Virtual reality, cultural tourism, and visitor experience: a case study

Victoria Teresa Apajalahti

2024

Virtual reality, cultural tourism, and visitor experience: a case study

Victoria Teresa Apajalahti

A Dissertation submitted to the School of Tourism and Maritime Technology of the Polytechnic of Leiria in partial fulfilment to complete a Double Degree Programme in the following degree programmes: Master in Tourism Management degree programme (Széchenyi István University) and Master in Sustainable Tourism Management degree programme (Polytechnic of Leiria)

Dissertation conducted under the supervision of Professors Célia Rafael, Maria Sofia Lopes and Ana Pires

2024

Acknowledgements

- This dissertation was done as part of a research financed by national funds through FCT - Foundation for Science and Technology, IP, within the scope of the reference project UIDB/04470/2020.

- I would like to thank my supervisors Sofia Lopes, Ana Pires and Celia Rafael for all the hard work, time, expertise, and kindness they have shared with me over the past year that has made this dissertation possible.

- I also want to express my appreciation to the team at VR Tours Vienna and the manager Rainer who helped me with this project and were kind and accommodating with me in Vienna. Additionally, I want to thank all their guests who took the time to answer the survey.

Abstract

Immersive technologies, such as virtual reality (VR) and augmented reality (AR) are becoming increasingly popular in the tourism industry. In cultural tourism, these technologies are being used to enhance visitors understanding of history and provide them with more differentiated and innovative experiences. This is particularly important considering people's growing demand for self-learning, authentic experiences, and meaning-creation in travel. Virtual reality offers different ways to connect and interact with the history and heritage of a destination, opening new possibilities for cultural tourism experiences. This dissertation explores consumers' perspectives about virtual reality products on the visitor experience in cultural tourism through a case study of VR Tours Vienna. VR Tours Vienna is a walking tour in the UNESCO (United Nations Educational, Scientific and Cultural Organisation) protected centre of Vienna, Austria during which the history of the city is experienced through virtual reality. The research aims to understand how tourists perceive the experience of exploring history and culture through VR as part of a walking tour by examining perceived enjoyment, content quality, educational experience, and the reuse intention of VR. A mixed methodology – combination of a statistical analysis of a survey questionnaire and content analysis of online customer reviews were used to receive a holistic understanding of the customer experience. Educational experience, enjoyment, satisfaction with staff and content quality were found to be in the core of a successful experience. The study found positive results to a heightened reuse intention of virtual reality products after the VR experience. These results show that immersive technologies such as VR can be applied in tourist attractions and destinations to optimise tourists' experience and to increase knowledge about the local history and culture.

Keywords: Virtual Reality, Cultural Tourism, Visitor Experience, Immersive Experience, VR Tour

Table of Contents

List of figures

List of tables

List of pictures

List of Acronyms

AI – Artificial Intelligence

AR - Augmented Reality

CAVE - Cave Automatic Virtual Environment

DMO – Destination Management Organisation

HMD - Head Mounted Display

IVR – Immersive Virtual Reality

MR - Mixed Reality

MSME - Micro, Small & Medium Enterprises

UGC - User Generated Content

UNESCO - United Nations Educational, Scientific and Cultural Organisation

VR - Virtual Reality

XR - Extended Realities

1. Introduction

Virtual Reality (VR) offers the possibility to connect with culture and heritage in a new way and therefore has the potential to contribute to increasing cultural awareness. VR can be an important tool in cultural tourism contexts and together with the research and awareness about it, its use in cultural tourism is increasing (Guttentag, 2010; Frey, & Briviba, 2021). VR experiences are usually designed to be both entertaining and educating making it interesting for cultural tourists (Bird et al. 2023; Okanović et al., 2022). Cultural tourism can be a great platform for virtual reality, as cultural tourism is often educational in nature and could be seen as gaining momentum as more people seek to enhance their travel experiences with learning opportunities that add personal meaning and cultural awareness (Han et al., 2019).

Virtual reality (VR) and augmented reality (AR) are quite recent technologies (Cipresso et al., 2018) that can be referred to together as the extended realities (XR) and immersive technologies. With the help of these technologies, immersive experiences can be created that offer the possibility to go beyond our reality and experience a piece of history, future, or reality which is inaccessible or restricted from the location. The idea behind immersive technologies is that they blur the lines between the physical world and the virtual world, creating a sense of immersion and enhancing the realness of the virtual experience (Suh & Prophet, 2018). As these technologies enhance the active experience of the visitor in the context of cultural tourism and support the concentration and motivation of the tourist involved in a learning experience, they are becoming more used by tourism businesses to support the motivation of the visitor (Ammirato et al., 2021). For example, visitor engagement, learning and destination experiences are found to be enhanced by using AR and VR (Pratisto et al., 2022).

Virtual reality is used as a valuable tool to improve the customer experience in cultural tourism destinations, sites and museums and mainly used for education, entertainment (Pratisto et al., 2022) and marketing (Lin et al., 2020). It is used to enrich the customer experience in the destinations through different types of VR tours and experiences often showcasing the destination and/or its history (Bideci and Bideci, 2023; González-Rodríguez et al., 2020; Rauscher and Humpe, 2022). It is also common for museums to use VR as part of their exhibitions (Errichiello et al., 2019; Lee, H. et al., 2020).

Experiences are in the core of tourism and according to Pine & Gilmore (1998) are built on 4E's: education, entertainment, aesthetics, and escapism. These are all features that virtual reality can offer or that can be experienced through VR.

This research investigates how tourists perceive the experience of exploring history and culture through virtual reality as part of a walking tour?. The research takes the form of a case study of VR Tours Vienna, a tourism company operating in the Austrian capital. The research was conducted using a mixed method of quantitative and qualitative approach, with a statistical analysis of data from a survey questionnaire and a content analysis of the company's online customer reviews from Google and TripAdvisor.

This dissertation is structured as follows. Firstly, the literature review is presented, discussing the relevant topics of cultural tourism, virtual reality and visitor experience. Then the case study is presented, including the company, the research question and the hypotheses and their justifications. The dissertation continues with a methodology section where the mixed methods are presented. This is followed by a results section, which first presents the results of the quantitative analysis, followed by the content analysis. Finally, there is a discussion and a conclusion and recommendations section to conclude the dissertation.

2. Literature review

In order to dive into the topic of the dissertation and provide a framework for it, the literature review section aims to provide an understanding of previous research in the field by discussing the topics of cultural tourism, virtual reality, visitor experience, virtual reality as part of cultural tourism, the benefits and challenges it brings, and online consumer reviews.

2.1. Cultural tourism

Cultural tourism is an important form of tourism as it counts for 40% of all tourism (UN Tourism, 2016). It can be defined as an activity where the visitor's primary motivation is to visit a destination for the tangible and intangible cultural attractions and products to learn, experience, discover and consume them (Ammirato et al., 2021; Richards, 2018). Cultural tourism spreads cultural awareness, which is recognised to be important for a more sustainable future (UNESCO, 2022).

Culture encompasses everything between and beyond historic monuments and museums to living heritage practices to contemporary art forms (UNESCO. *Culture.*, 2024). Tangible culture can be for example objects and artifacts in a museum, or the pyramids in Egypt. Intangible culture on the other hand includes customs and traditions like a certain way of cooking or dancing but also events like festivals and concerts while intangible cultural heritage is "practices, representations, expressions, knowledge and know-how, transmitted from generation to generation within communities, created and transformed continuously by them" (UNESCO, 2003). The idea of culture is spreading towards more global, diverse, and modern everyday practices and shifting away from the thought of only tangible and historical heritage (Ammirato et al., 2021; Richards, 2018). In the modern take of cultural tourism tourists are invited to be part of the destination and its culture, enriching the cultural and visitor experiences (Ammirato et al., 2021; Richards, 2018).

Richards (2018) suggest dividing cultural tourists into two groups: general and specific cultural tourists. Specific cultural tourists have culture as their prior motivation while general cultural tourists use cultural services while traveling but not as their main motivation of travel and sometimes unintentionally. When it comes to the diversity of cultural tourists Richards (2018) and van der Ark (2013) recognised that the relationship between the age of the cultural consumers has an influence on the kind of culture that is being consumed - older visitors prefer more traditional monuments and museums whereas younger visitors look for more modern

architecture, contemporary art, and creativity. As cultural tourism is so diverse it's no wonder why virtual reality and other technologies are being increasingly tested and utilised within. In the cultural tourism context these technologies are used to enable the user to go beyond our reality and experience a place, history, event, or culture presented (Bec et al., 2019).

2.2. Virtual reality

VR offers wide possibilities since it allows to experience and enter different realities and places. VR content can either be interactive, allowing users to engage with a virtual environment, or it can be passive, where users simply observe 3D 360-degree content without interacting with it (Pratisto et al., 2022). A virtual environment is computer generated and can even be considered as an alternative reality. The content can be built to adjust within movement and allow interaction, or in the case of 3D 360 content, the user can enjoy the 360 features by turning their head and looking in different directions (Pratisto et al., 2022). VR is not so new as an invention as the concept was already invented in the 1960's but technology that allows a better experience is quite new (Cipresso et al., 2018).

Virtual reality can be divided into three categories: fully immersive, semi-immersive and non-immersive experiences (Beck et al., 2019). Fully immersive VR is a simulation where one or more senses are activated and persons' movements are aligned with the virtual world allowing or giving the possibility for navigation and interaction (Mura et al., 2017; Pratisto et al., 2022; Suh & Prophet, 2018). In a fully immersive experience, the content is experienced through a head mounted display (HMD) (Pratisto et al., 2022), more commonly known as VR glasses. Semi-immersive VR allows the person to remain aware of and connected to their physical surroundings while being immersed. It is usually experienced through CAVE (cave automatic virtual environment) technology (Beck et al., 2019; De Lurdes Calisto and Sarkar, 2024).

Non-immersive virtual reality means that a person stays fully aware of their surroundings throughout the experience and the content like a virtual world or 360° pictures and videos are accessed through a computer screen (Ventura et al., 2019; Beck et al., 2019). Some examples include a virtual museum tour or the computer game Minecraft where a virtual world is created (Ventura et al., 2019).

2.2.1. Extended realities market and research

Immersive technologies like virtual reality, augmented reality (AR) and mixed reality (MR) (Suh & Prophet, 2018) have become increasingly popular research topics in tourism and hospitality (Pratisto et., 2022). In Scopus (n.d.), the first publications regarding virtual reality and tourism date back to 1995 while the oldest publication regarding augmented reality and tourism is from 2001. Virtual reality also seems to be more popular in comparison to augmented reality in tourism research since by a search done on Scopus (on 6th September 2024) with the terms "virtual AND reality AND tourism" produced 1,763 results but the search with "augmented AND reality AND tourism" gave only 1,119 responses. The topic is gaining popularity, and it can be recognised since more than half of the papers for both topics have been written between 2020 and 2024 resulting in 1,207 papers and 722 papers, respectively.

While research on immersive technologies and their application in tourism is growing, the broader industry adoption of XR technologies seems to be focused primarily on sectors outside of tourism. According to Statista (2023) the global market size of extended realities has more than doubled from 2021 and was worth 41 billion US dollars in 2023. The industry is expected to pass the 100 billion US dollar mark in 2026. Research in the extended reality seems to focus on computer science, engineering, mathematics, medicine, and social sciences (Scopus, n.d.). This seems to indicate that its usage and research is widespread and focuses mainly on other industries than tourism. For example, research, neuroscientists, automotive industries, gaming and entertainment and health education have shown successful adaptation of XR technologies (Cipresso et al., 2018; Forbes, 2024). Virtual reality is gaining a lot of interest in research as there is a total of 182,468 documents when searched in Scopus and to put it in perspective tourism has only 149,379 search results. The oldest paper regarding tourism dates back to 1947 while the oldest paper about virtual reality is from 1955 (Scopus, n.d.). While VR products are still relatively rare in the cultural tourism sector, they are gaining popularity as more products become available. However, there appears to be no data available to support this trend.

Research in the field of extended realities in cultural tourism can include many different subjects, variables, customer groups, technological solutions, research methods and locations, which makes it full of opportunities and challenges. Table 1 shows some of the studies considered to be more relevant in this research, highlighting the diversity of the research field. The studies are presented in more detail below.

In comparing the studies of Bideci and Bideci (2023), González-Rodríguez et al. (2020), Rauscher and Humpe (2022), Lee et al. (2020), Alam et al. (2024), and Su et al. (2023) the following aspects are discussed: the type of VR experience, location, variables studied, methodologies, and conclusions (see table 1).

The type of experience across the studies varies in its application of virtual reality (VR). Bideci and Bideci (2023) and González-Rodríguez et al. (2020) focused on immersive VR in walking tours, with the former exploring ancient site of Olympia in Greece and the latter investigating guided historical city tours in Barcelona and Seville. Rauscher and Humpe (2022) examined a VR time-travel experience centred around Bavarian history, offered in a physical location in Munich. In contrast, Lee et al. (2020) studied a VR experience for destination planning that could be accessed remotely from home. Alam et al. (2024) and Su et al. (2023) extended the range of experiences to theme parks in Malaysia and the historic Ruins of Saint Paul's in Macao,

The location of the studies covers Europe, Asia and the United States of America, demonstrating the global appeal and adaptability of VR technology. Bideci and Bideci (2023) and González-Rodríguez et al. (2020) looked at European cultural heritage destinations in Greece and Spain, while Rauscher and Humpe (2022) concentrated on Munich, Germany. Meanwhile, the studies by Alam et al. (2024) and Su et al. (2023) focused on theme parks and cultural sites in Asia, highlighting how VR and AR are being integrated into tourism experiences in different cultural contexts. Lee et al (2020) departed from the face-to-face focus and examined a virtual planning tool hosted on the website of the Santa Clara, USA, Destination Management Organisation (DMO), allowing global access from home.

The studies explored a range of variables depending on the specific focus of the VR experience (table 1). Bideci and Bideci (2023) identified nostalgia, presence, engagement through learning, and service experiences as the main themes within customer reviews. González-Rodríguez et al. (2020) examined service quality, experience quality, VR technology, and experience staff. Behavioural intention is a common variable in the field. It has been the focus of investigation by several researchers, including Rauscher and Humpe (2022), Alam et al. (2024), and Su et al. (2023), who have attempted to identify individuals' behavioural intentions in relation to the reuse of virtual reality (VR) technology. Similarly, Lee, M. et al. (2020) have explored the behavioural intentions of individuals to visit specific destinations. However, the measurement of behavioural intentions in these studies has been from different perspectives and in combination with different variables. Rauscher and Humpe (2022) considered the behavioural

intention to use VR, focusing on performance expectancy, hedonic motivation, and price value. Alam et al. (2024) explored intention to reuse VR but focused on perceived usefulness, ease of use, and compatibility with lifestyle, along with visitor satisfaction. Lee et al. (2020) measured the relationship between quality, telepresence, and intention to visit destinations. Su et al. (2023) broadened the scope by comparing VR and AR, focusing on system quality, user satisfaction, learning effects, and behavioural intentions.

Most of the studies employed content analysis or quantitative methods, with some integrating mixed approaches (table 1). Bideci and Bideci (2023) and González-Rodríguez et al. (2020) both used content analysis of online customer reviews, aligning their methodologies closely. Rauscher and Humpe (2022) took a quantitative approach, integrating qualitative aspects to assess customer intentions and motivations. Lee et al. (2020) and Alam et al. (2024) also employed quantitative methods, focusing on factors that drive user intentions to visit or reuse VR experiences. Su et al. (2023) utilised a mixed-method approach to assess the impact of VR and AR, distinguishing their study with a more experimental design.

The conclusions of the studies reveal both the promise and challenges of VR in tourism (table 1). Bideci and Bideci (2023) highlighted the emotional and educational engagement VR can provide through immersive experiences, with nostalgia and presence being particularly strong factors. Similarly, González-Rodríguez et al. (2020) concluded that the quality of the experience and service are key to successful VR tourism products. Rauscher and Humpe (2022) pointed to the novelty of VR in cultural tourism, suggesting that enjoyment and entertainment are crucial for broader adoption, but noted that VR has yet to become mainstream. Lee et al. (2020) concluded that high-quality VR experiences enhance telepresence, leading to stronger destination visit intentions. Alam et al. (2024) demonstrated that visitor satisfaction plays a key role in encouraging the reuse of VR, with ease of use, enjoyment, and compatibility being critical factors. Finally, Su et al. (2023) found that AR outperformed VR in terms of user satisfaction, learning effects, and behavioural intentions, however, VR was still well received, despite some problems with prolonged use.

In summary, these studies illustrate the diverse applications of VR in tourism, from on-site historical tours to remote planning tools. Despite differing locations and focus areas, the studies consistently emphasise the importance of quality, engagement, and user satisfaction in determining the success of VR experiences.

Table 1 - Research in the field.

Study reference	Type of experience	Location	What was studied (variables)	Who was studied	Methodology	Conclusions
Bideci and Bideci (2023)	An immersive VR experience 'Back in Time Olympia'. Allows comparing the current to the past.	Olympia Archaeological Site in Greece	How nostalgic sensations can be evoked in travellers during cultural heritage tourism. Nostalgia; presence; engagement by learning and service experience.	402 online customer reviews from two platforms.	Content analysis with MAXQDA-22 software.	Nostalgia, presence, engagement by learning and service experience are essential in VR tourist experience.
González-Rodríguez et al. (2020)	Past view' a guided tourist route with the purpose to get a better understanding of old times of historic cities.	Seville and Barcelona, Spain	Target traveller, experience time of year, service quality, quality of experience, IVR technology, staff	119 online customer reviews from TripAdvisor.	Content analysis.	Immersive virtual reality technologies can enhance tourists' quality of experience, leading to memorable experiences and a better destination image. Main themes: service quality, the quality of the experience, the IVR technology, and the staff.
Rauscher & Humpe (2022)	A virtual time travel through the Bavarian history.	Munich, Germany	Performance Expectancy; Effort Expectancy; Social Influence; Facilitating Conditions; Hedonic Motivation; Price Value; Habit; Behavioural Intention; Use Behaviour	314 visitors who took part in the VR experience.	Mixed methods: a quantitative survey with qualitative questions about social influence.	Technology acceptance is primarily driven by enjoyment and entertainment. However, due to the novelty of the technology, intention to use it has not yet turned into actual use.
Lee, M. et al. (2020)	A website-based virtual reality (VR) service "Santa Clara Virtual Tour" about Santa Clara's attractions and hotels.	The official Visit Santa Clara website (www.santaclara.org).	Content Quality; System Quality; Vividness; Attitude; Telepresence; Behavioural Intention	247 U.S. adults who have used VR.	An online self-administered field survey. Participants were required to browse the virtual tour of Santa Clara for at least 3 minutes.	VR quality has a strong positive effect on customers' attitudes and sense of telepresence, which in turn leads to a positive behavioural intention to visit the destination.
Alam et al. (2024)	A VR experience that was used in three different theme parks. The specific experiences offered were not described.	Theme parks in Malaysia	Perceived Usefulness Perceived Ease of Use Compatibility with Lifestyle Visitors' Satisfaction Intention to Reuse VR Enjoyment	357 participants from various age groups and with different levels of VR usage experience.	Quantitative research, using a field survey,	Ease of use, enjoyment, and lifestyle compatibility positively affect visitors' intention to reuse VR. Visitor satisfaction mediates the relationship between ease of use, compatibility, and reuse intention.
Su et al. (2023)	A VR education system was specially designed for this study for the Ruins of Saint Paul's in Macao, which allowed users to explore the site virtually.	The Ruins of Saint Paul's in Macao. VR system available on-site or at home, AR available through smartphones.	System Quality; Information Quality; Behavioural Intentions; Learning Effects; User Learning Satisfaction; Involvement	60 participants. Mainly tourists or local college students in Macao who had used Macao tourism websites and apps.	A mixed research method including a quasi-experiment, semi-structured interviews, and a questionnaire.	The VR education system had a positive impact on users' learning satisfaction and behavioural intentions. AR provided a more flexible and enjoyable learning experience than VR.

