

The Challenges and Benefits of Implementing Virtual Reality and Augmented Reality in the Hotel Industry

Bachelor Thesis for Obtaining the Degree

Bachelor of Business Administration in

Tourism and Hospitality Management

Submitted to Dr. Daniel Dan

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Affidavit

I hereby affirm that this Bachelor Thesis represents my own written work and that I have used no sources and aids other than those indicated. All passages quoted from publications or paraphrased from these sources are properly cited and attributed.

The thesis was not submitted in the same or in a substantially similar version, not even partially, to another examination board and was not published elsewhere.

Date: 31.05.2022

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Abstract

The hotel industry is a significant element when planning any kind of trip, whether it is for business or leisure. For a couple of years now, the hotel industry has started to digitalize itself slowly but steadily by introducing different technologies. An example would be the virtual keycards where the guests do not have to stop by the check-in desk anymore but receive their digital keycards on their mobile phone and can directly enter the hotel room. These technologies play an important role for the improvement of the hotel's processes and financials as well as helping the guest in different decision-making processes, which provides comfort to the guest. Some of the large hotel chains like Marriott or Shangri-La already partially use VR and AR in the Marketing department to attract more customers. This example and further examples are discussed in more detail below. The goal of this thesis is to study and analyze the impact, both negative and positive of the implementation of virtual reality (VR) and augmented reality (AR) in the hotel industry. VR and AR are some of the techs that are supposed to be a helpful tool and a game changing player in the hotel industry. In order to better understand the process of implementing VR and AR in the hotel industry, in-depth research was conducted by the author to help understand the whole picture. Only then can the challenges and benefits that come with such an implementation be identified and analyzed.

For the purpose of better understanding the problem, an online survey was conducted. A large number of responses was gathered to help determine the different points of view of the participants. The participants had to answer the questions once from the perspective of a hotel manager and once from the perspective of a hotel guest. The results provided insight on the opinion and behavioral aspects of people towards such an implementation from hotel managers, hospitality management students and guests that answered the survey. Surprising was the fact that only very few people heard of and used VR and AR when staying at a hotel. Nevertheless, most participants responded positively to the implementation of these technologies in the entire hospitality industry.

Keywords: Virtual reality, Augmented reality, Hotel industry, Challenges, Benefits

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Abbreviations

3D – Three Dimensional

4D – Four Dimensional

Ads – Advertisements

App – Mobile Application

AR – Augmented Reality

DMO – Destination Management Organization

G – Hotel Guest

GDS – Global Distribution System

GM – General Manager

HM – Hotel Manager

MU – Modul University Vienna

PC – Personal Computer

PR – Public Relations

SWOT – Strengths, Weaknesses, Opportunities, Threats

USP – Unique Selling Proposition

VR – Virtual Reality

WWW – World Wide Web

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1 Introduction

1.1 Presentation of the Problem

Virtual reality (VR) and augmented reality (AR) have become a significant part of today's technology. VR simulates an environment that can be accessed with the help of special glasses (Christodoulidou, 2020). AR uses the real world with the addition of information in the form of bubbles with texts or squares that pop up depending on the location (Gartner, 2022). The main difference is that one creates a completely new and simulated world, while the other uses the real world but with some additional components. Both technologies are mostly known for their entertainment aspects in the gaming industry. Yet, they are used in more sectors than anticipated, such as education, medicine, engineering, communication, and several others (Mathew, 2014). In 2021 the market size of VR reached 4.8 billion US dollars worldwide, with a strong increase from year to year, and is projected to reach over 12 billion US dollars by 2024 (Alsop, 2021a). Augmented reality, on the other hand, had a market size of 9.5 billion US dollars in 2021 and it is predicted to reach a total amount of almost 300 billion US dollars worldwide by 2024 (Alsop, 2021b). These numbers show that both AR and VR play a significant role in contemporary life. They are on the march of becoming indispensable constituents in every area of a human life's, including the tourism and hospitality industry, with a significant impact on those (Williams & Hobson, 1995).

According to Kutsenko (2019), both AR and VR can enhance the customer engagement in the hotel industry in numerous diverse ways if an implementation is to be lead through. Therefore, this implementation is encouraged and recommended, especially in the pre-booking phase where customers have many questions and insecurities about the accommodation and its facilities (Nayyar et al., 2018). Even though AR and VR are widely used in different sectors like gaming; there is still limited research and information on how they could benefit the hotel industry. At the same time, it is also unknown, which challenges and benefits such an implementation could bring with itself. As stated by Tussyadiah et al. (2017) and Christodoulidou (2020), it has a bright future not only for the tourism industry but also for the hospitality industry and therefore for the hotel industry. It can be used in many ways, especially as a marketing

tool or to improve the customer experience. AR and VR have been examined individually or in connection with other industries, but never in direct comparison with the hotel industry. Since it is not explored very much in the hospitality industry and much less in the hotel industry, this thesis aims to offer insight on a potentially more technological future for the hotel industry. A future in which there will be great in how hotels will be chosen by the guests as well as the booking itself and finally the stayover.

As both challenges and benefits are analyzed, it is assumed that there are both positive and negative aspects. Even though there are more challenges than benefits, the benefits are outweighing them in terms of potential and opportunities for the future. The first research question considered in this thesis will weigh the challenges and benefits of the implementation of augmented and virtual reality in the hotel industry: RQ1 What are the challenges and benefits of implementing virtual and augmented reality in the hotel industry? Research question 2 considers the ways in which AR and VR could impact the Hotel Industry: RQ2 In which ways does the implementation of virtual and augmented reality impact the hotel industry?

1.2 Aims of the Bachelor Thesis

This thesis results contribute to extend knowledge on using VR and AR in the hotel industry and to have a better understanding on the implementation. First, the purpose of this research is to find out how AR and VR could impact the hotel industry if the hotels would actively implement and use the above-mentioned technologies in different sectors such as marketing, bookings or as guides for the destinations and the facilities inside the hotel. Second, it envisions what those challenges and benefits are and how they can be overcome if needed. Moreover, it explores the advantages and disadvantages for the guests as well as for the hotels using these technologies. Finally, it sketches the whole picture of the implementation and the potential that is provided for the future for both consumers and businesses, which in this case are the hotels. At the end of this research, the readers will be able to have a better understanding whether this implementation will be beneficial for the future of the Hotel Industry and the changes it will bring along, both positive and negative.

