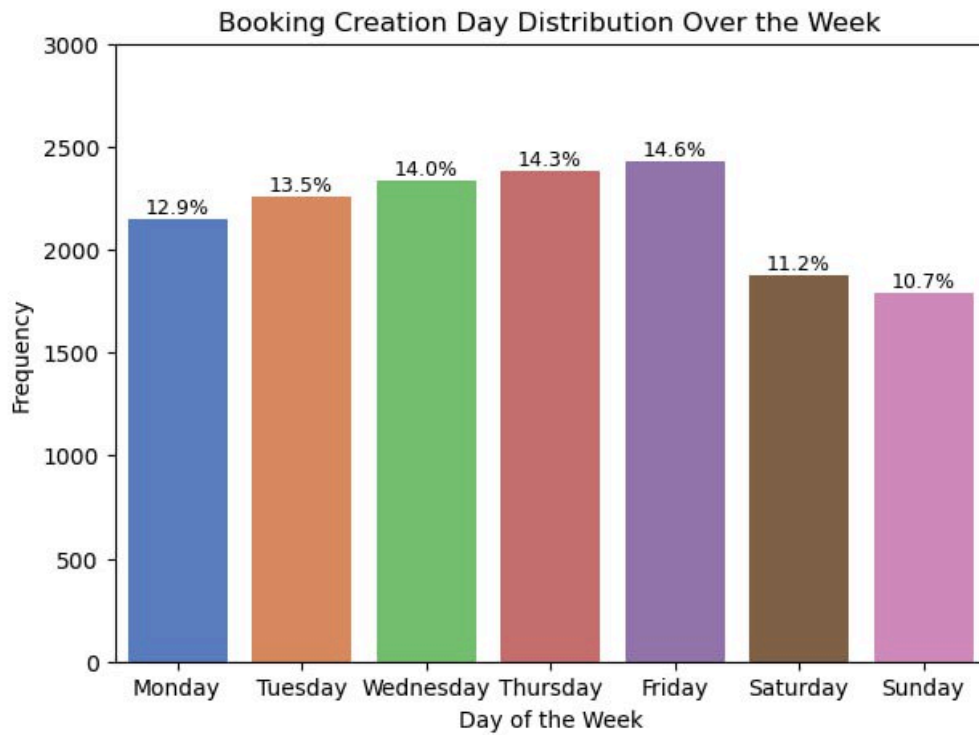


Figure 8. Booking creation day distribution over the week

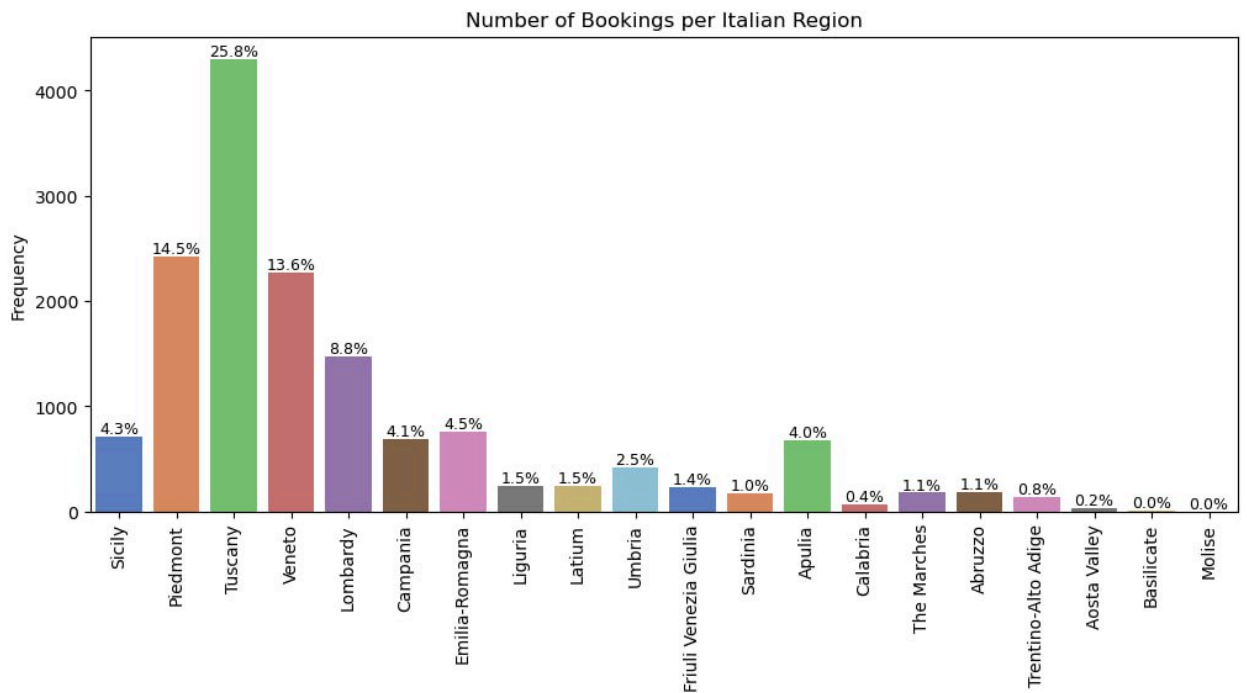


Figure 9. Total booking per Italian region

Cross Tabulations:

Cross-tabulations explore relationships between two categorical variables. The author wanted to explore the interaction between days of the week and month for booking creation and booking date.