Source: own elaboration.

2.2.2. Immersion

Immersion means “becoming physically or virtually a part of the experience itself” (Pine and Gilmore, 1998). Immersion in the context of virtual reality (VR) and augmented reality (AR) refers to the experience of being deeply engaged or involved in a simulated environment. It is the sensation of being present in an alternate reality that replaces the user's real-world surroundings. Immersion can be achieved through a combination of sensory inputs, interactivity, and contextual relevance that VR and AR technologies provide (Su et al., 2023).

Suh & Prophet (2018) divide immersion into two: mental and physical immersion. Mental immersion is "a state of mind in which a user feels that they are deeply engaged within an immersive environment" whereas physical immersion happens when a user is physically and mentally engaged in an immersive environment which is achieved through interpreting visual, auditory, and haptic cues to gather information, navigate and control objects in a synthetic environment.

Immersive technologies allow the users to have immersive experiences which are based on the feelings of escapism and aesthetics (Pine & Gilmore, 1998). The level of immersion can be enhanced when tourists have a higher level of knowledge or interest in the subject matter and content (Lee, H. et al.,2020). A high level of immersion is important in VR products in the cultural tourism industry since it is recognised to make user experiences more enjoyable and memorable and when educational content is involved immersion can lead to better learning outcomes (Su et al., 2023). Su et al. (2023) sugges that immersion is influenced by system quality and information quality, which include factors such as the responsiveness of the system, the smooth transmission of information and graphics, and the simplicity of operation and learning.

2.2.3. Content quality

Bigné et al. (2001, p. 608) define perceived quality as the “overall judgment made by the consumer regarding the excellence of a service”.

Content quality is crucial as it directly affects telepresence, the feeling of being present in the virtual environment (Lee, M. et al., 2020). Content quality is perceived differently by each user. Okanović et al. (2022) concluded that the users who are new to the VR technology give out more positive results on content quality. While Parasuraman, Zeithaml, and Berry (1988)

emphasised that personal perceptions of a service and product have a high impact on the perceived service and product quality.

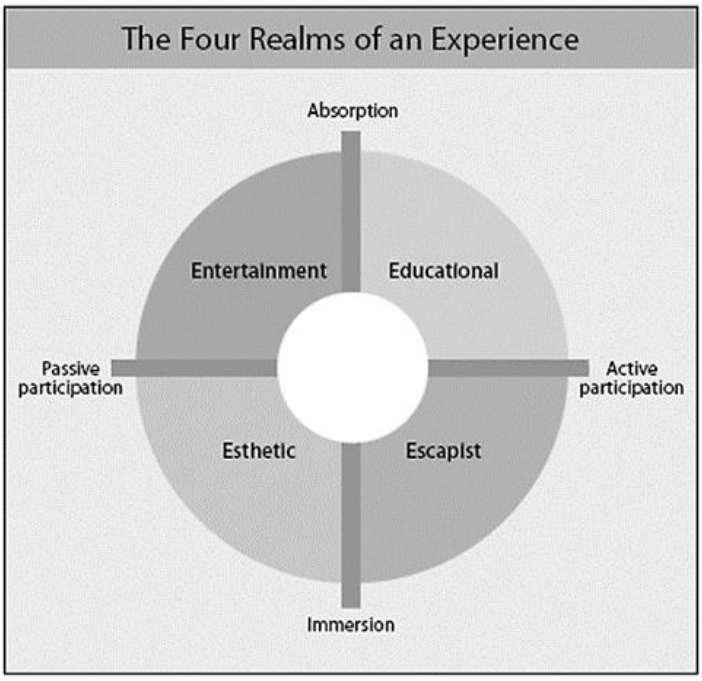
The quality of VR can be measured from many perspectives. Lee, M. et al. (2020) measured the quality of virtual reality from three perspectives: content quality, referring to the informational aspect of the VR experience, system quality meaning the technical performance of the VR system and vividness that is associated with the sensory richness of the VR experience. Su et al. (2023) measured quality through both information quality and system quality, evaluating them based on the usefulness, ease of understanding, completeness, timeliness, and correctness of the information provided by the system's content and by the system itself.

2.3.Visitor experience

According to Pine and Gilmore (1998) experiences are built on 4E's: entertainment, education, aesthetics, escapism. Experience is beyond the service provided; it is a memorable event to the customer (Pine & Gilmore, 1998). They are also claiming that experiences are personal and only exist in the mind of the person and for the experience to be formed the person needs to be involved on an emotional, physical, intellectual, and/or spiritual level.

Pine and Gilmore (1998) introduced a theory in which customer experience is divided into two dimensions. The first dimension is participation, where the customer's role can either be active or passive, depending on the type of experience. The second dimension is the connection between the customer and the experience, which is measured by the level of immersion or absorption. Immersion occurs in aesthetic and escapist experiences, while absorption happens in entertainment and educational experiences, as shown in Figure 1.

Figure 1 - "The four Realms of an Experience".



Source: Pine and Gilmore (1998)

For each experience, the customer goes through a 'customer journey'. The customer journey includes different touchpoints to the experience, starting with hearing about it, perhaps reading reviews about it, checking their social media and websites, arriving, talking to staff, experiencing the actual product, and then ending with the aftermath, including any contact with the experience such as looking back at pictures, giving reviews (Lemon & Verhoef, 2016). During the experience there are other facilitators that can and will affect the experience like the staff, technical aspects, the weather, safety, the traveling group, customers' own mood (Larsen, 2007; Pine and Gilmore, 1998). Even the novelty of the experience can factor the enjoyment in tourism experiences (Mitas & Bastiaansen, 2018).

Employee-tourist interaction plays a crucial role in shaping the overall experience, with different forms of engagement significantly influencing tourists' perceptions of satisfaction, service quality and value (Barnes et al., 2020). Research by Barnes et al. (2020) identifies five key types of interaction - emotional, flexible, personalised, knowledge-based and co-creative - each of which makes a significant contribution to the overall experience. These findings emphasise the importance of fostering diverse and dynamic employee interactions to enhance the value of the tourism experience.

2.4. Virtual reality as part of an experience in cultural tourism

Virtual reality as part of an experience in cultural tourism has benefits but also challenges that are important to consider. Some of these benefits and challenges are discussed further in the following chapter. One of the benefits of using an immersive technology such as virtual reality in cultural tourism is the recognised improvement in learning and visitor experience (Han et al, 2019; Bird et al., 2023; Fan et al., 2022; Lee, H. et al., 2020) but also impact on behavioural intentions to reuse the technology (Yu et al., 2023; Alam et al.,2024) and visit destinations (Lee, M. et al., 2020; Lin et al., 2020).

2.4.1. Benefits and challenges of VR in tourism

The extended reality market is still developing in the cultural tourism industry and brings with it challenges (table 2) but also many benefits (table 3). Most of the studies about immersive technologies in tourism focus on finding benefits and positive experiences (Bird et al., 2023; Fan et al., 2022; Lee, H. et al., 2020). However, it appears that not many studies address the costs and practicalities of utilizing VR or XR technologies.

The novelty of the technologies and their management can be considered a challenge (table 2). Both users and the industry are not yet so familiar with AR and VR and might need assistance using it (Fan et al., 2022; Su et al., 2023; Wen et al., 2023). Additionally, adaptation of new technologies can be costly. Most tourism companies are MSME's (micro, small and medium sized enterprises) meaning the risk of investment in new technologies can be even higher. In some cases, the adaptation of such technologies may even require investment in infrastructure such as the devices, internet and other connections or space (Pratisto et al., 2022). In addition, the use of XR applications may be limited by space constraints, battery life and equipment costs (Innocente et al., 2023). Wen et al. (2023) points out that companies should decide whether they want to offer immersive solutions as part of their product to improve their market position or to have it as an additional service and charge for it.

Table 2 - Challenges of immersive technologies (AR & VR)

Challenges	Technology	Reference
Novelty of technology: users not familiar with using extended reality technologies and might need help	AR & VR	Fan et al. (2022); Su et al. (2023); Wen et al. (2023)
Novelty of technology: companies might need help in usage, management, and maintenance	AR & VR	Fan et al. (2022); Su et al. (2023); Wen et al. (2023)

Adaptation of AR and VR can be costly due to high equipment costs, and content making	AR & VR	Lee, H. et al. (2020); Wen et al. (2023)
Risky investment especially for MSMEs (Wen et al., 2023)	AR & VR	Wen et al. (2023)
Might cause added investment to infrastructure, like connections or space	AR & VR	Pratisto et al. (2022)
Content with too much information decreases satisfaction and lowers participation	AR & VR	Bird et al. (2023)
Space constraints, battery life and equipment cost may limit XR applications	AR & VR	Innocente et al. (2023)

Source: own elaboration

VR has been recognised to have many benefits (table 3) when used in the tourism and cultural tourism industries. VR's capability to increase accessibility at cultural sites by offering access to inaccessible objects and areas, as well as to widen the customer segment by welcoming tourists with different interests, has been recognised as one of the main benefits while supporting heritage protection (Han et al., 2019; Lee; M. et al., 2020; Lin et al., 2020; Pratisto et al., 2022).

Bird et al. (2023) takes a more progressive perspective by noting how extended realities can increase safety and decrease crowds in museums since the exhibitions can be experienced without being close to artefacts.

Not only can virtual reality be used to convince new customers, but it can also be used on "existing customers" in destination marketing, by encouraging people to see the destination from another perspective and to boost revisitation (Pratisto et al., 2022; Lee, M. et al., 2020; Lin et al., 2020).

Slow tourism, which is considered a sustainable form of tourism because it encourages the use of sustainable transport and longer stays in destinations, can be promoted using virtual reality together with the destination image (Lin et al., 2020). In their study (Lin et al., 2020) nostalgia, which plays an important role in tourists' intention to participate in slow tourism, was awakened with virtual reality.

Virtual reality and immersive experiences have been found affective when it comes to behavioural intentions and the intention to visit destinations (Chung et al., 2017; Jung et al., 2020; Marasco et al., 2018; Lee; M. et al., 2020). VR can be considered a good marketing tool as behavioural intentions towards the destination have been found to be affected by multiple factors such as content quality, perceived visual appeal of the immersive experience and perceived ease-of-use (Chung et al., 2017; Jung et al., 2020). As well as attitude toward destination, various devices as part of virtual experiences and remote virtual museum

experiences have been found to affect the behavioural intentions toward destination (Marasco et al., 2018; Lee; H. et al., 2020).

Benefits of increased reuse intention, improved learning and visitor experience and satisfaction (featured in table 3) are discussed in the following chapters in more detail.

Table 3 - Benefits of immersive technologies (AR & VR)

Benefits	Technology	Reference
Improved learning experiences.	VR	Han et al. (2019); Lee; H. et al. (2020)
Positive experiences with VR affect the intention reuse the technology.	VR	Yu et al. (2023); Alam et al. (2024)
Immersive VR increases positive visitor experience	VR	Bird et al. (2023); Fan et al. (2022); Lee, H. et al. (2020)
Showing a new perspective of the destination that could or would not be experienced otherwise	AR & VR	Pratisto et al. (2022)
Encourages the intention to visit	AR & VR	Lee, M. et al. (2020); Lin et al. (2020)
Added accessibility to fragile sites or to physically disable people	AR &VR	Lee, H. et al. (2020)
Can be used both locally and remotely	AR & VR	Su et al. (2023)
Lowering risk of false expectations, when used in marketing as a pre-experience	VR	Fan et al. (2022)
Successful encouragement to slow tourism and improved destination image	VR	Lin et al. (2020)
Possibility to increased safety and crowd control	AR & VR	Bird et al. (2023)

Source: own elaboration

2.4.2. Educational experiences

Education in tourism refers to the process of learning and creating new knowledge through experiences that enhance understanding and knowledge (Lee et al., 2020). Since education is one of the four realms of an experience (Pine and Gilmore, 1998), it is considered relevant when discussing VR experiences in tourism. Many VR experiences and products in cultural tourism focus on educational content, and with the help of VR and the possibilities it brings, these educational experiences are made more entertaining (Guttentag, D, 2010; Lee et al., 2020). A concept called "edutainment," a blend of education and entertainment, is therefore key to creating successful visitor experiences in a cultural context (Bird et al., 2023). Edutainment combines learning with enjoyment, making the experience more engaging for the visitor.

The role of enjoyment in learning should not be overlooked. Lucardie (2014), who studied adult education, found that fun and enjoyment act as motivators for learning, encouraging

concentration and enhancing the absorption of knowledge and skills. Though Lucardie's study focused on adult education, her findings are relevant here, as cultural tourism also involves learning. Interaction and enjoyment, including laughter, can make the learning process more effective and memorable (Lucardie, 2014).

Learning in cultural tourism involves reflective observation and active experimentation, both of which are influenced by the learner's emotions (Han et al., 2019). Learning through virtual reality and an immersive experience is about interactive engagement of the mind, not only passive reception of information, and the usage of VR and immersive experiences have been shown to have positive effects on the learning experience (Lee et al., 2020).

The quality of educational content is also playing an important role and emphasised as something that should be put effort into when planning new AR and VR products. If people receive too much information in a short period, it can decrease satisfaction and lower their participation (Bird et al., 2023). When unnecessary information is reduced, the feeling of being overwhelmed with information regarding for example historical sites, museum exhibits, and navigation speeds is removed (Su et al., 2023). The educational aspect of a VR experience is recognised to contribute to the visitor's appreciation of the aesthetic elements of the virtual environment and sense of escapism (Lee et al., 2020).

2.4.3. Enjoyment and emotional involvement

VR is considered a hedonistic experience (Tussyadiah et al., 2018) therefore, it is crucial to examine the impact of emotions and enjoyment in VR experiences. Enjoyment is being defined as to a feeling of happiness, pleasure or something that gives keen satisfaction ('enjoyment,' 2024). Emotional involvement is defined as the degree to which an individual is emotionally engaged in a behaviour (Marasco et al., 2018; Holsapple & Wu., 2007), and in the context of VR experiences it refers to emotional engagement with the content, such as feeling part of the virtual environment and being carried away (Marasco et al., 2018).

Customers tend to focus more on the hedonistic value of immersive experience rather than utilitarian values (Jung et al., 2020; Chung et al., 2017; Marasco et al., 2018). The utilitarian value refers to the perceived benefit while the hedonistic value refers to the aesthetic experience and perceived enjoyment. Although emotional involvement has not been found to affect behavioural intentions towards a cultural destination (Marasco et al., 2018), the perceived

enjoyment of VR has been recognised to have a positive effect on travel intention (Li and Chen., 2019).

The perceived enjoyment of immersive experiences is influenced by aesthetics of the content and the confirmation of expectations (Chung et al., 2017). This implies that when users are completely immersed, they are also emotionally involved. Additionally, the perceived visual attractiveness of virtual reality experiences has been confirmed to have a positive effect on the user's emotional involvement (Marasco et al., 2018). Enjoyment has a positive impact on flow state, satisfaction, and attitude (Fan et al., 2022).

Satisfaction, on the other hand, close to enjoyment, according to Kotler & Keller (2012), is a feeling of pleasure or disappointment that results from how well the product or service meets expectations. It is a critical measure of the effectiveness and success of the information system, while user satisfaction is the main cause of concern in IT (Zviran et al., 2006). In the context of websites, user satisfaction is critical to building long-term customer relationships and increasing profitability (Zviran et al., 2006).

2.4.4. Reuse intention

For the VR products in cultural tourism to find continuing success it is important that the already experienced users are willing to reuse the technology. Research has shown that the intention to reuse virtual reality (VR) in the tourism context yields positive results (Yu et al., 2023; Alam et al., 2024). Yu et al. (2023), who focused on senior tourists, found that the studied group is aware of the pleasures and advantages of using VR and augmented reality (AR) in tourism experiences, which increases their willingness to reuse these technologies. Their study highlighted that both perceived advantages and perceived enjoyment significantly influence the intention to reuse VR.

Similarly, Alam et al. (2024) also found perceived enjoyment as a key factor positively affecting the reuse intention of VR in tourism. However, unlike Yu et al. (2023), they found no connection between perceived usefulness and reuse intention. Instead, their findings emphasised the importance of perceived ease of use as a determining factor for the intention to reuse VR.

2.5. Online customer reviews and user generated content (UGC)

Travellers rely on user generated content for decision making, making it important for tourism companies to ensure that they have good reviews (Assaker, 2019). User generated content (UGC) refers to content created by users such as written posts, reviews, videos and comments that are posted and shared on the internet by users. Especially social media channels like Instagram, Facebook and TripAdvisor are used to share a lot of travel related content.

Social media allows users to be interactive with each other and companies by commenting on posts and having discussions. However, there are differences among users. Only 1% of users post, 10% comment or interact and the remaining 90% are only observing/lurking (Oliveira et al., 2020).

Oliveira et al. (2020) researched why people share their travel experiences on social media. They recognised that the most important factor to share travel experiences online is that it is perceived as fun and enjoyable. Additionally, people want to help their peers and share their experiences so that others can make better and more informed decisions. On the contrary, security and privacy reasons were the biggest inhibitors to sharing information.

People are most likely to share visual content, especially photos about their travels. Videos and narrative content such as reviews were noted to be shared by fewer people (Oliveira et al., 2020).

The credibility of online customer reviews can be difficult to assess (Fang et al., 2016). Fang et al. (2016) and Schuckert et al. (2015) studied the perceived value of online tourism reviews. Reviews that are easy to read or written by reviewers with a history of positive feedback or extreme opinions are perceived as more valuable. While Fang et al. (2016) recognise that bad reviews are often seen as more valuable due to their helpful nature to fellow customer to avoid bad decisions, Schuckert et al (2016) noted that reviews with extreme sentiment, either highly positive or negative, are perceived as more helpful.

Schuckert et al. (2015), who conducted a review and analysis of research on online customer reviews in tourism and hospitality, found that more than half of the studies examined hotel reviews. On the other hand, Oliveira et al. (2020) studied a group that included people who had travelled within the last two years and their perceptions of sharing. The studies involving online customer reviews in tourism tend to focus on quantitative methods, either through

questionnaires (Oliveira et al., 2020), large datasets (Fang et al., 2015) or content analysis (Bideci and Bideci, 2023; González-Rodríguez et al., 2020).