1.3 Methods of Analysis

For this thesis, the author uses both primary and secondary research. The literature review is based entirely on secondary data, which means that already existing data are used to provide a more in-depth understanding of the topic. Meanwhile, the findings and discussion are based on a combination of primary and secondary data. The primary data were collected through a survey that used different channels such as LinkedIn and Facebook. The target group was primarily hotel managers and Modul University (MU) students as well as MU alumni that have a comprehensive understanding of the hotel industry. To this end, a set of questions were posed to determine the positions of the target groups towards the researched topic as well as understand how virtual and augmented reality are perceived if implemented in the hotel industry.

1.4 Outline of the Thesis

This thesis is divided as follows: introduction, literature review, methodology, findings, conclusion, and recommendations.

The introductory part will provide an overview of the topic with background information as well as the statement of the problem with the research questions and the aim of the thesis. Finally, the methods and approaches used to determine the results.

The literature review consists of five significant parts: the explanation of virtual reality and augmented reality; the difference between the two technologies; the perception and potential that they have; and finally, the educational purposes of VR and AR for the hotel industry.

The methodology describes thoroughly how the research data were gathered, by which means it was analyzed, and with which approaches and methods were used to determine the results and findings of the thesis.

The fourth part considers the findings followed by the conclusion and the discussion. Lastly, the author will give recommendations on what further research and data collection can be pursued to have an even deeper understanding of the implementation of VR and AR in the hotel industry.

2 Literature review

2.1 Virtual reality

2.1.1 Definition of VR

According to Mandal (2013, p.304) virtual reality is defined as “a technology which allows a user to interact with a computer-simulated environment, whether that environment is a simulation of the real world or an imaginary world.” This means that any given environment can be simulated, even a hotel and its facilities. Operators can intervene in different situations, depending on the user’s movement, to adapt and customize the experience or even change the status from a bystander to a participant (Riva, 2006). This means that people can walk around, do house chores, and explore different surroundings and environments (Farshid et al., 2018). Of course, to be able to have such an experience, adequate hardware and software is needed. A Virtual Reality starter pack includes VR goggles and headset, the camera which is used for movement tracking, and a device that can support VR like a personal computer (PC), a laptop, or a PlayStation (Nowag, 2020).

2.1.2 Example uses of VR technology

Virtual Reality has become a usual tool in today’s technology. Even though experts only saw the potential of VR in the gaming industry, throughout time, it became a significant tool in many different industries (Zobel et al., 2018).

The planning and management area is one of the beneficiaries of the VR technology. A notable example of the use of VR technology is architectural planning, visualizing the space is an enormous advantage not only for the architect but also for the customer who is able to see the project beforehand and can intervene if there is something that he or she wants to change (Heldal, 2007). In the entertainment industry VR is often used as a great tool to enhance customer experience. An example would be the Sahara Hotel & Casino in Las Vegas which offers simulated rides around a speedway in a racecar preproduction surrounded by a huge screen to make it all look as realistic as possible (Guttentag, 2010). Another notable example of the use of VR, somewhere other than the gaming industry, is the global distribution system (GDS) Amadeus. Amadeus is one of the world’s leading GDSs in Europe. In one of their

videos, Navitaire, which is a daughter company of Amadeus, presented how a potential online booking of a vacation could look like in the future. The entire process would be visual, and the user could easily book the flights and seats, the rental car at the destination and finally pay virtually with their credit card (Amadeus, 2017).

The education industry also benefits from the VR technology in several distinct aspects. For instance, the cultural institution, the Foundation of the Hellenic World, uses it to organize VR exhibitions. These exhibitions were the Center’s highlight allowing the visitors to walk through ancient cities, experience the work of an archeologist, and relive a few moments in ancient Greece (Gaitatzes et al., 2001).

2.1.3 Challenges and Benefits of VR in tourism

SWOT Analysis of VR Applications in Tourism

Strengths	Weaknesses	Opportunities	Threats
A powerful tool to enhance tourism	Limitations in technology	Protection of cultural and natural heritage sites	The lack of cultural interaction
A powerful promotional tool	Negative first impression	Sustainable tourism and environmental protection	Negative impact on real tourism and travel
Marketing tool for travel agencies/tour operators	Distance from real experience	Accessibility for disabled or elderly visitors	Economic impacts of real tourism in emerging economies or no high-tech destinations
Testing out products before going or purchasing	Lack of resident-tourist interactions	Time travel	Taxation of VR applications in the tourism industry
The ability to provide sensory experiences to customers	High cost for customers	Turning dreams into reality	Contributing to an anti-social process in society
To reduce the negative impacts of tourism	Physical and psychological disorders	Embody another being	Negative effects on other sectors related to tourism
Creating a destination attraction	Ambiguity about tourism policy and planning	Design without limitations	Negative effect on employment in tourism and related sectors
Embody knowledge	Impossibility of souvenir purchasing	Achieve the impossible	Virtual travel/ tourism acceptance and accessibility
Allowing the exploration of each destination in great depth	The lack of definitions for tourists	Be fearless/ removing bureaucratic, security and language problems for visitors	Monopolization or non-competition between tour operators
Positive cost effects for tourism businesses	The lack of a conceptual framework	Alternative tourism experiences such as e-sporting events	Other legal issues

Table 1 - SWOT Analysis of VR Applications in Tourism

Above, there is a SWOT analysis conducted by Dilek et al. (2018) which focuses on the VR technology in the tourism industry. The most important aspects are put together

in Table 1. The table consist of four columns with each being one of the SWOT analyses factors: Strength, Weaknesses, Opportunities, and Threats. Under each of these headlines there are several aspects which belong in that category. For example, time travel is considered an opportunity, while high costs for the customer are a weakness. The negative impact of VR on the real tourism industry is that it can be perceived as a threat and a strength would be the that it could be used as a marketing tool to promote destinations.