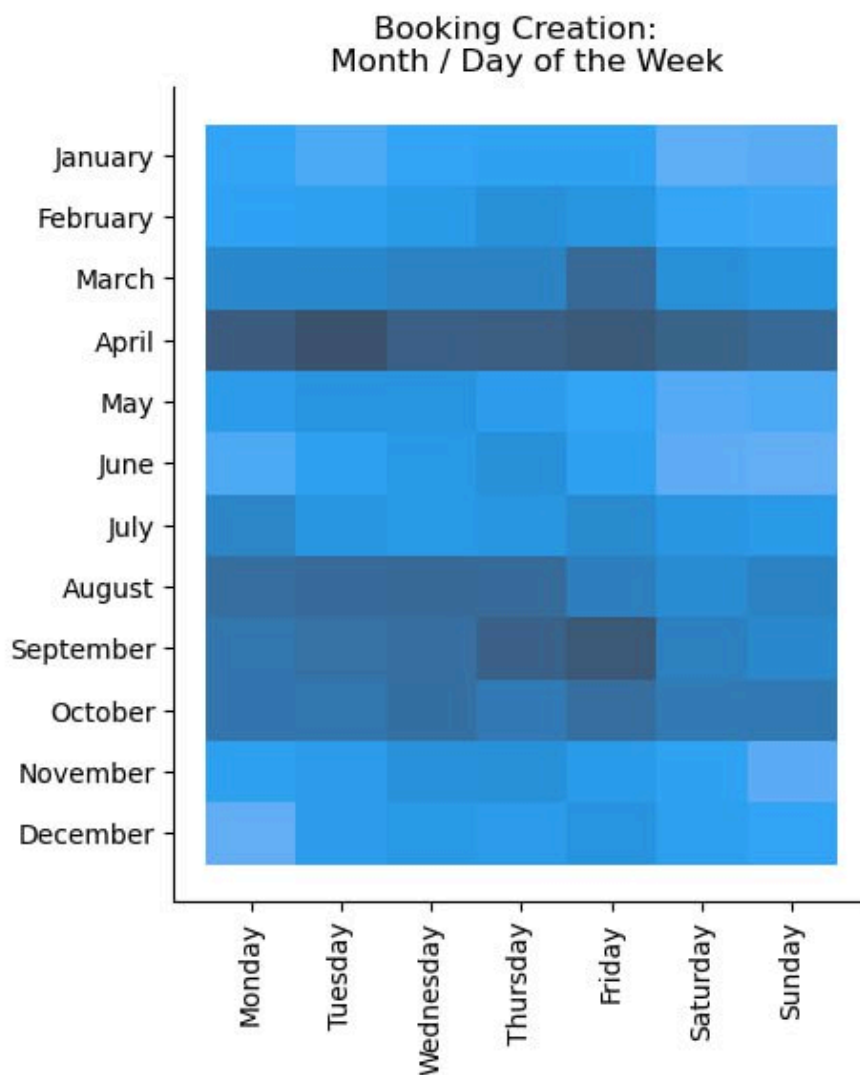


Figure 10. Booking creation month vs day of the week

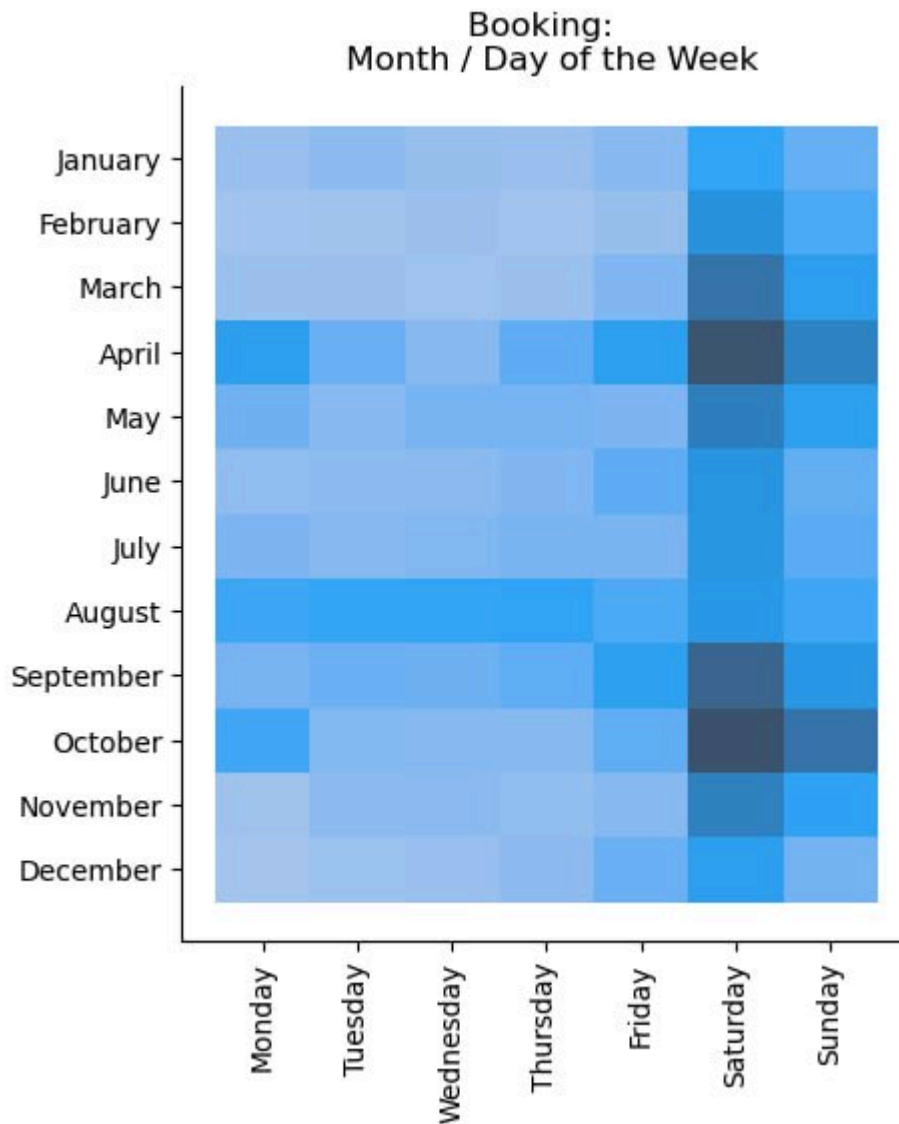


Figure 11. Booking month vs day of the week

RESULTS

After conducting summary descriptive statistics on the data, distinct patterns have emerged regarding booking preferences for consumers using this specific platform. The analysis reveals that the majority of bookings are for couples, with Saturday being the most popular day of the week. Additionally, during the high season, the distribution of bookings is even greater than on other days of the week. Moreover, the data analysis indicates a positive correlation between several variables. By exploring further correlations and conducting regression analysis, the company could potentially develop models to predict consumer purchasing behavior.

DISCUSSION

The main limitation of this study was the lack of access to certain types of data, particularly demographics, as they were not directly linked to sales. Website statistics indicate that the primary markets visiting Winedering are the US, UK, and Italy.

The author suggested adding several data fields to the query, such as the code of the experience booked, type of experience, time of the experience, internal ranking, buyer's nationality or country of origin, and if possible, age and gender. Unfortunately, it was not possible to retrieve and include this additional data in the analysis.

More data fields would have allowed for the proposal of correlations or regression models. It would have also been helpful to work with a data set corresponding to the experiences to identify features shared by the most popular or most sold experiences.

The findings strongly recommend that Winedering continues to develop strategies for analyzing their data to gain a deeper understanding of the behavior of wine tourists who make purchases through online channels. However, it's crucial to consider the study's limitations, such as the bias towards the Italian market, where most sales and platform visibility are concentrated. In future applications of this framework, expanding the analysis to include the markets the company aims to target would enable better comparisons and correlations. Additionally, a more in-depth analysis of consumer preferences could be conducted by examining the experiential features or cross-correlating with a dataset specifically focused on the content of the experiences. The current analysis focused only on bookings, examining variables such as price, booking date, and booking creation to understand booking patterns and preferences. The study was constrained by time and resources, limited to descriptive statistics, but there's potential for deeper analysis.

The findings, however, might provide insight into adjustments that could be made to the company's internal processes.

FUTURE RESEARCH DIRECTIONS

In the near future, there is significant potential for the creation of advanced analysis models that could optimize data processing through machine learning. Over the past couple of years, the company has accumulated more than 16,000 data points. The future of wine tourism indicates a strong need to incorporate cutting-edge AI tools and models, such as sentiment analysis and the analysis of consumer reviews. There is considerable scope for development in data processing and analysis.

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