2.6. Summary

This literature review has discussed the application of virtual reality in cultural tourism and has explained the concepts in more detail. Importantly, learning, enjoyment, content quality, reuse intention of VR in the context were introduced and will also be used in the next chapter which will discuss the case study on which this dissertation is based.

3. Case study

This chapter will introduce the case study, the research problem and hypothesis. In this section the relevance of this study to the research object and the context of the case study are also discussed.

3.1.VR Tours Vienna

The subject of the research is VR Tours Vienna which is a tourism company located in Vienna, Austria. They aim to give an unprecedented experience of the history of Vienna by offering a walking tour that includes a VR experience. They offer a 2-hour and 3,4km long walking tour through the UNESCO protected city centre during which six stops are made to enjoy the history with the help of virtual reality. The tour starts from their office (picture 1), where the VR glasses and headphones are distributed to the customers and instructions are given on how they are properly used during the tour (picture 2). Through the VR glasses 3D 360° animations are being watched and the full 360 environment can be enjoyed by moving around. Each location is displaying history of one era, from the 15th century (picture 3) to the end of the second world war (picture 4). The tour allows the customers to discover Vienna in the past and in the present.

Picture 1 - VR Tours office. VR glasses laid out on the counter.

Source: Author. (2023)

Picture 2 - Customers wearing VR glasses.

Source: Author. (2023)

Picture 3 - VR scene representing a parade in the 15th century at St. Stephen's Cathedral.

Source: VR Tours Vienna (12.6.2024)

Picture 4 - VR Scene showcasing the destruction from the second world war near St. Stephens Cathedral.

Source: VR Tours Vienna (12.6.2024)

The walking tour is hosted by one or two tour guides who walk the group through the marked route. The guiding comes through an audio guide heard from earphones and is available in German, English, Spanish, French, Italian and Dutch. Some tours in German are narrated by a tour guide. The two-hour walking tour takes the following route *The Johannesgasse – Kärntnerstraße – Graben – Hofburg – Burggarten – Neuer Markt – Stephansplatz* (VR Tours Vienna, 12.6.2024).

VR Tours Vienna was chosen to be the subject of this research due to the nature of their service. While the aim was to research virtual reality products in cultural tourism, VR Tours Vienna

could be thought to be in the core of it because it is located and discussing UNESCO heritage sites which means it is culturally relevant and it is educating in nature. Other VR products in Vienna were explored but they were not so attractive. VR Tours Vienna is successful in having a good flow of customers which seems not to be the case in all the virtual reality products.

The company could be categorised in multiple industries such as the tourism industry, walking tours and companies using immersive technologies. Especially the tourism industry and the walking tours are highly competed in big cities like Vienna where good user generated content and marketing becomes very important (Assaker, 2019). VR Tours Vienna is the only walking tour company in the city that is offering virtual reality as part of a walking tour. However, the most direct competition they have in Vienna is a bus tour designed for tourists offering virtual reality as part of it (Wien.info, 10.9.2024).

It is hoped that this study will help the company to improve its success by better understanding how its customers perceive the experience, as well as providing valuable information about its customers.

3.2. Research problem

This study aims to answer the research question "how do tourists perceive the experience of exploring history and culture through virtual reality as part of a walking tour?." Understanding what customers perceive as important and enjoyable in virtual reality products for cultural tourism and their intention to reuse them is pursued. Hopefully, this will enable companies in the industry to offer their customers enjoyable and sustainable experiences by understanding their customers better while making profitable and worthwhile investments.

The research question aims to understand better how the visitor experience can be optimised to ensure the success of immersive technology usage in cultural tourism as it has been recognised to have benefits such as improved learning, heritage protection, better customer experiences etc (Bird et al., 2023; Fan et al., 2022; Lee et al., 2020; Han et al., 2019).

Although studies have explored various aspects of Virtual Reality (VR), such as the intention to reuse (Rauscher & Humpe, 2022; Lee et al., 2020; Alam et al., 2024; Su et al., 2023; Wen et al., 2023), educational experiences/learning outcomes (Su et al., 2023; Lee et al., 2020; Bird et al., 2023; Han et al., 2019), and user enjoyment (Li & Chen, 2019; Fan et al., 2022; Jung et al., 2020; Chung et al., 2017), there is a gap in research combining these factors that this study will

examine Additionally, the use of a mixed-methods approach—incorporating both online customer reviews and questionnaires—is still underexplored in this context.

Some of the studies in the field focus on experimental case studies instead of operating companies. Existing projects like TRVLR (Han et al., 2019; Lin et al., 2020), Google Cardboard and Daydream (Errichiello et al., 2019; Lee et al., 2020; Han et al., 2019) have been discontinued and while new technology is being created it is important to understand through case studies what the customers value and if they value the experience so much they are willing to reuse it.

Intention to re-use, enjoyment and educational experience of VR products were chosen as the main measures for this study to provide a more holistic understanding of the opportunities and customer interest and readiness for such products. Other measurements in this study were content quality, satisfaction, immersion, recommendation and novelty of the experience. VR Tours Vienna was found to be a suitable fit to measure all of them.

To measure these aspects, a mixed method was used, combining a quantitative survey and content analysis of online reviews. Four objectives have been set for this study, which will generally support the aim of this research. The objectives are listed below. Additionally, to support the mixed methods approach, six hypotheses were created for the quantitative study, while four research questions were created for the content analysis, both introduced below.

3.3.Objectives for the questionnaire

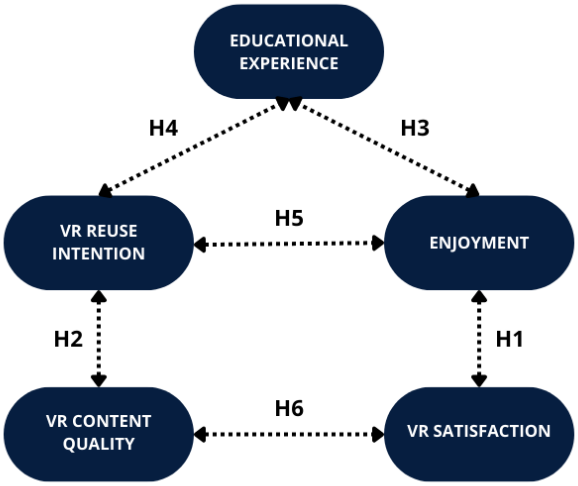
The research objectives are listed below.

1. To assess how VR as part of a walking tour is perceived by users in terms of enjoyment, content quality, learning, satisfaction and reuse intention.
2. To analyse the relationship between opinion about VR content quality, feelings during the experience, perception of having learned something new and the intention to reuse VR.
3. To assess if VR as part of a walking tour is perceived as a good tool for learning about the history and culture of a destination and to support travel plans.
4. To explore the information shared by users in their online customer reviews about the VR experience.

3.4. Hypothesis justification

The quantitative study has six hypotheses measuring the different correlations between five constructs: VR satisfaction, perceived enjoyment, content quality, VR reuse intention and educational experience, which are presented in the hypothesis diagram (figure 2). The hypothesis justifications are listed below starting from the first hypothesis. Before justifying the hypotheses, the definitions of variables are presented in table 4.

Figure 2 - Hypothesis diagram.



Source: Own elaboration.

Table 4 - Variable definitions.

Variable	Definition
Educational experience	Sometimes referred to as education or learning effects in other studies refers to the perception of having learnt and having an educational experience as a part of the VR experience.
VR reuse intention	Customers intention or perception of using virtual reality in similar settings in the future.
VR content quality	The satisfaction toward the visual and audio aspects of the content of the virtual reality experience.
VR satisfaction	Perceived satisfaction with the VR experience.
Enjoyment	Customers perceived enjoyment and perceived positive feelings during the VR experience.

H1: there is a positive correlation between VR satisfaction and perceived enjoyment.

Fan et al. (2022) confirmed that enjoyment has a positive impact on satisfaction in augmented reality (AR) experiences. Since virtual reality (VR) is more immersive than AR, and immersion has been shown to enhance the enjoyment and memorability of user experiences (Su et al., 2023), it is believed that VR offers even greater potential for creating positive visitor experiences. Research has proved that immersive VR significantly improves visitor experiences (Bird et al., 2023; Fan et al., 2022; Lee et al., 2020), suggesting a strong positive correlation between VR satisfaction and enjoyment.

H2: there is a positive correlation between VR content quality and VR reuse intention.

Jung et al. (2015) recognised that earlier research (Ansari et al., 2013, Bayaraktar et al., 2012, Koo et al., 2013, Wang and Chen, 2011, Zhao et al., 2012) had found perceived quality to affect the intention to reuse technological innovations. Additionally, in the cultural tourism context, content quality of virtual reality has been recognised to have a positive impact on the behavioural intention to visit a destination (Marasco et al., 2018; Jung et al., 2020) making it interesting to see if it also affects the behavioural intentions to reuse VR services.

H3: there is a positive correlation between educational experience and perceived enjoyment of the VR tour.

Virtual reality is found to enhance learning, destination experiences (Pratisto et al., 2022) and to improve the concentration and motivation of tourists involved in a learning experience (Ammirato et al., 2021; Han et al., 2019). As an increasing number of tourists look for learning and meaning-creation in their travels (Han et al., 2019) and since immersive experiences improve learning it could lead to enjoyment and satisfaction. This should also lead to positive outcomes due to meeting the expectations of cultural tourists. A high level of immersion can enhance the user's experience, making it more enjoyable and memorable, and can lead to better learning outcomes when educational content is involved (Su et al., 2023). Lucardie (2014) found that enjoyment and fun works as a motivator to learn knowledge and skills, encouraged concentration and works as aid in the absorption of learning. With these justifications it is believed that there is a correlation between enjoyment and a good educational experience in the context of the VR tour.

H4: there is a positive correlation between learning and VR reuse intention.

Su et al. (2023) found a connection between behavioural intentions and learning to reuse immersive technology in cultural tourism. However, their study was done in a cultural heritage

site in Korea and the product was created for that research making it interesting to find out whether it will be true in the context of this case study as well.

H5: there is a positive correlation between enjoyment and VR reuse intention.

Yu et al. (2023) and Alam et al. (2024) have found perceived enjoyment to have a positive effect on the reuse intention of virtual reality in tourism context. It was found interesting to find out whether enjoying the VR experience will also have a correlation towards wanting to use VR again for cultural tourism purposes based on this VR tour.

H6: there is a positive correlation between VR satisfaction and VR content quality.

High-quality content, particularly in educational VR experiences, enhances immersion and edutainment, which are key factors in effective learning (Okanović et al., 2022). However, content overload can overwhelm users, leading to decreased satisfaction and reduced engagement (Bird et al., 2023). Additionally, the overall sense of immersion is shaped by both system and information quality, including factors such as system responsiveness, seamless information flow, graphical performance, and ease of use (Su et al., 2023). Therefore, it is believed that the quality of VR content directly affects user satisfaction by influencing the immersive experience.

3.5. Reviews analysis – research questions

The content analysis was found appropriate to answer the following research questions to support the objectives of this study.

1. What themes do customers emphasise the most in their online customer reviews about the experience?
2. Which themes tend to be referred in positive and negative reviews?
3. Which themes tend to be mentioned together in online customer reviews about the VR tour experience?

3.6. Summary

This chapter has discussed the case study and introduced the purpose of this research. The research problem, objectives, hypothesis and research questions that have been defined and explained will be measured in the following chapter that will explore the research methods.

4. Methodologies

This chapter will introduce the two methodologies used in this research including the steps necessary to reach the results: data collection, analysis and measurements.

The topic of this dissertation was explored by two research methods to ensure a holistic and diverse understanding of how the customers perceive the virtual reality experience within a walking tour in cultural tourism. The mixed methodology of statistical analysis of a survey questionnaire and content analysis was considered appropriate to answer the research question of the study, and both methods had been used previously in similar settings. Analysing online customer reviews was chosen to support the questionnaire and to receive a more holistic understanding of the visitor experience.

There has been debate among researchers whether content analysis is classified as a qualitative or a quantitative research method (Camprubí & Coromina, 2016). Content analysis involves the analysis of text, which suggests a qualitative method, but because it involves counting it could also be considered a quantitative method, and some argue that it should be considered a mixed method. Additionally, Camprubí and Coromina (2016) note that it is possible to identify correlation and relationship between variables with the content analysis.

This chapter is divided into two sections, first the quantitative research and its methodology is presented and after methodology for content analysis is presented.

4.1. Quantitative research

The quantitative part of the research was developed with a survey questionnaire to participants in the VR Tours Vienna. In this section the questionnaire and the data collection and analysis methods are presented.

4.1.1. Questionnaire

Based on the product's characteristics, satisfaction, sharing intention, personal innovativeness, reuse intention, perceived enjoyment/emotional involvement, content quality, and educational experience were measured through 25 items. They consisted of sentences about the experience, presented in table 5, and participants were asked about their level of agreement, using a 7-point Likert scale from strongly disagree (1) to strongly agree (7). Questions were adapted from Chung et al. (2017), Lee et al. (2020), Bird et al. (2023), Su et al. (2023), Jung et al. (2015/2020),

Marasco (2018) and Errichiello (2019). Ten additional measurements about socio-demographic characteristics, experience with VR and Vienna were included: age, gender, employment, native language, previous experience with VR, whether Vienna has been visited before, connection to Vienna, language the tour was done in and the way the customer found out about the VR experience.

To measure enjoyment and emotional involvement five measurements were chosen. The first two measure the enjoyability of the VR experience (Lee et al., 2020) and experiencing Vienna through it (Chung et al., 2017). The three other measurements explored how the users felt during the immersive experience. The emotions chosen were comfort, fear, and safety based on the qualifications of the experience. For instance, the VR experience includes immersive scenes about the plague and the war, which may evoke a range of emotional responses. While some may perceive these elements as thrilling and exhilarating, others may perceive them as frightening and overwhelming. As the experience is characterised by immersion in the past, it is interesting to find whether the immersion experienced evokes feelings of comfort, amusement, fear, or safety.

To understand how the customers perceive the content of the VR Tour and its educational possibilities the questionnaire had eight measurements. Firstly, it asked whether the VR experience made the customer more knowledgeable about Vienna followed by questions whether their curiosity to learn new things was stimulated and if the VR has provided a good experience for learning. Two questions measured the connection with the people, culture, and history. Finally, it was asked if the customer was inspired about their travel plans due to the tour.

To measure the reuse intention of virtual reality two questions were applied that asked about whether they see value in doing a VR Tour while visiting a destination/site and about the motivation to take part again in similar activities.

To understand the perceived content quality of the visual, audio and physical elements of the experience, satisfaction with these elements was measured. Satisfaction about having the VR experience was measured on its own.

Three questions were applied for both sharing intention and personal innovativeness. Sharing intention was measured through intention to recommend or share about the experience and

recommend visiting Vienna. Personal innovativeness asked about whether customers are excited and familiar with new technologies.

Table 5 - Questionnaire measurements.

Measurement group	Measurement	Source
Emotions and enjoyment		
Enjoyment 1	Experiencing the history of Vienna through the VR Tour was enjoyable (virtual reality and audio guiding included)	Chung et al. (2017)
Enjoyment 2	The VR Tour was fun (virtual reality and audio guiding included)	Bird et al. (2023)
Enjoyment 3	I felt comfortable during the VR experience (while wearing VR glasses)	
Enjoyment 4	I felt scared during the VR experience (while wearing VR glasses)	
Enjoyment 5	I felt safe during the VR experience (while wearing VR glasses)	
Education		
Educational experience 1	The VR Tour made me more knowledgeable about the history and culture of Vienna	Bird et al. (2023)
Educational experience 2	The VR Tour stimulated my curiosity to learn new things	Bird et al. (2023)
Educational experience 3	VR provided a good experience for learning	Lee et al. (2020)
Educational experience 4	I understand the local culture better because of this tour	
Educational experience 5	This experience has motivated me to find more about the history and culture of Vienna	Bird et al. (2023)
Educational experience 6	The virtual tour gave me an overview of the history of Vienna	
Educational experience 7	I understand the local people better because of this tour	
Educational experience 8	The virtual tour provided relevant information of Vienna for my travel plans	
VR reuse intention		
VR Reuse Intention 1	I see value in doing a VR Tour while visiting a destination/site	
VR Reuse Intention 2	This experience has motivated me to participate in additional VR activities	Bird et al. (2023)
Content quality		
Content Quality 1	I am satisfied with the visuals of the virtual reality videos	
Content Quality 2	I am satisfied with the audio during the virtual reality videos	
Content Quality 3	I am satisfied with the physical aspects of the VR Tour (including hardware)	
Satisfaction		
Satisfaction	I am satisfied that I had this VR experience	Chung et al. (2017)
Sharing intention		
Sharing Intention 1	I will recommend this VR Tour	Jung et al. (2015)
Sharing Intention 2	I will share about the VR experience on the Internet or social media	Errichiello et al. (2019)
Sharing Intention 3	I will recommend visiting Vienna after this VR experience	
Personal innovativeness		
Personal Innovativeness 1	Among my peers, I am usually the first to find out and try out new information technologies.	Errichiello et al. (2019)

Personal Innovativeness 2	I like to experiment with new digital and smart technologies.	
Personal Innovativeness 3	I can usually figure out new tech products and services without help from others.	Errichiello et al. (2019)

Source: Own elaboration.

4.1.2. Data collection

The survey questionnaire was targeted to participants in the VR Tours Vienna, in the period between 4.11. and 20.12. Data was collected physically in Vienna during 13 days during fall 2023 (4.-5.11., 10.-12.11., 18.-19.11., 24.-26.11., 2.-3.12., 9.12.) Furthermore, the VR Tours Vienna team assisted with data collection on certain occasions by providing the QR code to visitors when the author was not on site. The questionnaire was on an online platform and was accessed through a QR code. After the tour was finished, the customers were asked to scan the QR code and answer the survey (picture 5). The questionnaire took around five minutes to complete and was offered in English and German. All participants of the VR tour in the dates previously presented asked to take part in the study, so no exclusions were made. A total of 60 responses were obtained. Regrettably, no corresponding data regarding visitor numbers for the period in question is available for comparison.

Picture 5 - Data collection at St. Stephen's Cathedral.

Source: Author. (2023)

4.1.3. Data analysis

Once the data collection was complete data analysis began. The data was coded in Excel and then extracted to IBM SPSS Statistics for data analysis. In total, 16 measurements from the questionnaire were used to measure the six hypotheses.

To measure the hypothesis correlations Spearman's coefficient was used. Correlation coefficient (rho) and the statistical significance of the test (p-value) are represented when explaining the results. The significance of the correlations is mentioned and were either at 0.01 or 0.05 level (2-tailed). If the significance is at 0.01 level it means that there is only a 1% change that the correlation is caused by a random chance and for 0.05 significance level it means a 5% chance (Schober, Boer and Schwarte, 2018).