According to Cheong (1995) Virtual Reality can also be considered as a threat. Since VR makes it possible to recreate environments, one-to-one, tourists might not want to travel to that destination anymore if they have seen it virtually. Of course, it is not possible to compare the actual trip to the virtual one. Yet, people who are on a tighter budget might consider traveling to a cheaper destination instead of making the effort to go to the one they have seen virtually if that is far away and more expensive. This leads to the main threat, which is that virtual tourism might replace the actual tourism in future (Cheong, 1995). Following the replacement of actual tourism by virtual tourism as stated in the table above, this could have serious negative consequences. Another challenge would be the unfavorable impact on the employment sectors at the destination as well as on the income of the destination. The whole supply chain would be affected and would drag up difficult consequences for the entire world economy. This would include travel agencies, airlines, accommodations, DMOs, the destinations and country's economy, including the citizens of those destinations who live off tourism (Dilek et al., 2018). This, of course, has a direct impact on the hospitality industry.

Another challenge would be the evolution of the technology in the future since it is uncertain how it will change in the next few years. The senses like seeing and hearing are quite well developed, yet, the other three senses, smelling, tasting, and feeling, are not involved at all in the technology. They are quite important to make the trip more accurate and have the impression of truly being there (Guttentag, 2010). In addition, as mentioned in Table 1, there is an absence of cooperation between the traveler and the local citizens who are often the essence of the real trip. There is no ability to buy local products and gifts to bring home to the family and friends as a

symbol and reminder of that journey. This is considered an important part of the tourist experience, to buy and bring home souvenirs (Wilkins, 2010).

On the other hand, there are also a lot of benefits that come with the VR technology. As specified by Dilek et al. (2018) in the table above, VR could be a great marketing tool for the hospitality industry to promote their hotels and the destinations. This can help customers visualize their potential trip and accommodation before genuinely traveling to the destination and, if necessary, changes and adjustments can be made (Rainoldi et al., 2018).

Another benefit would be that it offers an alternative to actual travel, and it can be considered a sustainable way of traveling, without polluting the planet (Dewailly, 1999). In addition, the problem of overcrowding in cities like Dubrovnik or Venice could be avoided with the help of virtual traveling (Foster, 2017). Since one only needs to buy the VR gadgets, it is also more affordable than the actual travel and it is also time saving because you do not need to travel by any transportation means. One is directly at the destination without spending a cent on the transport and there is no need to spend time at different institutions like travel agencies or embassies to plan the vacation or wait for a visa (Cheong, 1995). Besides, it is a safe means to travel if considering the Coronavirus pandemic because there is no need to leave the house and you can still travel around the world without any restrictions or rules to follow (VR direct, 2020). Furthermore, it gives the possibility to people who cannot travel to still have an experience like everyone else. For example, disabled people or seniors who have limited travel opportunities. This would provide a chance to do something that otherwise would have been impossible (Sonida Senior Living, n.d.).

2.1.4 The usage of VR in hotels

VR in the hotel industry comes with many benefits and advantages. Nowadays, many hotels offer on their websites VR tours of their properties to attract more customers as they are considered more appealing than traditional advertisements (Wan et al., 2007). Moreover, VR can help the tourist overcome the fear of uncertainty and lack of knowledge about the trip as well as the destination and accommodation (Lee & Oh, 2007). In addition to overcoming anxiety, VR can be a valuable tool when it comes to

planning the trip. It not only helps to find an adequate accommodation, but it can also help with the choice of destination and tourist attractions (Pestek & Sarvan, 2021).

Amadeus is one of the world's leading global distribution systems, also known as GDS. In one of their videos Navitaire, which is a daughter company of Amadeus, presented how a potential online booking of a vacation could look like in the future. The entire process would be very visual, and the user could easily book the flights and seats, the rental car at the destination and finally pay virtually with a credit card that has prior been linked to the system (Amadeus, 2017).

The Shangri-La hotel chain offers 360-degree videos of the destination and the property, which can be viewed with the help of VR technology. Users can simply download the files and with the right accessories, enjoy the virtual presence of being at one of the Shangri-La destinations (Experience the virtual world of Shangri-La Hotels and Resorts, n.d.). Being the first luxury brand to adopt the VR technology, Shangri-La saw the enormous potential of enhancing the worldwide sales as well as the customer experience. In the beginning, the travel agents were the main target as they were the key elements to the customer decision-making process. Still, customers are also encouraged to make use of the videos if possible (Hotel Business, 2015). There are several other hotels that use the same technology as the Shangri-La to promote their property and facilities. One of them would be the Atlantis Dubai, which provides a virtual tour of the hotel from the first-person perspective. It can be watched as a normal video on the internet or with the help of adequate VR gear to have the full experience. The Pullman Brisbane King George Square also provides a virtual hotel tour. But the difference to the one mentioned above is that it is accompanied by an audio which guides the viewer through the property and provides some additional information (Revfine, 2021a).

For their campaign "Travel Brilliantly," Marriott Hotels created and presented the "first-ever immersive 4D VR experience" called "Teleporter" in 2014, which enabled guests to explore and enjoy the location while being in a "Teleporter station" (Sabre, 2017). What is special about this 4D simulation, is that besides the audio-visual elements, it additionally includes olfactive and kinesthetic effects. This means that the users can smell the saltiness of the sea in the air or the perfume of a lavender field as

well as feel the movement of the ground when somebody is stamping on it, for instance (Mofoken & Matima, 2018). The testers were brought to their virtual honeymoons in London and Hawaii where they had a simulated experience (Revfine 2021.) Already in 1995, Cheong mentioned that such full stimulation packages, which also include smell, taste, and touch, would be available for travelers using VR gear (Cheong, 1995). In addition to the 4D simulation, Marriott also initiated something that is called “VR postcards”. This is a platform where guests can have a look at different vacation stories from different destinations over the world with the help of a VR headset (Sabre, 2017). The properties offering this service were in New York and London at which the guest had the possibility to have this in-room experience. The reactions and the responses towards this project were amazing and a great step towards implementing VR in the hotel industry (Framestore VR, 2016).

2.2 Augmented reality

2.2.1 Definition of AR

Springer Science+Business Media (n.d.) defines Augmented reality as “a system that enhances the real world by superimposing computer-generated information on top of it.” It uses artificial information such as visual and audiovisual elements to focus on various aspects of the real world and provide more information when pointed upon one of these aspects. Contrary to VR, the user is still able to see the real world but with an addition of information (Hayes, 2020). Usually, AR does not require more than a smartphone (hardware), which should have a camera and a mobile application (software) to be used (Porter & Heppelmann, 2017). So, everyone who owns a smartphone could use augmented reality.