To support the understanding of the research question "what do the customers value the most in a VR Tour" it was found interesting to look for trends and frequencies of the researched themes. Frequencies were calculated for all the measurements per variable group (see table 5 in section 4.1.1). The frequencies represent the proportions of responses per 7-point Likert scale for each item.

4.2. Content analysis

The content analysis in this dissertation measured the online customer reviews that have been written for VR Tours Vienna on both Google and TripAdvisor. The customers can freely write their reviews based on their experience on both sites. There is no check on whether the customer has ever been a customer and some fake reviews or reviews written for the wrong company are also possible.

4.2.1. Online customer reviews

When leaving a review on Google the customer is asked to rate the place/experience with a star rating with a scale from 1 to 5 with 5 being the highest. The review can be left without any comments, but customers are encouraged to do so with a text "talk about your own experiences in this place". The guidance text can be considered very neutral and not guiding the reviews to be positive nor negative. There is also a possibility to add pictures or videos from the experience. When leaving a review in Google a customer must be logged into their Google profile and the review will be public so that others are able to view their profile including other

reviews they have left. Google does not validate reviews but checks them for false content and removes such content.

Leaving a review in TripAdvisor has more detailed questions and does not require being logged in. When leaving a review, the customer is first asked to rate the experience from a scale of 1 to 5, with 5 being the highest. Then the reviewer is asked to leave more details about when they went and who did they go with (business, couples, family, friends, solo). Then there is a text box where the review is supposed to be written. In TripAdvisor in the text box there is an encouragement for a positive review which differs per experience as there is an example review for example "The views were amazing. We took so many photos!". There is also review tips including dos and don'ts available. The final mandatory step is to write a title for the review. Customers can also add some photos if they like.

4.2.2. Data collection

The online customer reviews were manually extracted from both Google and Tripadvisor in January 2024. In both platforms VR Tours Vienna has a good rating. In Google with the total of 198 reviews the average is 4,8 and in Tripadvisor the average is 5 with 77 reviews as seen in table 6 and 7. In both platforms the most popular languages for the reviews were German followed by English (see table 6 for Google and 7 for TripAdvisor). Other languages received only some individual reviews. All reviews were translated to English with the help of an AI online translator tool "DeepL". In Tripadvisor it is not possible to leave a review without a comment but in Google it is possible. This means that all 77 reviews from Tripadvisor were taken into the content analysis, but from Google 46 reviews had to be excluded as they were only rated with the "stars" and included no comments.

Table 6 - Distribution of Google reviews by language and rating.

Google – average rating 4,8					
Rating	German	English	Other	No comment	**Total**
5 stars	100	28	5	39	**172**
4 stars	11		1	5	**17**
3 stars	3	1	-	2	**6**
2 stars	1	-	-	-	**1**
1 star	1	1	-	-	**2**
Total	**116**	**30**	**6**	**46**	**198**

Source: Own elaboration.

Table 7 - Distribution of TripAdvisor reviews by language and rating.

TripAdvisor – average rating 5				
Rating	German	English	Other	**Total**
5 stars	40	22	3	**65**
4 stars	7	2	-	**9**
3 stars	2	1	-	**3**
2 stars	-	-	-	**0**
1 star	-	-	-	**0**
Total	**49**	**25**	**3**	**77**

Source: Own elaboration.

Data was organised by the review, location of the review, rating, and language. Further the reviewers were categorised based on the number of published reviews as seen in table 8. The largest share of reviewers (33%) posted a review on the platform they used (TripAdvisor/Google) for the first time. It seems to be very common to have less than 5 reviews, as a quarter had published 2 to 5 reviews before. Having 6 to 15 reviews is rather uncommon, with only 8% of reviewers having done so, and the same goes for having 51 to 100 reviews, with 6% having done so. 18% of the reviewers had published 16 to 50 reviews, while 10% had published more than 100 reviews.

Table 8 - Distribution of Reviews Based on the Number of Previous Reviews Published by the Reviewer (both TripAdvisor & Google)

Number of Reviews Previously Published by Reviewer	**1**	**2-5**	**6-15**	**16-50**	**51-100**	**More than 100**
Number of Reviews in Current Dataset	76	57	18	41	14	23
Percentage (%)	33	25	8	18	6	10

Source: Own elaboration.

4.2.3. Data analysis

All reviews have been manually and individually reviewed to create categories and understand trends. Key themes, or words of the review were written down (Stepchenkova and Zhan, 2012). From these words categories were created. Some words or themes were combined to represent both if applicable to not have too many categories. Once the first versions of the categories were created, definitions were developed (Stepchenkova and Zhan, 2012; Camprubí & Coromina, 2016). The definitions were made using previous studies that had already defined the same concepts, but in a way that made it easy for anyone to identify the categories from online customer reviews (Camprubí & Coromina, 2016).

The categorisation was an essential part of the content analysis, which aimed to visualise the closeness of the reviews, the closeness of the words and the associations between reviews and words. Using this method, the most frequently mentioned topics in the reviews were being able to identify (González-Rodríguez et al., 2020).

A random sample of 23 reviews was created based on the procedure followed by Stepchenkova and Zhan (2013) using a sample of 10% of reviews. Categories were redefined few times based on the feedback from the random sample that was tested by four different people to ensure reliability (Camprubí & Coromina, 2016). Reliability of the categories was calculated with Cohen's K (McHugh, 2012). The Cohen's K values obtained ranged from 0.144 to 1.00 as seen in table 9. Most values fell between 0.6 and 0.9, indicating good reliability. According to Landis & Koch (1977: 165) results of 0.81-1 indicate 'almost perfect', 0.61-0.80 'substantial', 0.41–0.60 moderate, 0.21–0.40 fair and 0–0.20 slight agreement between the coders. Most of the categories reached an almost perfect or substantial agreement level, positive content quality was 0.622, negative content quality was 0.646, both positive and negative reviews were 0.735, positive reviews reached 0.765, satisfaction with staff was 0.793, recommendation scored 0.84, immersion was 0.848 and both negative reviews and reuse intention had a perfect score of 1.00. Two categories had values of moderate agreement: education (0.429), and new/unique experience (0.436) while enjoyment (0.144) had only a slight agreement between the coders and required refinement.

Table 9 - Cohen's K results.

Category	Level of agreement	Cohen's K
Positive	0.94	0.7648
Negative	1	1
Positive & Negative	0.94	0.7350
Content quality - positive	0.82	0.6218
Content quality - negative	0.9	0.6460
Immersion	0.94	0.8480
Education experience	0.72	0.4300
Reuse intention	1	1
Enjoyment	0.72	0.1442
Satisfaction w staff	0.9	0.7933
Recommendation	0.92	0.84
New/unique experience	0.7	0.4360

As a result, nine categories were created (table 10). Additionally, each review was marked either as a positive, negative or as a positive and negative review.

Table 10 - Content analysis categories.

Category name	Definition
VR content quality – positive	If any form of the VR content (what is seen through the VR glasses) including e.g. mentions of the virtual world, scenes is mentioned positively or together/followed by a positive comment.
VR content quality – negative	If the customer shares any dissatisfaction with the VR content quality.
Immersion	How immersed (being deeply mentally involved) the customer felt with the VR videos scenario.
Education experience	If a customer learned something, found it informative, or their curiosity was evoked by the tour.
VR reuse intention	Customers intention to do the same or a different VR tour or tourism activity in the future.
Enjoyment	Customer expresses enjoyment/satisfaction in general.
Satisfaction with the staff	Customer was happy/satisfied with the staff/guide of the tour and perhaps found them valuable.
Recommendation	Customer recommends the tour for others.
New/unique experience	Customer felt that the experience was special, new or unique in general or for them.

Source: Own elaboration.

The data was then analysed with four different methods: frequency of categories, chi-square test, z-score test and calculating word frequency. The frequency of the categories was calculated from the categorisation that was done on Excel. The data was moved into IBM SPSS for further tests.

With the chi-square test the different categories from the content analysis (education experience, immersion, VR reuse intention, enjoyment, satisfaction with the staff, recommendation, new/unique experience, VR content quality (combined negative and positive references to content quality)) were checked for relationship with positive or with negative and both negative and positive comments. In other words, the chi-square was used to check if two categorical variables are related or independent (Agresti, A.,2013).

Z-Score test calculates the connection/importance between categories meaning that two categories are mentioned often together. A score higher than 1,96 reports a meaningful relationship between two categories (Ritchey, 2007).

Both the calculation of the word frequency and the conduction of the word cloud were done in an AI tool called ATLAS.IT[1] .The word frequency was calculated per review meaning that the words are calculated based on how many reviews mentioned the word instead how many times the word appeared all together in all the reviews.

4.3. Summary

This chapter covered the methodologies of the statistical analysis of a survey questionnaire and the content analysis of online customer reviews used in this dissertation highlighting the categories used for the measurement. In the following chapter the results will be presented using the methodologies. First the results for the questionnaire will be presented followed by the results for the content analysis.

5. Results

This chapter represents the results for this study. The chapter is divided into two: questionnaire results and content analysis results and are presented in that order.

5.1. Questionnaire

In this section the results for the quantitative research are presented. Starting by introducing the sample characteristics. The frequencies of each category are then presented followed by introducing the results for each hypothesis using the Spearman's coefficient including a heatmap of the correlations.

5.1.1. Sample characteristics

To understand the sociodemographic characteristics of the respondents their age, gender, employment and native language were asked. Additionally, to further understand the profiles, knowledge of the visitors and motivations to visit VR Tours previous experience with VR, familiarity and connection with Vienna, the language the VR tour was done in and the way they found out about the tour were asked. This data provides insights into the visitor profile. The demographic profile of the sample is detailed in table 11.

[1] ATLAS.ti is a computer-assisted qualitative data analysis software that facilitates analysis of qualitative data for qualitative research, quantitative research, and mixed methods research. https://atlasti.com/?_gl=1*1qnmquq*_up*MQ..*_ga*MTIxNzAwNTk0Ny4xNzI2MjA2Njkx*_ga_K459D5HY8F*MTcyNjIwNjY5MS4xLjAuMTcyNjIwNjY5MS4wLjAuMA (15.8.2024)

The largest age groups among respondents were those aged 45-54 and 25-34, representing 30% and 28.3% of the sample respectively, followed by those aged 55-64 years, who represented 16.7%. In terms of language, the most common were German speakers who were a clear majority (80%) followed by English speakers (10%), the rest (10%) was a mixture of different languages. Gender distribution was very even. Half of the respondents were male, while 48,3% were female. 1,7% was non-binary. Regarding employment status, the majority of respondents were full-time employees, accounting for 63.3% of the sample. This was followed by part-time employees (15%) and students (10%).

Most of the respondents (56,7%) had previous experience with virtual reality. Nearly half of the sample (43,3%) were residents of Vienna or its metropolitan area. 36,7% lived elsewhere in Austria, and 20% were traveling from abroad. Regarding previous visitation to Vienna 61,7% noted that they had visited before, 16,7% noted to be first time visitors, and the rest did not answer the question. A big majority of the respondents did the tour in German (86,7%) while the rest reported doing the tour in English. 40% found out about the tour through recommendation, 38,3% found out through social media or different channels on the internet and 21,6% found in other ways.

Table 11 - Socio-demographic characteristics of questionnaire respondents.

	Frequency	Percent
Age		
Under 18	4	6,7
18-24	3	5
25-34	17	28,3
35-44	7	11,7
45-54	18	30
55-64	10	16,7
65 or older	1	1,7
Gender		
Man	30	50
Woman	29	48,3
Non-binary	1	1,7
Employment		
Employed full-time	38	63,3
Employed part-time	9	15
Student	6	10
Retired	3	5
Unemployed	1	1,7
Other	3	5

	Frequency	Percent
Previous experience with VR		
Yes	34	56,7
No	26	43,3
Visited Vienna before		
Yes	37	61,7
No	10	16,7
No answer	13	21,7
Connection to Vienna		
I live in Vienna or in the metropolitan area	26	43,3
I live in Austria, but not in Vienna	22	36,7
I am travelling from another country	12	20
Language tour was done in		
German	52	86,7
English	8	13,3
Way VR Tours was found about		
I was recommended	24	40
Social media/internet	23	38,3
News article	2	3,3
Other	11	18,3

Native language					
German	48	80			
English	6	10			
Other	6	10			

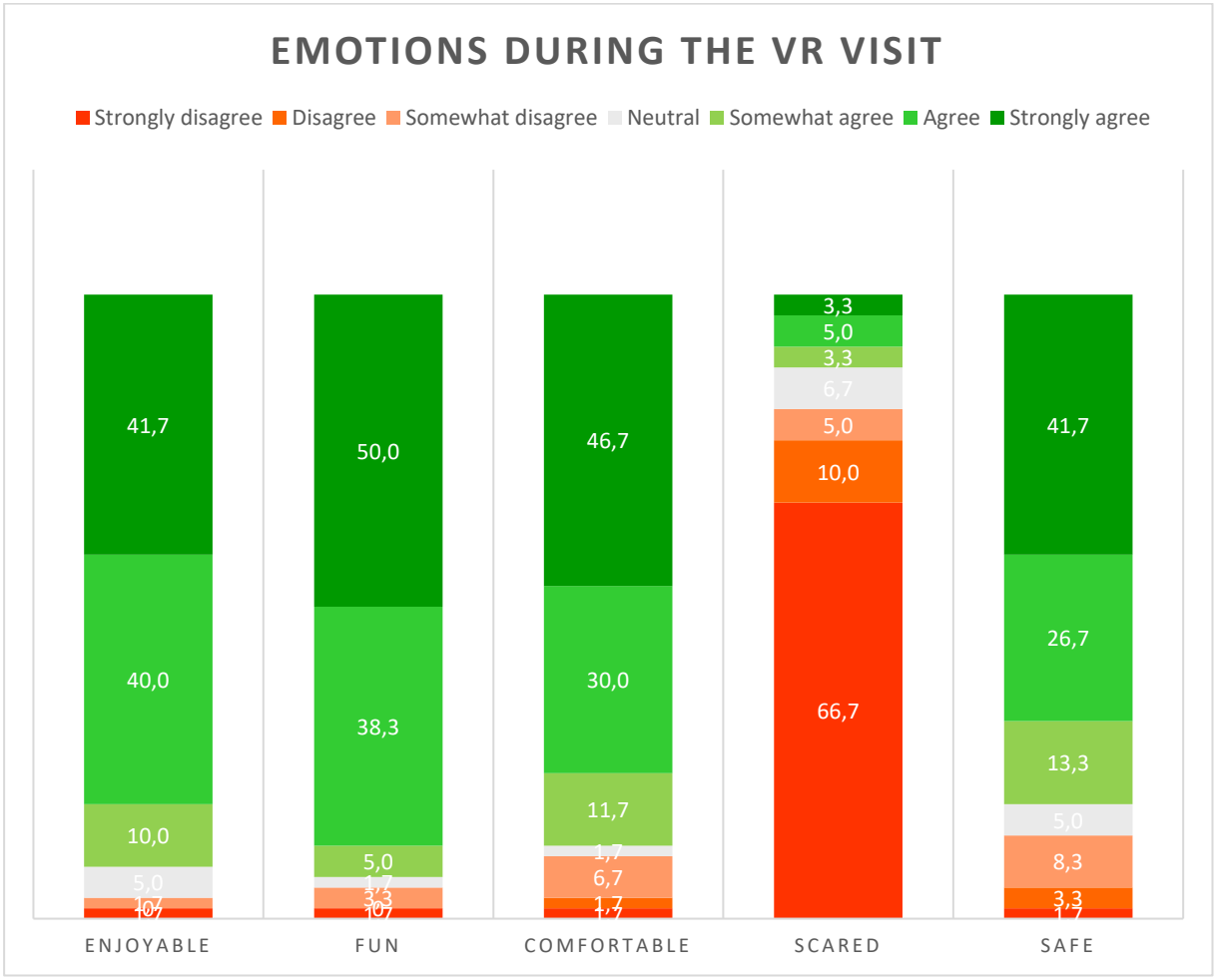
Source: Own elaboration.

5.1.2. Perception of visitors about the experience – frequency analysis

Frequencies represent the percentages of answered questions per variables. Results for the frequencies are divided into six and presented in the following order: emotions during the VR visit, VR reuse intention, educational experience, satisfaction and content quality, sharing the VR experience and finally personal innovativeness.

Figure 3 showcases the results of the measured emotions from the VR experience in Vienna. An overwhelming majority of respondents (91.7%) found the experience enjoyable. The VR experience also successfully evoked positive emotions among visitors. A significant percentage of respondents reported feeling comfortable (88.4%), safe (81.7%), and having fun (93.3%) during the VR tour. Despite these positive reactions, 11.6% of respondents expressed feeling scared during the experience. As mentioned in the section 4.1.1. due to immersion and possible triggering content some people might find the experience frightening.

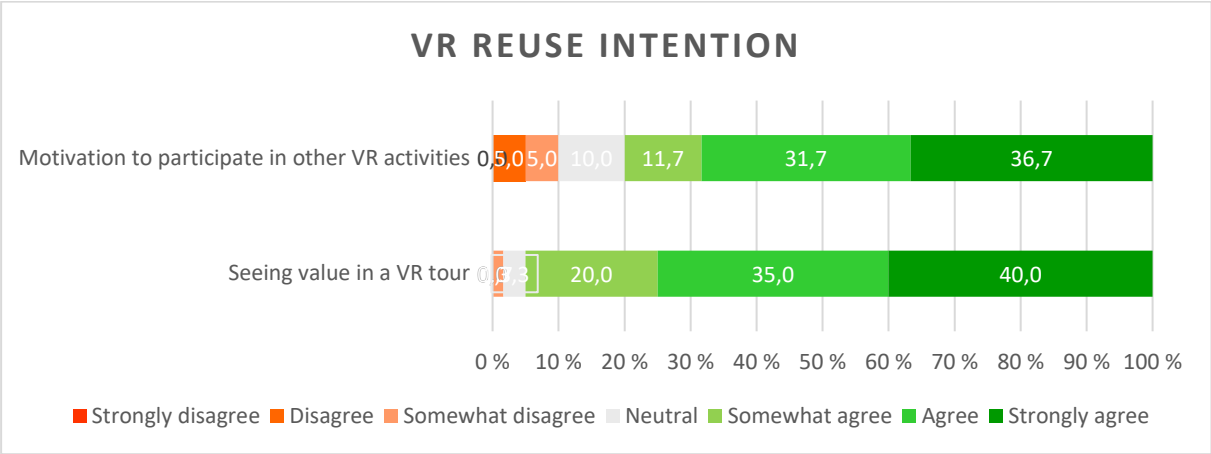
Figure 3 - Emotions during the VR visit.



Source: Own elaboration.

The VR tour proved to be highly motivating with 80.1% of respondents expressing a desire to participate in additional VR activities as a result of this experience and a whopping 95% of the respondents see value in doing a VR tour before or while visiting a destination/site as can be recognised from the figure 4.

Figure 4 - VR reuse intention.



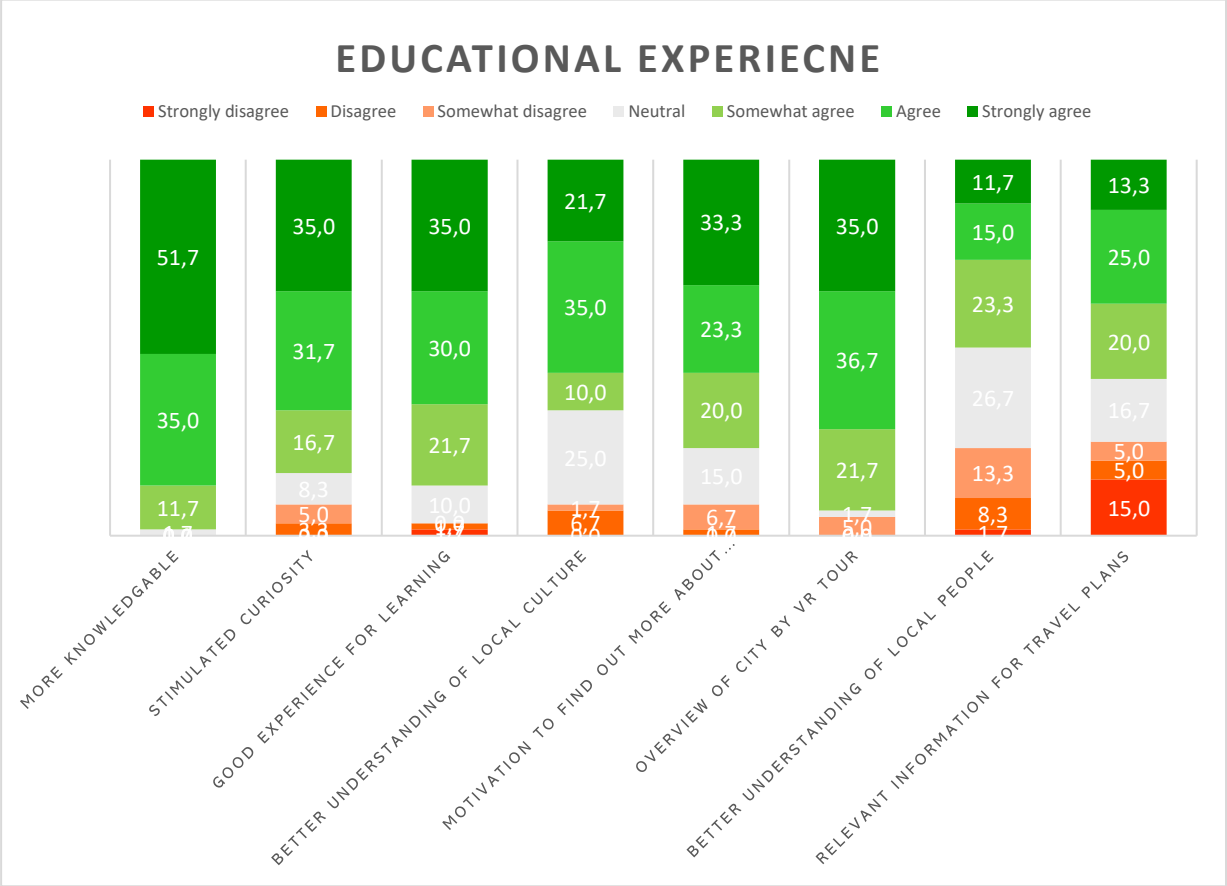
Source: Own elaboration.

As the VR tour gave a guided tour of the city and some cultural and historical sites and events within, visitors were also asked about a change in understanding of local culture and people as a result of the experience. 66.7% of respondents felt that the VR experience helped them better understand the local culture while only half felt that it helped them understand the local people better. Figure 5 represents results related to the perception of the educational experience of the tour.

In terms of providing an overview of the history of Vienna, a significant portion (93,4%) agreed that the virtual tour achieved this. Furthermore, 58.3% of respondents found that the tour provided relevant information for their travel plans. Nearly all respondents, 98,4%, noted that the experience made them more knowledgeable about Vienna.

The visitors were asked about how the tour affected their experience in learning and the results came off positive as 86,7% agreed on some level that VR provided a good learning experience. 83.4% reported that the tour had stimulated their curiosity to learn new things. Finally, 76,6% of the respondents agreed that the VR experience motivated them to learn more about the history and culture of Vienna.

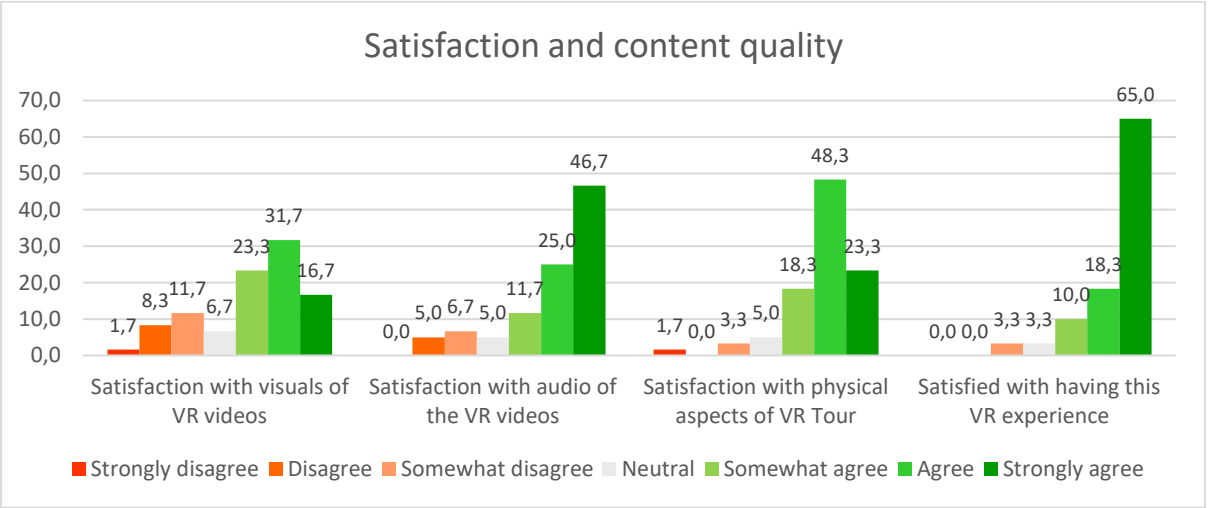
Figure 5 – Educational experience.



Source: Own elaboration.

Figure 6 represents the results of general satisfaction with the experience as well as with content quality. Respondents transmitted high levels of satisfaction with the audio during the VR content (83,4%) and the physical aspects of the VR experience (89,9%), however they were not as satisfied with the visual part of the VR content (71,7%). 93,3% were on some level satisfied to having the VR experience.

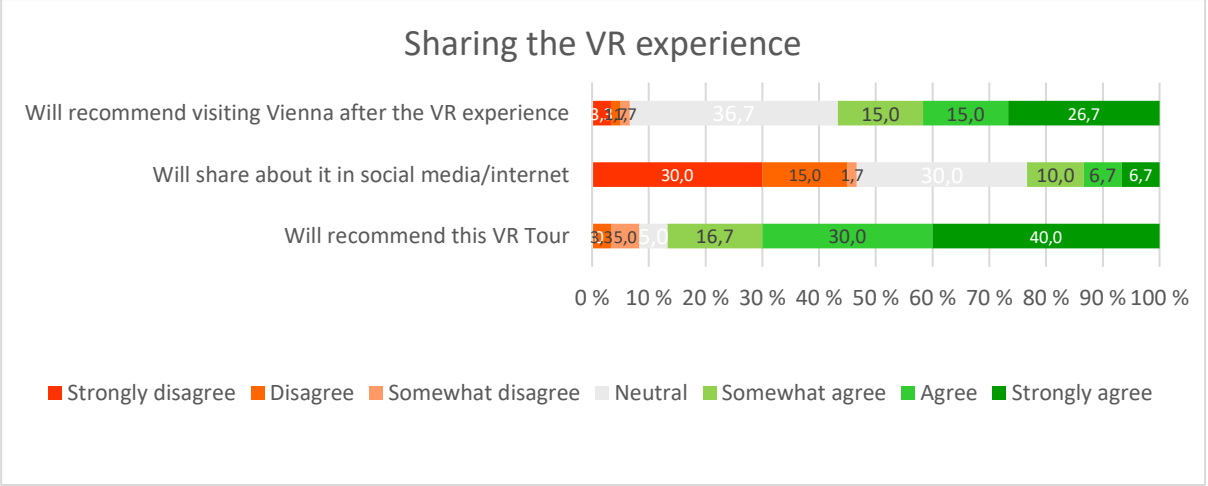
Figure 6 - Satisfaction and content quality.



Source: Own elaboration.

Agreeing with the satisfaction levels 86,7% of the respondents said that they will recommend the VR tour, however only 23,4% will share about their experience in social media or the internet. 56,7% are willing to recommend visiting Vienna after the VR experience. Figure 7 showcases the results of sharing the VR experience.

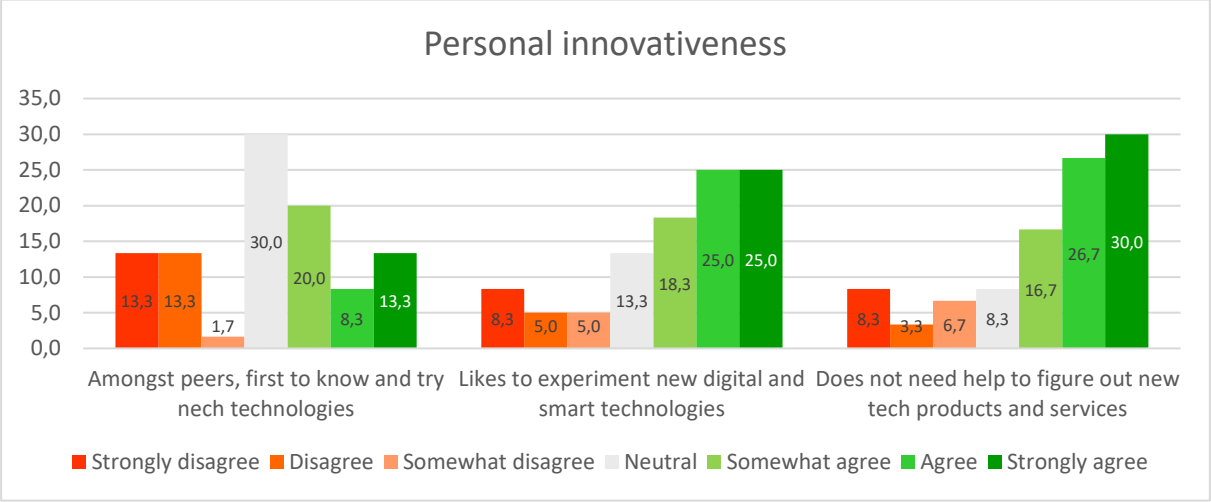
Figure 7 - Sharing the VR experience.



Source: Own elaboration.

Figure 8 represents the results regarding personal innovativeness. 28.3 per cent of respondents said that they were not the first to know about or try out new technologies, 30 per cent remained neutral on the question, while 41.6 per cent agreed that they were. 68,3% of the respondents said to like to experiment on new digital and smart technologies while a bigger percentage of 73,4% claim to be confident technology product and service users and don't need help to figure them out.

Figure 8 - Personal innovativeness.



Source: Own elaboration.

5.1.3. Hypothesis testing

The six hypotheses were confirmed to have mainly positive results, and they are each introduced individually below.

Hypothesis 1 stated the existence of a correlation between satisfaction and enjoyment. The analysis of this hypothesis is presented in table 12. It was concluded that there is a significant positive correlation, for a significance level of 1%, between satisfaction (with the VR experience) and all different questions about enjoyment: experiencing the history of Vienna through the VR Tour was enjoyable (rho = 0,634, p-value <0,001), VR tour was fun (rho = 0,535, p-value <0,001) and feeling comfortable during the VR experience (rho = 0,454, p-value <0,001). Therefore, hypothesis 1 is confirmed.

Table 12 - Hypothesis 1

Question 1	Question 2	Correlation coefficient (rho)	P-value	Conclusion
Satisfaction	Enjoyment 1	,634**	<0,001	CONFIRMED
Satisfaction	Enjoyment 2	,535**	<0,001	CONFIRMED
Satisfaction	Enjoyment 3	,454**	<0,001	CONFIRMED

Hypothesis 2 is about the existence of a positive correlation between content quality and VR reuse intention. For content quality two items were used: satisfaction with the visuals of the virtual reality videos and satisfaction with the audio during the VR videos. Reuse intention was

also measured with two items: seeing value doing a VR tour while visiting a destination/site and gained motivation to participate in additional VR activities. For all pair of items of content quality and VR reuse intention there is a significant positive correlation (see table 13). Between seeing value in doing a VR tour and satisfaction with the visuals of the VR videos there was a significance at 0.05 level with a rho = 0,262 and p-value = 0,043. Satisfaction with the audio had a significant correlation with seeing value doing a VR tour (rho = 0,376, p-value = 0,003. Motivation to participate in additional VR activities was significant at 0.01 level with VR video satisfaction (rho = 0,410, p-value = 0,001) and VR audio satisfaction (rho = 0,441, p-value <0,001). Hence, hypothesis 2 is supported.

Table 13 - Hypothesis 2.

Question 1	Question 2	Correlation coefficient (rho)	P-value	Conclusion
VR Reuse Intention 1	Content Quality 1	,262*	0,043	CONFIRMED
VR Reuse Intention 1	Content Quality 2	,376**	0,003	CONFIRMED
VR Reuse Intention 2	Content Quality 1	,410**	0,001	CONFIRMED
VR Reuse Intention 2	Content Quality 2	,441**	<0,001	CONFIRMED

Hypothesis 3 stated the existence of positive correlation between educational experience and enjoyment as seen in table 14. For the perception of the educational experience there were seven questions used while for enjoyment three item were used. The first question about education measured whether the tour made the customers more knowledgeable about the history and culture of Vienna and there is a positive correlation between this one and questions about enjoyment (rho = 0,535, p-value <0,001), fun (rho = 0,433, p-value 0,001) and comfort (rho = 0,398, p-value = 0,002).

The second question about educational experience was whether the VR tour stimulated curiosity to learn new things, which was significantly positively correlated with enjoyability (rho = 0,397, p-value 0,002) but had no significant correlation with the tour being fun (rho = 0,232, p-value = 0,074) nor feeling comfortable during the VR experience (rho = 0,211, p-value = 0,105).

The third question “VR provided a good experience for learning” correlated positively significantly with enjoyability (rho = 0,388, p-value = 0,002) and satisfaction (rho = 0,395, p-value = 0,002), fun (rho = 0,285, p-value = 0,027) and comfort (rho = 0,283, p-value = 0,028).

Understanding the local culture better due to the VR tour had a significant correlation with enjoyment (rho = 0,436, p-value <0,001), fun (rho = 0,340, p-value = 0,008) and comfort (rho = 0,317, p-value = 0,013).

Motivation to find more about the history and culture of Vienna due to the experience had similarly a significant correlation with enjoyment (rho = 0,414, p-value 0,001), fun (rho = 0,348, p-value = 0,007) and comfort (rho = 0,286, p-value = 0,027).

The perception of the VR tour giving an overview of the history of Vienna correlated positively significantly with enjoyment (rho = 0,533, p-value <0,001), fun (rho = 0,577, p-value <0,001), and comfort (rho = 0,299, p-value = 0,020).

Understanding the local people better due to the tour had no significant correlation with enjoyment (rho = 0,182, p-value = 0,163) nor fun (rho 0,082, p-value = 0,532) however had a significance positive correlation with comfort (rho = 0,317, p-value = 0,014).

Table 14 - Hypothesis 3.

Question 1	Question 2	Correlation coefficient (rho)	P-value	Conclusion
Enjoyment 1	Educational experience 1	,535**	<0,001	CONFIRMED
Enjoyment 1	Educational experience 2	,397**	0,002	CONFIRMED
Enjoyment 1	Educational experience 3	,388**	0,002	CONFIRMED
Enjoyment 1	Educational experience 4	,436**	<0,001	CONFIRMED
Enjoyment 1	Educational experience 5	,414**	0,001	CONFIRMED
Enjoyment 1	Educational experience 6	,533**	<0,001	CONFIRMED
Enjoyment 1	Educational experience 7	0,182	0,163	NOT CONFIRMED
Enjoyment 2	Educational experience 1	,433**	0,001	CONFIRMED
Enjoyment 2	Educational experience 2	0,232	0,074	NOT CONFIRMED
Enjoyment 2	Educational experience 3	,285*	0,027	CONFIRMED
Enjoyment 2	Educational experience 4	,340**	0,008	CONFIRMED
Enjoyment 2	Educational experience 5	,348**	0,007	CONFIRMED
Enjoyment 2	Educational experience 6	,577**	<0,001	CONFIRMED
Enjoyment 2	Educational experience 7	0,082	0,532	NOT CONFIRMED
Enjoyment 3	Educational experience 1	,392**	0,002	CONFIRMED
Enjoyment 3	Educational experience 2	0,211	0,105	NOT CONFIRMED
Enjoyment 3	Educational experience 3	,283*	0,028	CONFIRMED
Enjoyment 3	Educational experience 4	,317*	0,013	CONFIRMED
Enjoyment 3	Educational experience 5	,286*	0,027	CONFIRMED
Enjoyment 3	Educational experience 6	,299*	0,020	CONFIRMED
Enjoyment 3	Educational experience 7	,317*	0,014	CONFIRMED

To conclude there is not a holistic significance in correlation between enjoyment and educational experience, however from 21 correlations 17 were significant and only 4 had no significant correlation at all. Enjoyment has the strongest correlation with the educational experience during a VR tour apart from understanding local people better. Feeling comfortable during the VR tour seemed to have least correlation with education measurements. Hence, hypothesis 3 is partially confirmed.

Hypothesis 4 was about the existence of a positive correlation between educational experience and VR reuse intention. VR reuse intention was measured with two measurements: seeing value in doing a VR tour and motivation to participate in additional VR activities. As it is represented in table 15, they were both found to significantly correlate with the tour making more knowledgeable about history and culture of Vienna (rho = 0,579, p-value <0,001; rho = 0,672, p-value <0,001), stimulated curiosity to learn new things (rho = 0,415, p-value = 0,001; rho = 0,526, p-value <0,001), perception of a good learning experience (rho=0,642, p-value <0,001; rho = 0,528, p-value <0,001) and getting an overview of the city's history (rho = 0,396, p-value 0,002; rho = 0,563, p-value <0,001). To conclude positive highly significant correlation was found between education and VR reuse intention across all measurements and hypothesis 4 is recognised to be sustained.

Table 15 - Hypothesis 4.