2.2.2 Example uses of AR technology

Augmented Reality is used a lot nowadays, even more than it might be imagined. For instance, one of the many industries in which AR is to be found and used is the education industry. The ability to visualize information in three-dimensional space (3D) or to compare different perspectives at the same time makes users acquire the information faster and easier. Moreover, it improves the learner’s motivation and performance (Hincapie et al., 2021). According to Cranmer et. al. (2020), their study showed that Augmented Reality enriches the customer experience in several ways.

One of them would be the modernization of the present service, which attracts more customers. Additionally, it encourages tourists to discover unknown destinations and by providing extra information in various formats, it enhances the user's attention and holds it (Cranmer et al., 2020).

The industries of healthcare and medicine are also huge users of AR technology. Here not only the employees benefit from it, through trainings or exercises, but also the patients through patient engagement. Specific examples where AR is used are the surgical trainings, vein localization or facilitating the patients understanding of his/her condition and offering them the possibility to explore it more (McCarthy & Uppot, 2019). Another notable example of how AR is used, is the German company CSAE. They program the software for augmented reality devices which helps to blend in the instructions of how to assemble industrial components. It is called the "Operator Guided Assembling Process" and employees can easily follow the instructions given. This not only reduces the rate of errors but also increases the employee satisfaction (CSAE, 2022). One last example famous for using AR technology would be the world-known game Pokémon Go. To play this game, the user needs a smartphone with this app. When the game is loaded, a map of the real world appears on the screen with some figures that need to be caught. To level-up in the game, the player needs to go on walks to find even more figures being guided by the map on the phone (Pokemon GO, n.d.).

2.2.3 The usage of AR in hotels

For the tourism industry AR has been nothing but beneficial. It gives travelers the opportunity to discover new places with a novel and exciting approach (Cranmer et al., 2020). As an example, the rooms at the Hub Hotels by Premier Inn were designed with a city map where visitors can point their smartphones at. With the help of their app, the guests are then provided with all the tourist hotspots and sights around the hotel (Bogomolov, 2019). The guests can access information about the distance to the point of interest, opening hours, prices, or even the occupancy rates. Another example is the Casa Madrona, which implemented an AR-supported brochure so its customers can check out the hotel property and its facilities prior to their stay as well as during their stay (Augmented reality in NYC: Casa Madrona Hotel & Spa, 2015). The Best Western Kelowna allows their small guests to discover different things like nature

and animals through an app that at its core uses gamification, even though the hotel is in the city. The children can go around the premises on a quest and so they can discover the surroundings in a more attractive and safe way (Xlrator, 2016). Moreover, the Starwood hotel used beacon technology, which is a more specific AR technology, to send their guests the virtual key to the room on their phone. As a result, guests do not have to come by the reception to pick up the key, instead, they can directly go to their room and unlock the door with their phone (Hospitality Technology, 2015). Today, this technology is quite common and is used in most hotels if requested.

2.3 The difference between VR and AR

The main difference between VR and AR is that the first one is entirely based on an artificial environment, while the second one is combining the real world with some computerized information (Farshid et al., 2018). The graphical elements are much intricate in the virtual reality than in the augmented reality. AR uses templates, text boxes and simple frames, while for VR a whole software needs to be carefully programmed (Caudell, 1995). In addition, for VR you need special gear to have the full experience such as headsets and goggles, while AR can be used directly on the mobile phone or tablet. Augmented reality focuses more on customers, while virtual reality can also be considered by businesses or institutions such as universities, for marketing aims or educational purposes.

2.4 The perception and potential of using and implementing VR and AR in the hotel industry

Already in the early days, using this technology to virtually visit sights like theme parks was very popular and well perceived because the idea of being able to fully customise your journey was something extraordinary (Williams & Hobson, 1995). Huang et al. (2013b) state in their article that results of their research show a positive response from the participants regarding the usage of virtual tourism websites. Moreover, the respondents also showed a positive interest in the usefulness of such sites and emotions such as joy or even excitement. With the help of the Technology Acceptance Model, also known as TAM, researchers can determine the acceptance of users for new emerging technologies. The findings of the research made by Israel et al. (2019) undoubtedly demonstrate that the perceived usefulness is a key factor that

beneficially impacts the attitude in the direction of using it in the first place and utilizing the technology more. Therefore, it can be concluded that people are open to using new technologies such as virtual reality and augmented reality, especially when it eases their life and makes day-to-day activities more time and energy efficient. Yet, before being able to form an opinion on whether the technology has a good perceived ease of use, humans must be open to the use of these new technologies, namely VR and AR.

Usually, the first thing that people research on and then book when doing a trip, is the hotel (or any other type of accommodation such as hostel, motel, apartment etc.) (Camilleri, 2018). The research part, where they gather data to make the most suitable decision is an essential component of the booking process (Sun, 2014). Consumers these days need a lot of information before the decision-making so that they can be sure that they are making the best possible decision (Revfine, 2021b). Nowadays, the aim of companies is to offer their clients outstanding personalized proposals with additional value, so they feel more addressed and valued. As a result, the emerging technologies are the perfect fit for such companies like hotels, where the customer value and perception are some very important factors for the decision making. For instance, hotels can enable future guests to virtually visit and experience the hotel premises and facilities before their actual trip (Bogicevic et al., 2021). At the same time, VR is a great tool for the marketing purposes of a hotel since it can be used for operations like promotions, advertising, PR, and many more (Egger, 2017). This emphasizes once again the potential that these technologies have, not only for the guests but also for all the hospitality companies out there implementing VR and AR.

2.5 VR and AR for educational purposes in the hotel industry

On the same token, these technologies also help the hospitality education sector adapt to the changes and instruct future students about the usage of AR and VR in this industry. They can be used to simulate environments in which students have to practice and adopt the acquired knowledge during other courses. With tools such as “Second Life,” an online platform with different virtual environments including hotels, universities can use them to offer students real life experiences in a virtual environment and to enhance the learning opportunities and outcomes (Singh & Lee, 2009; Second Life, 2022). For instance, a real-world check-in experience could be

simulated in which the student would need to perform the actual check-in procedures and apply all the necessary skills to make the process as in real life. This would also diversify teaching approaches and create authentic scenarios. More and more universities and professors are considering using virtual learning as part of their courses (Huang et al., 2013a). According to Ghanbarzadeh & Ghapanchi (2022), adopting these new teaching approaches with the help of these new systems, especially the higher education segments benefit from it because it is easier for its audience to work with due to aspects such as age, knowledge, and experience. The students are more likely to keep their focus span longer on the task, rather than losing it quickly and starting other irrelevant activities (Guttentag, 2010). The Hotel Management School Les Roches in Switzerland sought to become more competitive decided to adopt new teaching methods and introduce new ones that are more groundbreaking, ingenious, and advanced. This included the introduction of virtual delivery of course content to improve the quality of the academic setting (Bray, 2002). Both AR and VR offer numerous benefits for the hospitality education, enhancing the teaching approaches and the academic results of students who make use of these technologies in their studies.