Question 1	Question 2	Correlation coefficient (rho)	P-value	Conclusion
VR Reuse Intention 1	Educational experience 1	,579**	<0,001	CONFIRMED
VR Reuse Intention 1	Educational experience 2	,415**	0,001	CONFIRMED
VR Reuse Intention 1	Educational experience 3	,642**	<0,001	CONFIRMED
VR Reuse Intention 1	Educational experience 6	,396**	0,002	CONFIRMED
VR Reuse Intention 2	Educational experience 1	,672**	<0,001	CONFIRMED
VR Reuse Intention 2	Educational experience 2	,526**	<0,001	CONFIRMED
VR Reuse Intention 2	Educational experience 3	,538**	<0,001	CONFIRMED
VR Reuse Intention 2	Educational experience 6	,563**	<0,001	CONFIRMED

Hypothesis 5 stated the existence of a positive correlation between enjoyment and reuse intention (see table 16). Seeing value in doing a VR tour and motivation to participate in additional VR activities correlated significantly with enjoyability (rho = 0,436, p-value <0,001; rho = 0,627, p-value <0,001), fun (rho 0,431, p-value = 0,001; rho = 0,528, p-value <0,001) and

comfort (rho = 0,408, p-value = 0,001; rho = 0,480, p-value <0,001). Perceived enjoyment of the VR tour in conclusion has a positive significant correlation with the reuse intention of virtual reality therefor hypothesis 5 is confirmed.

Table 16 - Hypothesis 5.

Question 1	Question 2	Correlation coefficient (rho)	P-value	Conclusion
VR Reuse Intention 1	Enjoyment 1	,436**	<0,001	CONFIRMED
VR Reuse Intention 1	Enjoyment 2	,431**	0,001	CONFIRMED
VR Reuse Intention 1	Enjoyment 3	,408**	0,001	CONFIRMED
VR Reuse Intention 2	Enjoyment 1	,627**	<0,001	CONFIRMED
VR Reuse Intention 2	Enjoyment 2	,528**	<0,001	CONFIRMED
VR Reuse Intention 2	Enjoyment 3	,480**	<0,001	CONFIRMED

Finally, hypothesis 6, with the data represented in table 17. VR satisfaction was found to have a significant correlation with all three measurements of content quality: satisfaction with visuals of the VR videos (rho = 0,568, p-value <0,001), satisfaction with audio during the VR videos (rho = 0,587, p-value <0,001) and satisfaction with the physical aspects of the VR tour (including hardware) (rho = 0,460, p-value <0,001). Hypothesis 6 was also supported.

Table 17 - Hypothesis 6.

Question 1	Question 2	Correlation coefficient (rho)	P-value	Conclusion
Satisfaction	Content Quality 1	,568**	<0,001	CONFIRMED
Satisfaction	Content Quality 2	,587**	<0,001	CONFIRMED
Satisfaction	Content Quality 3	,460**	<0,001	CONFIRMED

In the heatmap (table 18) the correlation between measurements used for the hypothesis is shown by colour. The yellow ones are highly significant (0,01 level), orange ones less significant (0,05 level) and the grey ones don't have correlation. Here are all 16 measurements used for the hypothesis correlated with each other. More significant correlations were found than was measured for the hypothesis.

Table 18 - Heatmap representing results for correlations (Spearman's coefficient).

	EN - Enjoymen	EN - Fun (1b)	EN - Comfort	LE - Knowledg	LE - Curiosity	LE - Good learning	LE - Local culture 2d	LE - Motivatio	RU - Value	LE - Overview	LE - Local people 2h	CQ - satisfacti	CQ - satisfacti	CQ - satisfacti	RU - Additional	SA - satisfacti
N - Enjoyment (1a)	1,000	,787**	,626**	,535**	,397**	,388**	,436**	,414**	,436**	,533**	0,182	,414**	,330**	,311*	,627**	,634**
N - Fun (1b)	,787**	1,000	,570**	,433**	0,232	,285*	,340**	,348**	,431**	,577**	0,082	,410**	,407**	,260*	,528**	,535**
EN - Comfort during VR (1c)	,626**	,570**	1,000	,392**	0,211	,283*	,317*	,286*	,408**	,299*	,317*	,319*	,450**	,362**	,480**	,454**
LE - Knowledgeable 2a	**,535****	**,433****	**,392****	1,000	,437**	,519**	,589**	,425**	,579**	,369**	,264*	,437**	,583**	,462**	,672**	,530**
LE - Curiosity stimulated 2b	**,397****	**0,232**	**0,211**	,437**	1,000	,585**	,546**	,709**	,415**	0,223	,371**	0,115	0,232	0,204	,526**	,333**
LE - Good learning experience 2c	**,388****	**,285***	**,283***	,519**	,585**	1,000	,658**	,521**	,642**	,424**	,563**	,329*	,313*	,381**	,538**	,395**
E - Local culture 2d	**,436****	**,340****	**,317***	,589**	,546**	,658**	1,000	,592**	,667**	,410**	,496**	,322*	,357**	,352**	,648**	,533**
LE - Motivation to learn more history 2e	**,414****	**,348****	**,286***	,425**	,709**	,521**	,592**	1,000	,383**	,285*	,459**	0,170	,264*	0,210	,640**	,436**
RU - Value doing a VR tour 2f	**,436****	**,431****	**,408****	**,579****	**,415****	**,642****	,667**	,383**	1,000	,396**	,341**	,262*	,376**	,297*	,548**	,445**
LE - Overview of Vienna 2g	**,533****	**,577****	**,299***	,369**	0,223	,424**	,410**	,285*	**,396****	1,000	0,242	,399**	,267*	,283*	,563**	,435**
E - Local people 2h	**0,182**	**0,082**	**,317***	,264*	,371**	,563**	,496**	,459**	,341**	0,242	1,000	,367**	,328*	,507**	,369**	,299*
CQ - satisfaction VR videos 3a	,414**	,410**	,319*	,437**	0,115	,329*	,322*	0,170	**,262***	,399**	,367**	1,000	,514**	,668**	,410**	,568**
CQ - satisfaction audio during VR 3b	,330**	,407**	,450**	,583**	0,232	,313*	,357**	,264*	**,376****	,267*	,328*	,514**	1,000	,658**	,441**	,587**
CQ - satisfaction with VR gear 3c	,311*	,260*	,362**	,462**	0,204	,381**	,352**	0,210	,297*	,283*	,507**	,668**	,658**	1,000	,373**	,460**
RU - Additional VR activities 3d	**,627****	**,528****	**,480****	**,672****	**,526****	**,538****	,648**	,640**	,548**	**,563****	,369**	**,410****	**,441****	,373**	1,000	,667**
SA - satisfaction with the VR experience 3e	**,634****	**,535****	**,454****	**,530****	**,333****	**,395****	**,533****	**,436****	,445**	**,435****	**,299***	**,568****	**,587****	**,460****	,667**	1,000

Source: Own elaboration.

5.1.4. Summary

The analysis of the socio-demographic variables found that locals and German speakers are the biggest customer group. The results were found to be positive both from the frequency testing and the Spearman's coefficient correlation tests. Most of the hypothesis were fully supported and none of the hypothesis were not confirmed at all.

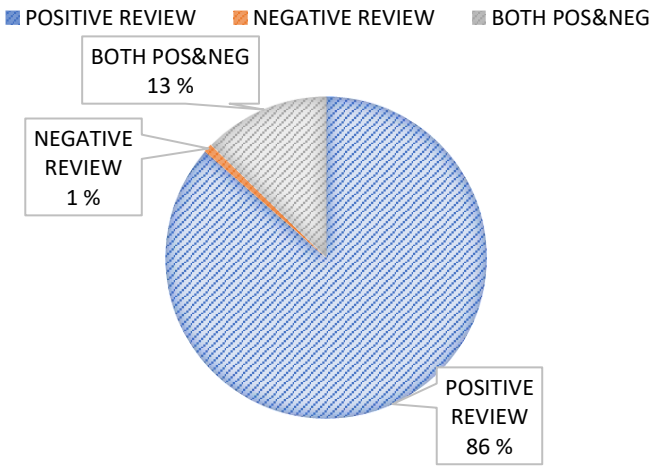
5.2. Content analysis

In this section the results of the content analysis of the reviews posted in Google (n=152) and TripAdvisor (n=77) are presented. This includes the frequency of appearance for each category considered (categories were described in table 10, section 4.3.2.) and some examples of reviews, with reference to categories identified in those reviews. This is followed by an analysis of the relationship between categories and the type of review (positive or negative) are presented. Then an analysis of categories that tend to appear together in a review is presented. Finally, a word frequency analysis is presented.

5.2.1. Categories in the reviews

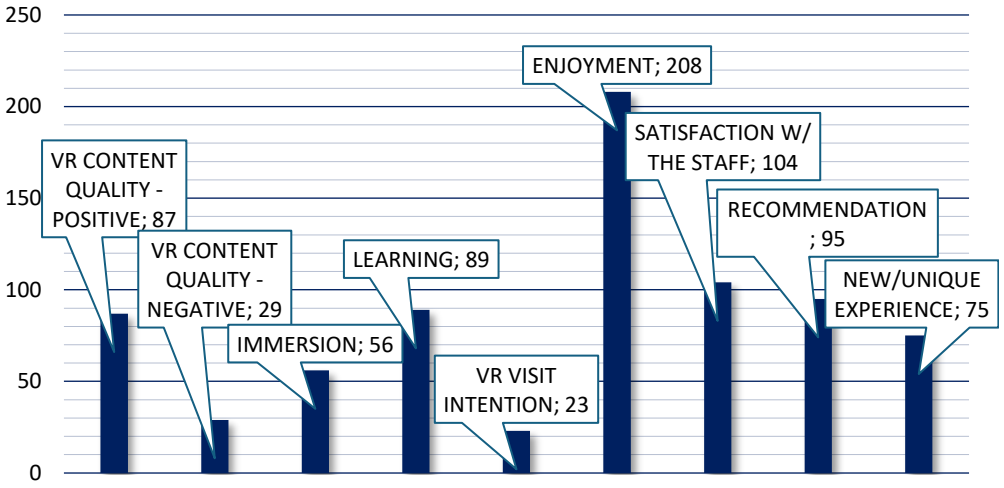
Content analysis was carried out based on the categories presented in section 4.3.2. “Table 10: Content analysis categories”. Most of the reviews were positive (N = 198, % = 86), while only two of the total 229 reviews within both platforms were negative. 29 reviews (13%) had both positive and negative expressions within (see figure 9).

Figure 9 - Positive/negative frequency.



As it is represented in figure 10, the most frequently mentioned category was enjoyment (N = 208, % = 91). The second most frequent category “satisfaction with the staff” was present half as many times (N = 104, % = 45). This is followed by recommendation (N = 95, % = 41), education (N = 87, % = 39), positive VR content quality (N = 87, % = 38) and new/unique experience (N = 75, % = 33). Immersion was included in 56 reviews (24%), while content quality in a negative tone was mentioned 29 times (13%) and the reuse intention of virtual reality or the same experience received a mention in only 23 reviews (10%).

Figure 10 - Category frequencies.



Source: Own elaboration.

Nearly all of the reviews were positive and were mostly paired with a four- or five-star rating. Positive reviews varied from short comments to longer comments covering multiple topics, like review 122 in table 19 seen below. The review was originally written in German but has been translated. This review succeeded to mention five different categories which were positive content quality, immersion, VR reuse intention, enjoyment and satisfaction with the staff. The reviewer mentions this to be their best virtual reality experience so far. That compared with the sense of immersion which they describe by being immersed in time and referring to a specific scene with a dog which had felt so real they almost had tried petting the dog. The experience has left them so excited, they claim to want to explore the past further and want to go back to having the experience.

Table 19 - Example review 1, positive.

Review 122, 5 stars, Google, German	*Categories*
A great experience! At least my best virtual reality experience so far! A relaxed city tour with an audio guide and a friendly guide. The virtual reality scenes really immerse you in time. You might find yourself trying to pet the dog on the spot 😅 Too bad it's only a simulation. I'd love to walk around and explore more of the past 😊 I'd love to go back :)	Positive VR content quality positive Immersion VR reuse intention Enjoyment Satisfaction with the staff

Source: Own elaboration.

Review 172 (table 20), written in Google in English discusses about the nature of the experience, being a mixture of a classical tour and modern technology. They also mention the staff being friendly. The reviewer seems to be really impressed by the experience describing it as "absolutely amazing" and recommends it to everyone. This comment gets the review in the categories of enjoyment, satisfaction with the staff, recommendation and new/unique experience.

Table 20 - Example review 2, positive.

Review 172, 5 stars, Google, English	*Categories*
The tour was absolutely amazing! A very professional combination of classic touring and 21st century technology with very friendly staff! Recommend to everyone!	Positive
	Enjoyment
	Satisfaction with the staff
	Recommendation
	New/Unique experience

Source: Own elaboration.

In nearly all negative toned reviews (29 out of 31) negative content quality was mentioned. As can be seen in the example review 124 (table 21) which is categorised as a both positive and negative review. Even though the reviewer is noting the scenes experienced through the VR glasses as "astonishing" they are then criticising them being "rather simply animated" and commenting that they did not feel immersed by saying that "you don't really feel drawn into it." The comment is positive in its general tone with mentions toward education, enjoyment and staff and the criticism is pointed only toward the content quality. The reviewer gave a star rating of 3 to the whole experience.

Table 21 - Example review 3, negative.

Review 124, 3 stars, TripAdvisor, German	*Categories*
The tour is very well organized. The team is friendly. The audio tour with headphones is better than the VR demonstration because you learn really interesting things about Vienna. The six scenes shown	Both positive and negative
	VR content quality - positive

via the glasses are astonishing the first time around, but in principle they are rather simply animated. You don't really feel drawn into it.	VR content quality - negative
	Educational experience
	Enjoyment
	Satisfaction with the staff

Source: Own elaboration.

Review 166 (see table 22) which rated the experience with only 2 stars seems to be disappointed and finds the experience expensive. The review comments on the content quality noting it to be "unclear and poorly made". Finally, the reviewer writes negatively about the staff claiming that they were in a bad mood and walking too fast.

Table 22 - Example review 4, negative.

Review 166, 2 stars, Google, German	*Categories*
Quite expensive for what you get. €40 for two hours is a lot, especially when you consider that there are exactly 6 scenes to watch. The quality is also not good, everything is unclear and poorly made. The guide was also walking so fast that there was no time to take photos. Finally, he was also in a bad mood and wanted it all to be over.	Negative
	VR content quality - negative

Source: Own elaboration.

5.2.2. Categories vs type of review

Chi-square tests were performed to assess if there are differences between positive, negative or both positive and negative reviews with respect to the presence of the categories considered. Due to the small number of reviews with negative comments, there was the need to split reviews in two groups: group 1 of exclusively positive comments and group 2 with negative or both positive and negative comments. This was done so that the assumptions of the chi-square test were satisfied (Agresti, 2013). The results for these tests are presented in table 23. For four of the categories considered there is a significant relationship between the presence/absence of that category and the tone of comment (positive or negative/both). Education ($\chi^2(1) = 4{,}001$, $p = 0{,}045$), immersion ($\chi^2(1) = 4{,}238$, $p = 0{,}040$), enjoyment ($\chi^2(1) = 4{,}465$, $p = 0{,}046$) and VR content quality ($\chi^2(1) = 30{,}351$, $p < 0{,}001$).

In 41,40% of the positive reviews, there was a reference about education with the experience. In negative/both reviews, only 22,6% referred education. Immersion was referred in 26,8% of positive reviews, but only in 9,70% of the non-exclusively positive reviews. Enjoyment also occurred more in positive comments (92,40% of them), but also occurred in most of negative/both reviews (81%). Only 40,4% of the positive reviews refer VR content quality, while 93,5% of the rest of the reviews had such a reference. This reflects the fact that negative comments tend to be about the VR content quality. There is no significant relationship between type of review and presence of VR reuse intention ($\chi^2(1) = 1,845$, $p = 0,330$), satisfaction with the staff ($\chi^2(1) = 0,001$, $p = 0,976$) and new/unique experience ($\chi^2(1) = 0,225$, $p = 0,635$). In the case of staff satisfaction, this is a result of the similarity between the percentage of reviews referring nice words about the staff among positive reviews (45,50%) and negative/both reviews (45,20%).

Table 23 - Chi-square analysis.

Categories	Positive N	Positive %*	Neg/Both N	Neg/Both %*	Total N	Total %	Chi-square	P-value
Education	82	41,40 %	7	22,60 %	89	38,90 %	4,001	0,045
Immersion	53	26,80 %	3	9,70 %	56	24,50 %	4,238	0,040
VR Reuse Intention	22	11,10 %	1	3,20 %	23	10 %	1,845	0,330
Enjoyment	183	92,40 %	25	81 %	208	90,80 %	4,465	0,046
Satisfaction with the staff	90	45,50 %	14	45,20 %	104	45,40 %	0,001	0,976
Recommendation	87	43,90 %	8	25,80 %	95	41,50 %	3,631	0,057
New/Unique experience	66	33,30 %	9	29,00 %	75	32,80 %	0,225	0,635
VR Content Quality	80	40,40 %	29	93,50 %	109	47,60 %	30,351	<0,001

***Percentage from total of positive (N = 198) or negative/both (N = 31) reviews. In all tests, df=1.**

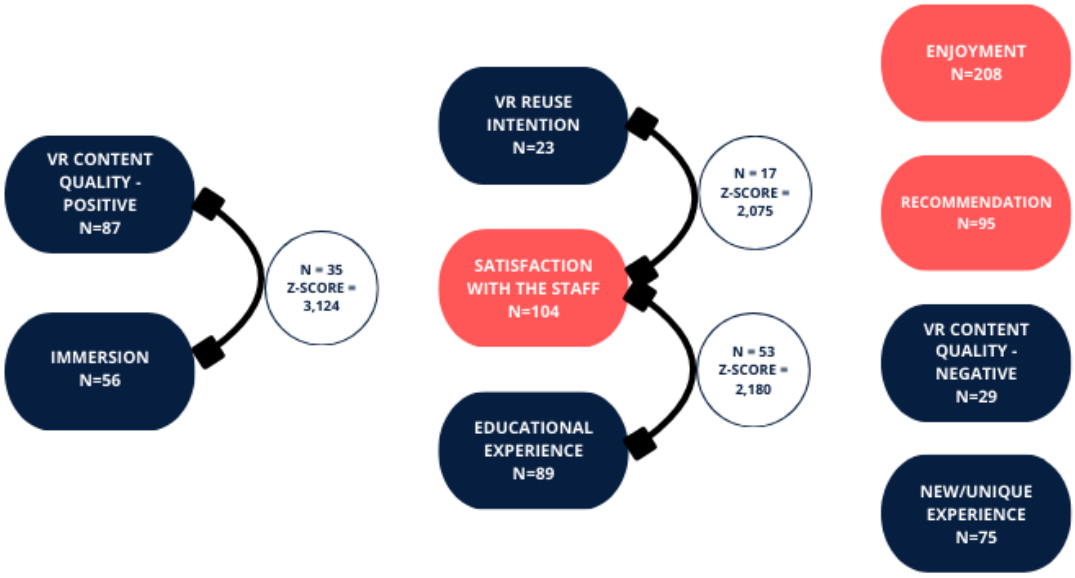
Source: Own elaboration.

5.2.3. Categories co-occurrence analysis

Following the procedure described in Stepchenkova & Zhan (2013) the 'aggregated' map of categories derived from online customer reviews is shown in figure 11. All nine categories are included as they have frequencies of 3% or higher (cf. O'Reilly, 1990). The three most frequent categories, enjoyment**,** satisfaction with the staff**,** and VR content quality (Positive) are represented by red bubbles. The remaining 6 categories are represented by dark blue bubbles. Links between bubbles, where present, are labelled with two numbers: the number of co-occurrences of the two attributes and the respective z-score. Only links with positive z-scores

above 1.96, which indicate a statistically significant positive association between attributes, are displayed. The link between VR content quality (positive) and immersion shows 35 co-occurrences with a z-score of 3.124, indicating a significant tendency for these two categories to appear together. Similarly, the line linking satisfaction with the staff and educational experience reflects 53 co-occurrences with a z-score of 2.180 and the link between VR reuse intention and satisfaction with the staff has 17 co-occurrences with a z-score of 2,075. However, no links exist between the three red bubbles, suggesting that these most popular categories were not statistically associated.

Figure 11 - Image map of categories co-occurrences.



Source: Own elaboration.

Review 142 shows the connection between the categories. It has succeeded to mention immersion, positive content quality, educational experience, satisfaction with the staff and VR reuse intention – all the categories that were found to have a significant relationship with another category. The review however quite consistent mentions different things in separate sentences, almost listing things. This seems to be quite common within reviews, as there seems to be many different things people want to mention.

Table 24 - Example review 5, Z-score.

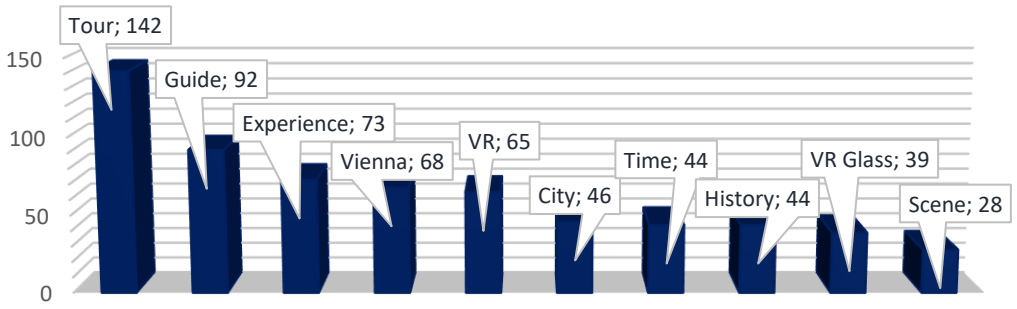
Review 142, 5 stars, TripAdvisor, German	*Categories*
Highly recommended tour through Vienna! I am Viennese and was able to find out a lot of interesting and rather unknown information about Vienna. At 6 stations you put on the VR glasses and virtually immerse yourself in the history of our beautiful city. Gladly again! The almost 2 hours flew by. Many thanks also to our 2 delightful guides who showed us around the city! PS the little surprise at the Mozart monument was really sweet! But I don't want to reveal any more. Simply take the tour yourself!	Positive
	VR content quality positive
	Immersion
	Educational experience
	VR reuse intention
	Enjoyment
	Satisfaction with the staff

Source: Own elaboration.

5.2.4. Word cloud and word frequencies

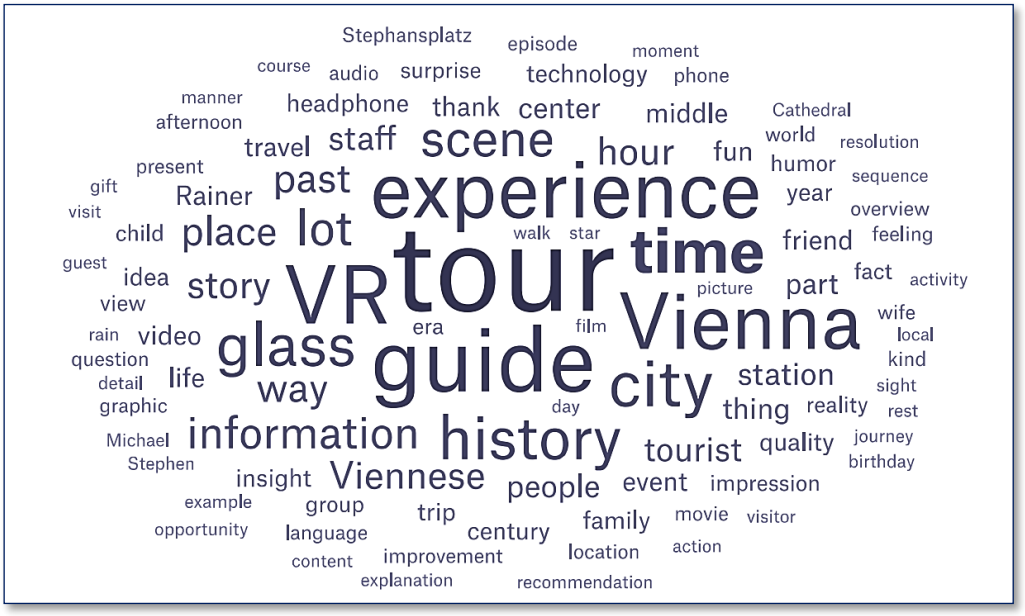
Figure 13 shows the 10 most popular words. The word "tour" was by far the most popular one and was mentioned in 142 reviews. The second most popular word was "guide" which was mentioned in 92 reviews. Experience was the third most popular word (N = 73) followed by Vienna (N = 68) and VR (N = 65). The words from the 6th to 10th are city (N = 46), time (N = 44), history (N = 44), VR Glass (N = 39) and scene (N = 28). The word cloud (figure 14) shows us further important themes that were present in the reviews such as "story", "place", "hour", "past", "humour", "tourist", "Rainer".

Figure 12 - Word frequency.



Source: Own elaboration.

Figure 13 - Word cloud.



Source: Own elaboration.

5.2.5. Summary

The chapter introduced the results for the content analysis and recognised the biggest trends in the online consumer reviews. The results revealed that most of the reviews were positive or

included some positive aspects. The most frequent themes the online customer reviews discuss are enjoyment and satisfaction with the staff as well customers tend to recommend the tour. Enjoyment was referred often in both positive and negative comments while content quality was more often mentioned in negative comments. Co-occurrences were found between positive content quality and immersion, and both educational experience and intention to reuse VR with staff satisfaction. The results regarding word frequency were aligned with other results and the most popular words were tour, guide and experience. The following chapter discusses the results of both research results and finds connections.

6. Discussion

This chapter is discussing the results of this research and finds their connection to the literature and previous research.

The frequency analysis of the quantitative survey revealed that respondents appreciated the experience, not only expressing enjoyment but also perceiving that they had learned more, had their curiosity stimulated to explore further, and felt more connected to the history and culture of the destination. Enjoyment is recognised to be an important part of the VR experience, and this study found it to have a positive correlation with a positive educational experience, and VR satisfaction but also the intention to reuse VR supporting studies by Fan et al. (2022), Yu et al. (2023) and Alam et al. (2024). As confirmed by Okanović et al. (2022), edutainment is integral to effective learning, and key to creating successful visitor experiences (Bird et al., 2023). This can be seen as confirmed by this study, as enjoyment and educational experience were found to be significantly correlated.

All hypotheses of the quantitative research were supported (except hypothesis 3 that was only partially supported). The intention to reuse virtual reality was found to have a positive correlation with content quality, educational experience and enjoyment which supports previous research (Ansari et al., 2013, Bayaraktar et al., 2012, Koo et al., 2013, Wang and Chen, 2011, Zhao et al., 2012). The findings from Su et al. (2023) regarding the impact of learning to VR reuse intention was supported emphasizing the importance of educational content within cultural city tourism and its possibilities.

These results highlight the potential of using VR to create an experience that promotes entertainment that engages visitors and tourists to connect with the local culture and learn about their history and traditions. Educational experience was found to partially correlate with

enjoyment, some measurements succeeding better than others. Especially the tour making the customers more knowledgeable about the history and culture of Vienna had a significant correlation with all aspects of enjoyment. This could refer to VR being a pleasant tool for educational experiences and that an enjoyment works as a motivator to learn (Lucardie, 2014) which the customers did and are satisfied now that they got learning and meaning-creation in their tourism experience (Han et al, 2019). As well Chung et al. (2017) confirmed that perceived enjoyment of immersive experiences is influenced by the confirmation of expectations. However, this is an interpretation, as we don't have any information about what the customers actually expected, but since the nature of the tour is to learn about history and experience it through VR, it could be assumed that the customers expected an educational and edutaining experience.

Satisfaction is a key indicator of a successful experience, and this aligns with Pine and Gilmore's (1998) theory of the 4E's—entertainment, education, aesthetics, and escapism. The positive correlation between satisfaction and content quality supports this framework. Specifically, aesthetics is reflected in the quality of the content, while escapism is linked to enjoyment, as immersive VR experiences are shown to enhance enjoyment (Su et al., 2023). Similarly, entertainment combines both education and content quality, reinforcing the role of educational value in overall satisfaction. This confirms that all elements of the 4E's contribute to a satisfying VR experience.

The reviews analysed were mostly positive, which suggests that VR tours in an experience generally appreciated by the users. This could also be influenced by the fact that customers' main reason to share about their tourism experiences is enjoyment and fun (Oliveira et al., 2020). The reviews do not represent all customers, but only those who took the initiative to write a review. When analysing the results of customers opinion regarding the experience it should be remember that facilitators like their mood, weather and travel group might have affected their opinion (Larsen, 2007; Pine and Gilmore, 1998) and they might have perceived the experience differently on another day.

The categories identified during the content analysis process tell a lot about what the customers value about the tour which based on the frequencies are in order enjoyment, content quality, staff, education, novelty and immersion. All reviews except two individual reviews included positive comments which could refer to that the experience (like all experiences) is made up

from multiple parts and that even though some of it was not great does not mean the whole experience is bad.

The role of staff and employee-tourist interaction is important and has effect on satisfaction (Barnes et al., 2020). Even in an experience which includes the special feature of using VR and traveling to the past, the staff was referred and praised in so many reviews. However, González-Rodríguez et al. (2020) found similar results in their content analysis. Technology has the potential of adding perspectives and possibilities to a touristic experience, but there is still place for the human part to play an important role. It was also concluded that even in the case of reviews which include something negative about the tour, almost half of them (45,4%) express satisfaction with the staff. Moreover, it was shown that there is some tendency for "satisfaction with the staff" and "intention to reuse virtual reality" co-occur in the reviews, showing once more that people value people and improve the experiences at the destination.

In addition, satisfaction with staff was linked to education, and although the educational content comes from an audio guide, the guides still play an important role in supporting the overall experience. This is something that could be further explored and considered when designing new VR products in the tourism industry.

The word cloud and frequency also indicate what customers value in the tour, such as the guide, VR, history, VR scenes and the experience itself. As the majority of reviews are positive, it can be concluded that these themes are perceived as valuable by the costumers.

7. Conclusions and recommendations

Virtual reality products, such as VR Tours Vienna, can positively impact the visitor experience in cultural tourism by enabling fun yet educational (edutaining) experiences about local cultural sights. These experiences make customers more curious to learn about the local culture and history, introduce them to new sites, and increase their visit intention. Additionally, they attract a variety of visitors, offer new types of experiences, evoke positive feelings, and enhance cultural learning. The aim of this study was to understand customers' perceptions about use of virtual reality in an experience in cultural tourism.

Based on the results from the questionnaire and content analysis customers seem to value enjoyment, education, content quality and staff the most in their experiences involving VR. In addition, as expected, the experience with VR Tours Vienna led to an increase in behavioural intentions to reuse virtual reality services in cultural tourism. These results highlight the

potential of technology in destination tourism and cultural tourism to improve visitor experience and learning experiences about the destination. Examining customer perceptions, visitor experiences, and their intention to reuse VR can help us understand how VR and similar technologies can support cultural preservation and raise awareness.

However, there are limitations to the study that need to be taken into consideration. The sample size of the survey questionnaire was small. A large portion of the respondents were locals (43.3%), so the results may not be fully applicable to cultural tourists. This also applies to the content analysis. The variety of consumers in cultural tourism experiences should be recognised in cultural tourism research. The fact that locals engage with VR products may indicate that these offerings are not yet known to tourists, but they are also attractive to local audiences. The beauty of cultural products is their broad appeal, as both locals and visitors find value in the experience. As locals have enjoyed and learned from them, the potential appeal to tourists may be even greater. The findings are not necessarily generalisable to other settings or groups and the study needs to be replicated with a larger sample size preferably in the same and other similar destinations. Finally, the reliance on a specific theoretical framework and only papers written in English language may limit the interpretation of the findings.

This study, in line with previous research, confirmed the importance of enjoyment, good content quality, and educational content in VR products, as well as customers' willingness to reuse them. However, it is important to further explore how willing customers are to reuse VR services in cultural destinations and how genuine these intentions are. Most of the participants had been recommended to have this experience, but what would make them find it on their own, will they search for similar products on their next city trip and if so, will they find them? The benefits have been proved many times, but it would be important to also research the challenges such as the cost and management of VR devices to ensure that customers will be further offered better experiences through VR on their cultural travels.

References

1. Agresti, A. (2013). Categorical data analysis. Wiley.

2. Alam, M. N., Turi, J. A., Bhuiyan, A. B., Kharusi, S. A., Oyenuga, M., Zulkifli, N., & Iqbal, J. (2024). Factors influencing intention for reusing virtual reality (VR) at theme parks: the mediating role of visitors satisfaction. Cogent Social Sciences, 10(1). https://doi.org/10.1080/23311886.2023.2298898

3. Ammirato, S., Felicetti, A. M., Linzalone, R., & Carlucci, D. (2021). Digital business models in cultural tourism. International Journal of Entrepreneurial Behaviour & Research, 28(8), 1940–1961. https://doi.org/10.1108/ijebr-01-2021-0070

4. Ansari, A., Kheirabadi, A., Ghalamkari, S., & Khanjari, A. R. (2013). Investigation the Relationship among Mobile Value-added Services Quality, Customer Satisfaction and the Continuance Intention: Case Study, Hamrah Avval Operator. International Journal of Information Science and Management., 67–84. http://ijism.ricest.ac.ir/index.php/ijism/article/download/219/188

5. Assaker, G. (2019). Age and gender differences in online travel reviews and user-generated-content (UGC) adoption: extending the technology acceptance model (TAM) with credibility theory. Journal of Hospitality Marketing & Management, 29(4), pp. 428–449. https://doi.org/10.1080/19368623.2019.1653807.

6. Barnes, S. J., Mattsson, J., Sørensen, F., & Jensen, J. F. (2020). Measuring employee-tourist encounter experience value: A big data analytics approach. Expert Systems With Applications, 154, 113450. https://doi.org/10.1016/j.eswa.2020.113450

7. Bayraktar, E., Tatoglu, E., Turkyilmaz, A., Delen, D., & Zaim, S. (2011). Measuring the efficiency of customer satisfaction and loyalty for mobile phone brands with DEA. Expert Systems With Applications, 39(1), 99–106. https://doi.org/10.1016/j.eswa.2011.06.041

8. Bec, A., Moyle, B., Timms, K., Schaffer, V., Skavronskaya, L., Little, C. (2019). Management of immersive heritage tourism experiences: a conceptual model. Tour. Manage. 72, 117–120

9. Beck, J., Rainoldi, M. and Egger, R. (2019). Virtual reality in tourism: a state-of-the-art review. Tourism Review, 74(3), pp. 586–612. https://doi.org/10.1108/tr-03-2017-0049.

10. Bideci, M., & Bideci, C. (2023). Back in Time with Immersive Heritage Tourism Experience: A Study of Virtual Reality in Archaeological Sites. In Springer proceedings in business and economics (pp. 312–317). https://doi.org/10.1007/978-3-031-25752-0_33

11. Bigné, J. Enrique, M. Isabel Sánchez, and Javier Sánchez. (2001). Tourism Image, Evaluation Variables and after Purchase Behaviour: Inter-relationship. Tourism Management, 22 (6): 607-16.

12. Bird, J. M., Smart, P. A., Harris, D. J., Phillips, L. A., Giannachi, G., & Vine, S. J. (2023). A Magic Leap in Tourism: Intended and Realized Experience of Head-Mounted Augmented Reality in a Museum Context. Journal of Travel Research, 62(7), 1427-1447. https://doi.org/10.1177/00472875221134031

13. Camprubí, R., & Coromina, L. (2016). Content analysis in tourism research. Tourism Management Perspectives, 18, 134–140. https://doi.org/10.1016/j.tmp.2016.03.002

14. Chung, N., Lee, H., Kim, J.-Y., & Koo, C. (2017). The Role of Augmented Reality for Experience-Influenced Environments: The Case of Cultural Heritage Tourism in Korea. Journal of Travel Research, 57(5), 627–643. doi:10.1177/0047287517708255

15. Cipresso, P., Giglioli, I. a. C., Raya, M. A., & Riva, G. (2018). The Past, Present, and Future of Virtual and Augmented Reality Research: A network and cluster analysis of the literature. Frontiers in Psychology, 9. https://doi.org/10.3389/fpsyg.2018.02086

16. De Lurdes Calisto, M. and Sarkar, S. (2024) 'A systematic review of virtual reality in tourism and hospitality: The known and the paths to follow,' International Journal of Hospitality Management, 116, p. 103623. https://doi.org/10.1016/j.ijhm.2023.103623.

17. DeepL Translate: The world's most accurate translator (no date). https://www.deepl.com/en/translator.

18. 'enjoyment' (2024) Merriam-Webster Dictionary. https://www.merriam-webster.com/dictionary/enjoyment.

19. Errichiello, L., Micera, R., Atzeni, M., & Del Chiappa, G. (2019). Exploring the implications of wearable virtual reality technology for museum visitors' experience: A cluster analysis. International Journal of Tourism Research, 21(5), 590–605.

20. Fan, X., Jiang, X., & Deng, N. (2022). Immersive technology: A meta-analysis of augmented/virtual reality applications and their impact on tourism experience. Tourism Management, 91, 104534. https://doi.org/10.1016/j.tourman.2022.104534

21. Fang, B., Ye, Q., Küçükusta, D., & Law, R. (2016). Analysis of the perceived value of online tourism reviews: Influence of readability and reviewer characteristics. Tourism Management, 52, 498–506. https://doi.org/10.1016/j.tourman.2015.07.018

22. Forbes. (2024) '18 Transformative Ways Industries are leveraging AR and VR,' Forbes, 13 August. https://www.forbes.com/councils/forbestechcouncil/2024/05/17/18-transformative-ways-industries-are-leveraging-ar-and-vr/.