3 Methodology

3.1 Justification of the chosen research approach

The methodology is important to be able to gather accurate data and establish how this data are collected. The type of data collection used for this thesis is of primary type. This refers to the data being collected by the author of the research paper, otherwise known as first-hand data collection (Hox & Boeije, 2005). The secondary data collection are data that was already gathered and analyzed by a previous author (Hox & Boeije, 2005) and is mostly used in the literature review for an in-depth understanding of the subject and problem.

The conducted primary data research has a quantitative approach as it collects many observations targeting diverse groups of people. The data collection was anonymously, being collected on different online platforms. A survey is appropriate because there is no need to conduct any further in-depth research like interviews, and the gathered data are enough to support the ideas and arguments of this thesis. Online surveys are easy to use especially when targeting specific groups like hotel managers, hospitality students and professors. Moreover, the anonymity of the respondents is essential so that any types of biases are avoided. Furthermore, since the implementation of VR and AR in the hotel industry affects not only the hotel managers but also normal citizens and tourists, it is only appropriate to also ask for their opinion on this topic.

3.2 Research design

The platform used for the development of the survey is called Lime Survey. The sample size consisted of 89 respondents and was promoted on all active social media platforms such as Facebook, Instagram, and LinkedIn, as well as through email. The target audience age range was between 18 and 68 years and targeted especially Modul University students and hotel managers. Furthermore, the use of word-of-mouth promotion was also used to attract and gain as many respondents as possible. The data collection began in mid-March and lasted four weeks until mid-April 2022. All questions of the survey are attached at the end of the thesis, in Appendix A. The online survey benefited from a brief introduction at the beginning of the survey,

followed by a short and insightful explanation of the goal for this bachelor thesis and its purpose. Afterwards, the questions for the data collection were pursued. The data collection was followed by the evaluation and analysis of the gathered data in the statistics programs such as RStudio and Jamovi. As mentioned above, when doing quantitative research there is a large number of observations. Prior to analyzing the data, they must be cleaned and ordered. Only then can it be properly run through the statistics programs.

The survey contained a total of 23 questions and included mostly Likert scale questions, with whom it is possible to measure the participant's opinion, but not only. For the Likert scale questions the scales were defined as follows: 5 – Very beneficial/Very useful; 4 – Somewhat beneficial/Somewhat useful; 3 – Neutral; 2 – Not beneficial/Somewhat useless; 1 – Hindering/Very useless; 0 – Not sure. For the analysis all the “Not sure” were left out from the analysis because they would negatively impact the results. There were also multiple-choice questions, rating scale questions, and open-ended questions which were used for gathering the respondent's opinion as well as for the demographics. For instance, the multiple-choice questions were used to find out how many stays the respondents have on average in a year. These different types of questions help to determine, what is important for the respondents when booking a hotel room and how the augmented reality and virtual reality could then have an impact on the hotel industry. Furthermore, they are beneficial to establish how open and willing the participants are towards using the above-mentioned technologies as well as their impressions and maybe also experiences with these technologies.

3.3 Analysis and results

The data were analyzed with dedicated softwares named RStudio and Jamovi. These programs are particularly useful when gathered data needs to be ordered and analyzed. After the compiling and ordering of the data, they were ready to be analyzed. Yet, to determine whether there are any relationships between the data and variables, reliability analyses as well as correlation analyses have been performed to determine the Pearson and Spearman's rho correlation. While the Pearson correlation is used to determine a linear relationship between two continuous variables (Nettleton, 2014), Spearman's correlation is useful in identifying a

monotonic relationship between two variables (Sereno, 2021). Moreover, statistical measurements like mean comparisons and normality checks have been conducted. In addition, frequency tables and other descriptive data indicators like standard deviation, range or median were analyzed. The results are visualized in tables and figures such as histograms, frequency tables, correlation matrices, and scatter plots with trend lines. In addition, every figure and table are accompanied by a detailed description and interpretation of the results.

4 Analysis and Discussion

After carefully analyzing the data, the results were both surprising and unsurprising at the same time. Considering that the 21st century is very digitalized, and the digitalization rate and number of new discoveries is growing day by day, it can be assumed that people at least read about VR and AR being implemented in the hotel industry. Furthermore, the unlimited access to the World Wide Web (WWW) and the different news platforms gives everyone the opportunity to inform themselves about this topic as there are several articles informing interested parties. Nonetheless, most of the survey respondents never heard of them being used in the hotel industry, not to mention using them. However, some of the respondents encountered and used the above-mentioned technologies, which is an indication for its spread and usage. Despite the lack of knowledge about the usage of VR and AR in the hotel industry, the respondents were open to their implementation considering that they could be a helpful tool if implemented properly.

The number of participants who took part in the survey was 89. From the total of 89 respondents, 59 were female, 29 were male and 1 person preferred not to say. In percentages, the females represented 66.3% of the total of 89 respondents while the males represented only 32.6%. The remaining 1.1% is the percentage for the respondent that chose "Prefer not to say." The graph below shows the gender distribution of the respondents who took part in the survey. The y-axis shows the three gender groups, while the x-axis shows the counted frequency.

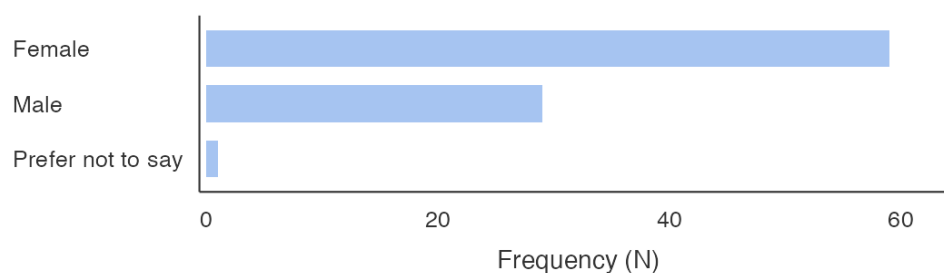


Figure 1 - Gender Distribution

To further analyze the respondents who participated in the questionnaire, the author considered the age range. The range is between 18 and 68 years. Most participants have the age of 22, followed by 21 and lastly 20 and 23. There are also some outliers

in both directions. Figure 2 below shows a detailed spectrum of all the participants ages and their counts.