23. Frey, B., & Briviba, A. (2021). A policy proposal to deal with excessive cultural tourism. European Planning Studies, 29, 601 - 618. https://doi.org/10.1080/09654313.2021.1903841.

24. González-Rodríguez, M. R., Díaz-Fernández, M. C., & Pino-Mejías, M. Á. (2020). The impact of virtual reality technology on tourists' experience: a textual data analysis. Soft Computing, 24(18), 13879–13892. https://doi.org/10.1007/s00500-020-04883-y

25. Guttentag, D. (2010). Virtual reality: Applications and implications for tourism. Tourism Management, 31, 637-651. https://doi.org/10.1016/J.TOURMAN.2009.07.003.

26. Han, D., Dieck, M. T., & Jung, T. (2019). Augmented Reality Smart Glasses (ARSG) visitor adoption in cultural tourism. Leisure Studies, 38(5), 618–633. https://doi.org/10.1080/02614367.2019.1604790

27. Holsapple, C. W., & Wu, J. (2007). User acceptance of virtual worlds. Data Base, 38(4), 86–89. https://doi.org/10.1145/1314234.1314250

28. Innocente, C., Ulrich, L., Moos, S., & Vezzetti, E. (2023). A framework study on the use of immersive XR technologies in the cultural heritage domain. Journal of Cultural Heritage, 62, 268–283. https://doi.org/10.1016/j.culher.2023.06.001

29. Jung, K., Nguyen, V. T., Piscarac, D., & Yoo, S. (2020). Meet the virtual Jeju Dol Harubang—The mixed VR/AR application for cultural immersion in Korea's main heritage. ISPRS International Journal of Geo-Information, 9(6), 367. https://doi.org/10.3390/ijgi9060367

30. Jung, T., Chung, N. & Leue, M. C. (2015). The determinants of recommendations to use augmented reality technologies: The case of a Korean theme park, Tourism Management, Elsevier, vol. 49(C), pages 75-86.

31. Koo, M.G. and Jho, W. (2012) 'Linking domestic decision-making and international bargaining results: beef and automobile negotiations between South Korea and the United States,' International Relations of the Asia-Pacific, 13(1), pp. 65–93. https://doi.org/10.1093/irap/lcs016.

32. Kotler, P. and Keller, K.L. (2012) Marketing Management. 14th Edition, Pearson Education. - References - Scientific Research Publishing (no date). https://www.scirp.org/reference/ReferencesPapers?ReferenceID=1839933.

33. Landis, J. R., & Koch, G. G. (1977). The measurement of observer agreement for categorical data. Biometrics, 33, 159e174.

34. Larsen, S. (2007) 'Aspects of a psychology of the tourist experience,' Scandinavian Journal of Hospitality and Tourism, 7(1), pp. 7–18. https://doi.org/10.1080/15022250701226014.

35. Lee, H., Jung, T., Dieck, M. C. T., & Chung, N. (2020). Experiencing immersive virtual reality in museums. Information & Management, 57(5), 103229. https://doi.org/10.1016/j.im.2019.103229

36. Lee, M., Lee, S., Jeong, M., & Oh, H. (2020). Quality of virtual reality and its impacts on behavioral intention. International Journal of Hospitality Management, 90, 102595. https://doi.org/10.1016/j.ijhm.2020.102595

37. Lemon, K. N., & Verhoef, P. C. (2016). Understanding customer experience throughout the customer journey. Journal of Marketing, 80(6), 69–96. https://doi.org/10.1509/jm.15.0420

38. Li, T. and Chen, Y. (2019). Will virtual reality be a double-edged sword? Exploring the moderation effects of the expected enjoyment of a destination on travel intention. Journal of Destination Marketing & Management, 12, pp. 15–26. https://doi.org/10.1016/j.jdmm.2019.02.003.

39. Lin, L., Huang, S., & Ho, Y. (2020). Could virtual reality effectively market slow travel in a heritage destination? Tourism Management, 78, 104027. https://doi.org/10.1016/j.tourman.2019.104027

40. Lucardie, D. (2014). The impact of fun and enjoyment on adult's learning. Procedia - Social and Behavioral Sciences, 142, 439–446. https://doi.org/10.1016/j.sbspro.2014.07.696

41. Marasco, A., Buonincontri, P., Van Niekerk, M., Orlowski, M., & Okumus, F. (2018). Exploring the role of next-generation virtual technologies in destination marketing. Journal of Destination Marketing & Management, 9, 138–148. https://doi.org/10.1016/j.jdmm.2017.12.002

42. McHugh, M.L. (2012) Interrater reliability: the kappa statistic. https://hrcak.srce.hr/89395.

43. Mitas, O. and Bastiaansen, M. (2018). Novelty: A mechanism of tourists' enjoyment. Annals of Tourism Research, 72, pp. 98–108. https://doi.org/10.1016/j.annals.2018.07.002.

44. Mura, P., Tavakoli, R., & Sharif, S. P. (2016). Authentic but not too much: exploring perceptions of authenticity of virtual tourism. Information Technology & Tourism, 17(2), 145–159. https://doi.org/10.1007/s40558-016-0059-y

45. Okanovic, V., Ivkovic-Kihic, I., Boskovic, D., Mijatovic, B., Prazina, I., Skaljo, E., & Rizvic, S. (2022). Interaction in eXtended Reality Applications for Cultural Heritage. Applied Sciences, 12(3), 1241. https://doi.org/10.3390/app12031241

46. Oliveira, T., Araujo, B. and Tam, C. (2020) 'Why do people share their travel experiences on social media?,' Tourism Management, 78, p. 104041. https://doi.org/10.1016/j.tourman.2019.104041.

47. O'Reilly, M. D. (1990). Free elicitation of descriptive adjectives for tourism image assessment. Journal of Travel Research, 28(4), 21e26.

48. Parasuraman, A., Zeithaml, V.A. and Berry, L.L. (1988) SERVQUAL: A Multiple-Item Scale for Measuring Consumer Perceptions of Service Quality. Journal of Retailing, 64, 12-40.

49. Pine B. J., Gilmore J. H. (1998). Welcome to the experience economy. Harvard Business Review, 76, 97–105.

50. Pratisto, E. H., Thompson, N., & Potdar, V. (2022). Immersive technologies for tourism: a systematic review. Information Technology & Tourism, 24(2), 181–219. https://doi.org/10.1007/s40558-022-00228-7

51. Rauscher, M., & Humpe, A. (2022). Traveling the Past: Raising Awareness of Cultural Heritage through Virtual Reality. Journal of Promotion Management, 28(2), 128–143. https://doi.org/10.1080/10496491.2021.1987958

52. Richards, G. (2018). Cultural tourism: A review of recent research and trends. Journal of Hospitality and Tourism Management, 36, 12–21. https://doi.org/10.1016/j.jhtm.2018.03.005

53. Richards, G. and Van Der Ark, L.A. (2013). Dimensions of cultural consumption among tourists: Multiple correspondence analysis. Tourism Management, 37, pp. 71–76. https://doi.org/10.1016/j.tourman.2013.01.007.

54. Ritchey, F. J. (2007). Statistical imagination (2nd ed.). Boston, MA: McGraw-Hill

55. Schuckert, M., Liu, X., & Law, R. (2015). Hospitality and tourism online reviews: recent trends and future directions. Journal of Travel & Tourism Marketing, 32(5), 608–621. https://doi.org/10.1080/10548408.2014.933154

56. Schober, P., Boer, C. and Schwarte, L.A. (2018). Correlation Coefficients: appropriate use and interpretation,' Anesthesia & Analgesia, 126(5), pp. 1763–1768. https://doi.org/10.1213/ane.0000000000002864.

57. Scopus - Document search (n.d.). https://www.scopus.com/search/form.uri?display=basic#basic.

58. Song, H. J., Lee, C., Park, J. A., Hwang, Y. H., & Reisinger, Y. (2014). The Influence of Tourist Experience on Perceived Value and Satisfaction with Temple Stays: The Experience Economy Theory. Journal of Travel & Tourism Marketing, 32(4), 401–415. https://doi.org/10.1080/10548408.2014.898606

59. Stepchenkova, S. and Zhan, F.Z. (2013). Visual Destination Image of Peru: Comparative Content Analysis of DMO and User-Generated Photography. Tourism Management, 36, 590-601. http://dx.doi.org/10.1016/j.tourman.2012.08.006

60. Su, P., Hsiao, P., & Fan, K. (2023). Investigating the Relationship between Users' Behavioral Intentions and Learning Effects of VR System for Sustainable Tourism Development. Sustainability, 15(9), 7277. https://doi.org/10.3390/su15097277

61. Suh, A., & Prophet, J. (2018). The state of immersive technology research: A literature analysis. Computers in Human Behavior, 86, 77–90. https://doi.org/10.1016/j.chb.2018.04.019

62. Tussyadiah, I. P., Wang, D., Jung, T. H., & Dieck, M. T. (2018). Virtual reality, presence, and attitude change: Empirical evidence from tourism. Tourism Management, 66, 140–154. https://doi.org/10.1016/j.tourman.2017.12.003

63. UN Tourism (2016) 'UNWTO congress to discuss the links between cultural heritage and creative tourism,' 23 November. https://www.unwto.org/archive/europe/press-release/2016-11-23/unwto-congress-discuss-links-between-cultural-heritage-and-creative-tourism.

64. UNESCO. (1.8.2024) *Culture*. https://www.unesco.org/en/culture?hub=365.

65. UNESCO. (2022) Reshaping policies for creativity: addressing culture as a global public good. https://doi.org/10.58337/oiln3726

66. UNESCO. (2003). Convention for the Safeguarding of the Intangible Cultural Heritage. Paris: UNESCO.

67. Ventura, S., Brivio, E., Riva, G., & Baños, R. M. (2019). Immersive versus Non-immersive Experience: Exploring the feasibility of memory assessment through 360° technology. Frontiers in Psychology, 10. https://doi.org/10.3389/fpsyg.2019.02509

68. VR Tours Vienna (18.6.2024) EN | VR Tours Vienna. https://vrtoursvienna.com/en/.

69. Wang, E., & Chen, C. Y. (2011). System quality, user satisfaction, and perceived net benefits of mobile broadband services. 8th International Telecommunications Society (ITS) Asia-Pacific Regional Conference, Taiwan, 26-28 June, 2011: Convergence in the Digital Age.

70. Wen, X., Sotiriadis, M., & Shen, S. (2023). Determining the Key Drivers for the Acceptance and Usage of AR and VR in Cultural Heritage Monuments. Sustainability, 15(5), 4146. https://doi.org/10.3390/su15054146

71. Wien.info. (10.9.2024) *Virtual reality*. https://www.wien.info/en/search?query=virtual+reality&pageNum=0.

72. XR market size worldwide 2021-2026 | Statista. (2023, March 9). Statista. https://www.statista.com/statistics/591181/global-augmented-virtual-reality-market-size/

73. Yu, J., Kim, S., Hailu, T. B., Park, J., & Han, H. (2023). The effects of virtual reality (VR) and augmented reality (AR) on senior tourists' experiential quality, perceived advantages, perceived enjoyment, and reuse intention. Current Issues in Tourism, 27(3), 464–478. https://doi.org/10.1080/13683500.2023.2165483

74. Zhao, L., Lu, Y., Zhang, L., & Chau, P. Y. (2011). Assessing the effects of service quality and justice on customer satisfaction and the continuance intention of mobile value-added services: An empirical test of a multidimensional model. Decision Support Systems, 52(3), 645–656. https://doi.org/10.1016/j.dss.2011.10.022

75. Zviran, M., Glezer, C. and Avni, I. (2006) 'User satisfaction from commercial web sites: The effect of design and use,' Information & Management, 43(2), pp. 157–178. https://doi.org/10.1016/j.im.2005.04.002.

Appendix 1. - Survey questionnaire

VR Tours Vienna questionnaire

You have just experienced history of Vienna and Austria through virtual reality in the area of UNESCO protected Historic Centre of Vienna. This study investigates the effect between Virtual Reality (VR) experience and tourist engagement in cultural destinations in Austria. This research is funded by CiTUR Leiria-Centre for Tourism Research, Development and Innovation.

The questionnaire is anonymous and the data collected will be used for research purposes only and won't be shared with third parties.

If you are answering the survey with your phone, please tilt it for a better experience.

Please note the following terms for the questionnaire:

VR TOUR = referring to the whole tour including guided walking tour and experiencing the history through VR glasses and videos
VR EXPERIENCE = Only refers to the moments when the VR glasses were worn and the VR videos displayed

The survey will take around 5 minutes to complete. Thank you for your contribution!

If you'd like to have access to the results of the research, you can contact Victoria Apajalahti at victoria.apajalahati@ipleiria.pt.

* Indicates required question

1. Emotions during the Virtual Reality (VR) visit *

Please indicate your level of agreement with each sentence using the following 7 point scale (from strongly disagree to strongly agree). It is recommend to flip your phone for better view.

Mark only one oval per row.

	Strongly disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly agree
Experiencing the history of Vienna through the VR Tour was enjoyable (virtual reality and audio guiding included)	◯	◯	◯	◯	◯	◯	◯
The VR Tour was fun (virtual reality and audio guiding included)	◯	◯	◯	◯	◯	◯	◯
I felt comfortable during the VR experience (while wearing VR glasses)	◯	◯	◯	◯	◯	◯	◯
I felt scared during the VR experience (while wearing VR glasses)	◯	◯	◯	◯	◯	◯	◯
I felt safe during the VR experience (while wearing VR glasses)	◯	◯	◯	◯	◯	◯	◯

2. Content experienced during the visit in Virtual Reality (VR) *

Please indicate your level of agreement with each sentence using the following 7 point scale (from strongly disagree to strongly agree). It is recommend to flip your phone for better view.

Mark only one oval per row.

	Strongly disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly agree
The VR Tour made me more knowledgeable about the history and culture of Vienna	◯	◯	◯	◯	◯	◯	◯
The VR Tour stimulated my curiosity to learn new things	◯	◯	◯	◯	◯	◯	◯
VR provided a good experience for learning	◯	◯	◯	◯	◯	◯	◯
I understand the local culture better because of this tour	◯	◯	◯	◯	◯	◯	◯
This experience has motivated me to find more about the history and culture of Vienna	◯	◯	◯	◯	◯	◯	◯
I see value in doing a VR Tour while visiting a destination/site	◯	◯	◯	◯	◯	◯	◯
The virtual tour gave me an overview of the history of Vienna	◯	◯	◯	◯	◯	◯	◯
I understand the local people better because of this tour	◯	◯	◯	◯	◯	◯	◯
The virtual tour provided relevant information of Vienna for my travel plans	◯	◯	◯	◯	◯	◯	◯

3. Satisfaction with the visit in Virtual Reality (VR) *

Please indicate your level of agreement with each sentence using the following 7 point scale (from strongly disagree to strongly agree). It is recommend to flip your phone for better view.

Mark only one oval per row.

	Strongly disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly agree
I am satisfied with the visuals of the virtual reality videos	◯	◯	◯	◯	◯	◯	◯
I am satisfied with the audio during the virtual reality videos	◯	◯	◯	◯	◯	◯	◯
I am satisfied with the physical aspects of the VR Tour (including hardware)	◯	◯	◯	◯	◯	◯	◯
This experience has motivated me to participate in additional VR activities	◯	◯	◯	◯	◯	◯	◯
I am satisfied that I had this VR experience	◯	◯	◯	◯	◯	◯	◯

4. Sharing the Virtual Reality (VR) experience *

Please indicate your level of agreement with each sentence using the following 7 point scale (from strongly disagree to strongly agree). It is recommend to flip your phone for better view.

Mark only one oval per row.

	Strongly disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly agree
I will recommend this VR Tour	◯	◯	◯	◯	◯	◯	◯
I will share about the VR experience on the Internet or social media	◯	◯	◯	◯	◯	◯	◯
I will recommend visiting Vienna after this VR experience	◯	◯	◯	◯	◯	◯	◯

5. Technology and Virtual Reality (VR) *

Please indicate your level of agreement with each sentence using the following 7 point scale (from strongly disagree to strongly agree). It is recommend to flip your phone for better view.

Mark only one oval per row.

	Strongly disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly agree
Among my peers, I am usually the first to find out and try out new information technologies.	◯	◯	◯	◯	◯	◯	◯
I like to experiment with new digital and smart technologies.	◯	◯	◯	◯	◯	◯	◯
I can usually figure out new tech products and services without help from others.	◯	◯	◯	◯	◯	◯	◯

6. Do you have previous experience with virtual reality (VR)? *

Mark only one oval.

- ◯ Yes
- ◯ No

7. Choose the language you experienced the VR tour in *

Mark only one oval.

- ◯ English
- ◯ German
- ◯ Spanish
- ◯ Italian
- ◯ Dutch
- ◯ French

8. What is your native language? *

Mark only one oval.

- ◯ German
- ◯ French
- ◯ English
- ◯ Spanish
- ◯ Dutch
- ◯ Italian
- ◯ Other: _____

9. Age *

Mark only one oval.

- ◯ Under 18
- ◯ 18-24
- ◯ 25-34
- ◯ 35-44
- ◯ 45-54
- ◯ 55-64
- ◯ 65 or older

10. What gender do you identify the most with? *

Mark only one oval.

- ◯ Woman
- ◯ Man
- ◯ Non-binary
- ◯ Other
- ◯ Prefer not to say

11. How did you find out about VR Tours? *

Mark only one oval.

- ◯ I was recommended
- ◯ News article
- ◯ Social Media/Internet
- ◯ Tourist information office
- ◯ Other: _____

12. Employment status *

Mark only one oval.

- ◯ Employed full-time
- ◯ Employed part-time
- ◯ Student
- ◯ Retired
- ◯ Unemployed
- ◯ Other: _____

13. What is your connection to Vienna? *

Mark only one oval.

- ◯ I live in Vienna or in the metropolitan area
- ◯ I live in Austria, but not in Vienna
- ◯ I am travelling from another country

14. If you are a traveler, what are your main motivations for visiting Vienna on this trip? Please choose all that apply.

Tick all that apply.

- [ ] Refreshment of body and mind and/or sports
- [ ] Pleasure, fun, excitement, shopping and/or entertainments
- [ ] Curiosity about foreign countries, people and places; interest in art, music, folklore and architecture
- [ ] Interest in historic places (remains, monuments and churches)
- [ ] Visiting friends and relatives
- [ ] Personal excitement of travelling, escaping from own permanent environment
- [ ] Visiting places and people for spiritual reasons (including pilgrimages)
- [ ] Meeting new people and seeking friendships and/or new and different experiences in different environments
- [ ] Business
- [ ] Pursuit of hobbies
- [ ] Education and learning
- [ ] Taking part in an event

15. Have you visited Vienna before?

Mark only one oval.

- ◯ Yes
- ◯ No

16. **Please leave your email address to enter into a prize draw to win a €10 gift voucher for "Vienna Ticket Office". The gift card is valid for over 100,000 events worldwide.**

Thank you for your participation!