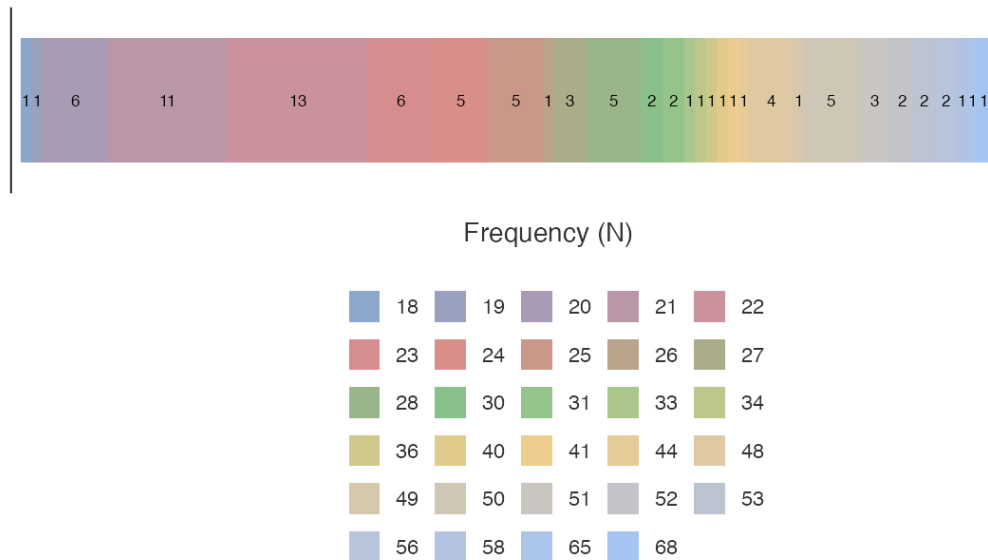


Figure 2 - Age Distribution

The employment status of the respondents plays a key role in the analysis and had a significant impact on the answers. This is the case because the status determines which attitude the participant has towards the implementation of VR and AR in the hotel industry. The opinion of a hotel manager is especially important because they have an entire knowledge base about how a hotel works and where processes can be improved. In addition to that, they know what is important to the guests and in which areas the guest satisfaction can be enhanced. Furthermore, the students are also essential since they are the future work force of the hospitality industry, even future hotel managers and future guests that will interact with these technologies. One of the respondents is a software developer working with VR and AR. Their answer is also quite important because he or she knows exactly how to program these technologies and can assess the challenges and benefits of implementing them in hotels. Nonetheless, all the other respondents are essential because they are all hotel guests and can assess the situation from the other perspective, namely the one of a hotel guest. Figure 3 below shows the distribution of the occupations of the participants and their counts.

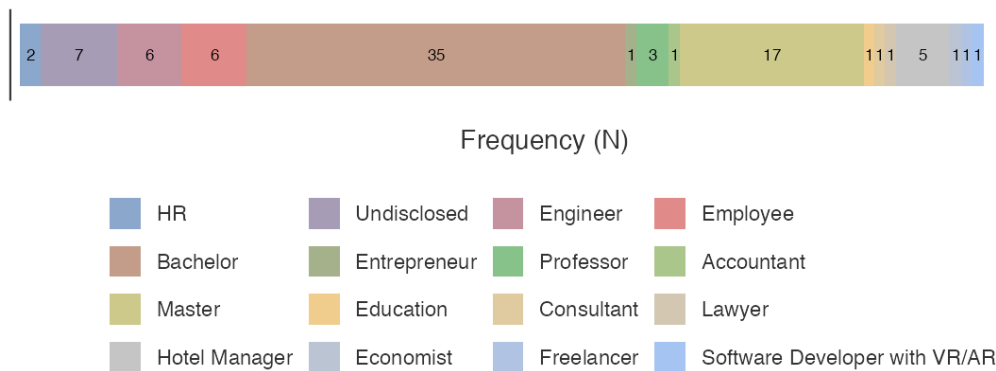


Figure 3 - Employment Status Distribution

The participants were asked how many stays they have on average in a year and how many nights those stays include. 36% of the respondents have between 3 and 5 stays in a year, namely 32, followed by the 1 to 2 stays with a percentage of 24.7% respondents and a total of 22 answers. Close behind are the 6-8 stays with 18 responses and a percentage of 18%. The stays consist of around 5.7 days on average, which means that the respondents are quite familiar with different hotels and their operating methods and procedures. Therefore, it can be assumed that the respondents' answers are suitable to be used in the data analysis to have an accurate result.

67.4% and 66.3% of the participants had never heard of augmented reality and virtual reality respectively being used in the hotel industry before. Only 24.7% respectively, 29.2% have heard of AR and VR being used. The rest of the respondents answered that they are not sure whether they have heard about it or not. This can be also seen in Table 2 and Table 3 below.

Levels	Counts	% of Total	Cumulative %
No	60	67.4%	67.4%
Not sure	7	7.9%	75.3%
Yes	22	24.7%	100.0%

Table 2 - Have you heard about Augmented Reality (AR) being used in the hotel industry?

Levels	Counts	% of Total	Cumulative %
No	59	66.3%	66.3%
Not sure	4	4.5%	70.8%
Yes	26	29.2%	100.0%

Table 3 - Have you ever heard about Virtual Reality (VR) being used in the hotel industry?

On the question of whether they actually used these technologies in a hotel, 92.1% chose “No” while only 7.9% chose “Yes”. Yet, the ones that answered with “Yes,” explained that they used a 3D view with which they navigated through the entire room and had a full view of it. Others referred to a virtual tour of the room including the hotel premises prior to booking the hotel. A respondent mentioned using these technologies inside the hotel as a virtual guide, to better navigate around the hotel and spa.

In the second part of the survey, participants were asked to consider and answer the questions from two perspectives, once from the perspective of a hotel manager and another from the perspective of a hotel guest. This meant that they had to imagine being a general manager (GM) and answering the questions in the best interest of the hotel. As well, they had to imagine being a hotel guest and answer the question in the best interest of the guest. The implementation of VR and AR was considered from several aspects like guest satisfaction, booking time efficiency, increasing number of bookings, marketing tool, presentation of the hotel premises including facilities and presentation of the surrounding area of the hotel. As it might be expected, the hotel guests (G) were not asked about the usefulness of VR and AR in the internal procedures and departments since they are not familiar with how a hotel is properly run and which aspects must be considered. Most of the posed questions were asked in a matrix format and Likert scaled with a 6-point scale from “Very useful” to “Very useless” also including “Not sure”. The answers to the Likert scaled questions were converted into numbers to be able to easily make the analysis with numbers. Yet, as mentioned above, to have an accurate result, all the “Not sure” answers were excluded from the analysis to avoid a negative impact on the results. Two of the posed questions in the second part of the survey were open-ended questions about the perceived challenges and benefits of the implementation of VR and AR in the hotel industry from both perspectives.

To easily analyze the answers, the author decided to compare the group of the hotel manager and the hotel guest with each other. Furthermore, in order to have a simpler analysis, each question received a computed variable with all the sub-questions. This facilitates the analysis as well as the result and its interpretation. To be able to compute these variables, a reliability analysis was performed to be sure that a

computation is actually possible and correct. The reliability analysis is measured with the Cronbach’s alpha. The alpha can be between -1 and 1. Ideally, the alpha should be between 0.8 and 1 (Blanz,2015). With respect to this analysis, it means that there is a strong reliability between all the sub-questions of each question, and they are computed to one variable for each question. Below, there is a table with the result of the reliability analysis.

Scale Reliability Statistics	
Cronbach's α	
scale	0.972

Table 4 - Reliability Analysis of all Sub Questions

As can be seen in Table 4, the Cronbach’s alpha for this study is 0.972, which is an indication for an excellent reliability. From this it can be deduced that a computation of variables is possible. Therefore, all the sub-questions of each main question were computed to a variable. This means that instead of 43 variables, only eight computed variables are left to be analyzed.

For the further proceedings, a descriptive analysis of the newly computed variables is done. This is relevant for the understanding of the following analyses. Moreover, it is important to have a picture and idea about some general information like mean or normality about the computed variables. The following table shows the descriptive data about the computed variables from the perspective of a hotel manager.

Descriptives					
	HM VR Usefulness	HM AR Usefulness	HM VR Efficiency	HM AR Efficiency	HM Do You Think
N	77	79	81	76	40
Missing	11	9	7	12	48
Mean	3.87	3.97	3.75	3.70	3.72
Median	4.00	4.00	3.83	3.83	3.67
Standard deviation	0.984	0.852	0.856	0.958	1.26
Minimum	1.00	1.00	1.00	1.00	1.00
Maximum	5.00	5.00	5.00	5.00	5.00
Skewness	-1.58	-1.21	-0.858	-0.803	-0.717
Std. error skewness	0.274	0.271	0.267	0.276	0.374
Kurtosis	2.26	1.83	1.37	0.529	-0.392
Std. error kurtosis	0.541	0.535	0.529	0.545	0.733
Shapiro-Wilk W	0.827	0.898	0.935	0.937	0.862
Shapiro-Wilk p	<.001	<.001	<.001	<.001	<.001

Table 5 - Descriptive Data of Computed Variables Hotel Manager (HM)

As can be seen, the computed variables are in columns, while the statistic measures are in rows. The first row N shows the number of answers that were given without the missing values “0 – Not sure” which are listed in the row below. For this table it is important to look at the mean because it describes the average of all the answers. In the table above, the mean ranges from 3.70 up to 3.97. As the answers have all been allocated integer numbers, it is necessary to round them up. Since the numbers are above 3.5, the next integer number to round them up to would be 4. It represents the answer “Somewhat useful/Somewhat beneficial”. Therefore, we conclude that the respondents perceive the implementation of VR and AR as something that could be beneficial and useful for the hotel industry. The median is essential as well, because it specifies the number in the middle of all the answers that were given. Of course, the data must be sorted from the smallest number to the highest. Only then can the median be determined. In Table 5 the median stretches from 3.67 to 4. This shows that the answers that were given are somewhat skewed in the direction of number 4 which, as mentioned before, shows that the responders believe VR and AR could be an efficient and useful tool for the hotel industry. In addition to the mean, the Shapiro-Wilk p is likewise important because it tells the author whether the answers are normally distributed or not. In the table above, all the Shapiro-Wilk p values are smaller than 0.01, which indicates that there is a significant violation of the normality distribution of the answers. Moreover, the negative skewness is an indicator for a right skewed curve, which also explains the reason for the afore-mentioned violation of normality. Furthermore, the median shows the distribution is skewed to the left. This is also known as negative skewness. The figure below shows a histogram for each of the 5 computed variables including a density curve.

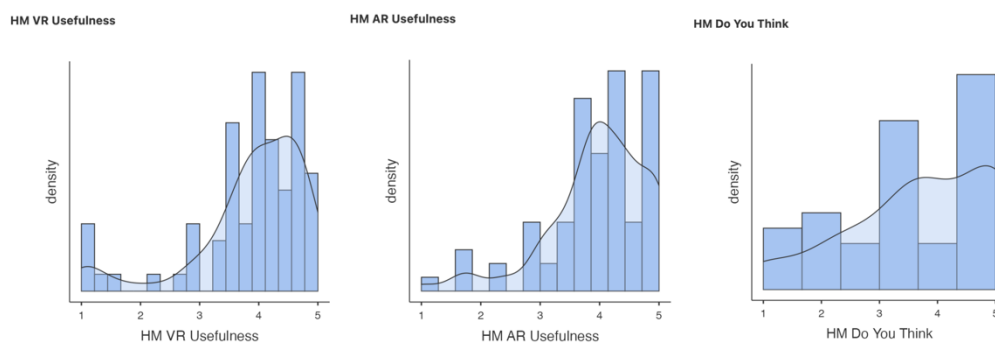


Figure 4 - Histograms of Computed Variables (HM) including Density Curve Part I

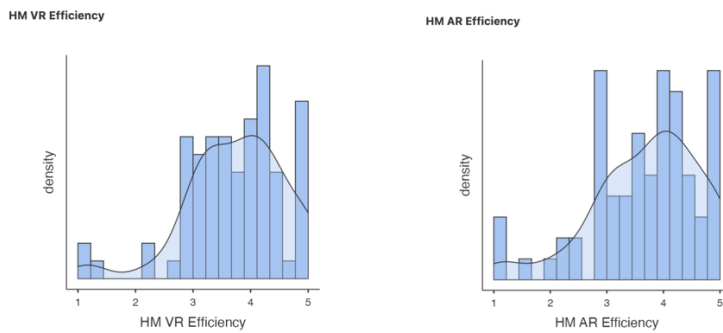


Figure 5 - Histograms of Computed Variables (HM) including Density Curve Part II

Table 6 below shows the descriptive data of the computed variables from the hotel guest perspective. The author considers the number of answers and the missing values, as well as the mean, median, skewness and normality. Again, as mentioned in the description of Table 5, the first row shows the number of respondents without the missing value that is shown in the row below. Looking at mean which ranges between 3.69 and 4.22, it can be rounded up and down to the integer number 4. From the perspective of hotel guests, the respondents consider the implementation of VR and AR to be “Somewhat beneficial” for the efficiency of the hotel industry. The median for the three computed variables ranks from 3.8 up to the maximum of 5. Therefore, it can be concluded that for the first computed variable “G Do You Think,” the majority of respondents picked the answer “Yes”. This meant that they agreed with most of the statements presented and considered that VR and AR would be a helpful tool for procedures such as the booking process.

Descriptives

	G Do You Think	G VR Efficiency	G AR Efficiency
N	50	80	78
Missing	38	8	10
Mean	4.22	3.69	3.73
Median	5.00	3.80	3.80
Standard deviation	1.15	1.00	1.09
Minimum	1.00	1.00	1.00
Maximum	5.00	5.00	5.00
Skewness	-1.46	-0.708	-0.717
Std. error skewness	0.337	0.269	0.272
Kurtosis	1.53	0.423	-0.0582
Std. error kurtosis	0.662	0.532	0.538
Shapiro-Wilk W	0.700	0.929	0.914
Shapiro-Wilk p	<.001	<.001	<.001

Table 6 - Descriptive Data of Computed Variable Hotel Guest (G)

In addition to the mean and the median, another important measure is the normality. The value for the Shapiro-Wilk p is again smaller than 0.01, showing a significant violation of the normality assumption. Hand in hand with the normality violations goes the skewness. All the values of the computed variables for the skewness are negative. This again indicates that the distribution curve is skewed to the left.

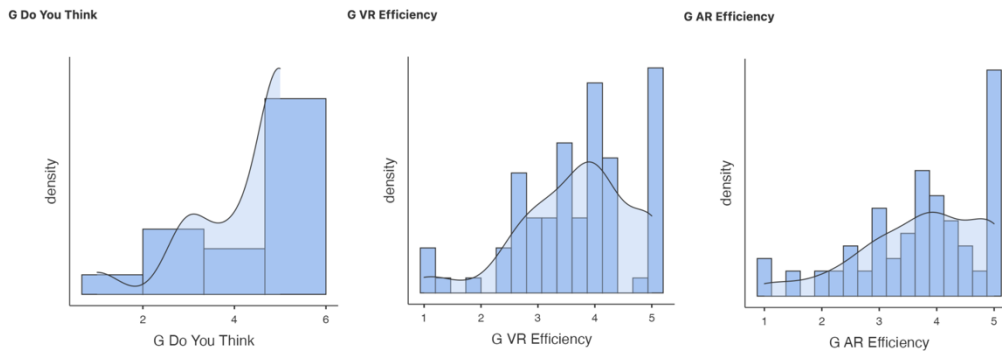


Figure 6 - Histograms of Computed Variables Hotel Guest Including Density Curve

The next step in the analysis is to check the correlation between the computed variables. This analysis helps to determine the relationship between variables. For this research especially, the comparisons between the group of hotel managers (HM) and the group of hotel guests (G) is important. Therefore, comparisons between the same groups can be disregarded for this part. The results are displayed, in Table 5, in a correlation matrix, which indicates the Pearson and Spearman correlation as well as the significance level p . Next to the significance there are small stars that flag if there is a significant correlation. Three stars flag a strong correlation which means that the significance is smaller than 0.001, two stars flag a medium correlation with a significance smaller than 0.01, while one star flags a low correlation, with a p smaller than 0.05. In the table below most of the comparisons have a strong correlation except for two that only have a medium correlation and one with no correlation at all. Moreover, the Pearson correlation is positive for every aspect as well as significant for most of the comparisons between the two groups, hotel managers and hotel guests. The same goes for Spearman's ρ correlation, which is below the Pearson correlation. As a result, it can be said that between most of the variables there is a significant correlation and they play a key role in the result.

Correlation Matrix

		HM VR Usefulness	HM AR Usefulness	HM VR Efficiency	HM AR Efficiency	HM Do You Think	G Do You Think	G VR Efficiency	G AR Efficiency
HM VR Usefulness	Pearson's r	—							
	p-value	—							
	Spearman's rho	—							
	p-value	—							
HM AR Usefulness	Pearson's r	0.715 ***	—						
	p-value	<.001	—						
	Spearman's rho	0.618 ***	—						
	p-value	<.001	—						
HM VR Efficiency	Pearson's r	0.503 ***	0.515 ***	—					
	p-value	<.001	<.001	—					
	Spearman's rho	0.480 ***	0.569 ***	—					
	p-value	<.001	<.001	—					
HM AR Efficiency	Pearson's r	0.442 ***	0.507 ***	0.902 ***	—				
	p-value	<.001	<.001	<.001	—				
	Spearman's rho	0.415 ***	0.581 ***	0.876 ***	—				
	p-value	<.001	<.001	<.001	—				
HM Do You Think	Pearson's r	0.293	0.426 **	0.733 ***	0.740 ***	—			
	p-value	0.083	0.008	<.001	<.001	—			
	Spearman's rho	0.203	0.532 ***	0.664 ***	0.673 ***	—			
	p-value	0.234	<.001	<.001	<.001	—			
G Do You Think	Pearson's r	0.472 **	0.503 ***	0.653 ***	0.607 ***	0.873 ***	—		
	p-value	0.001	<.001	<.001	<.001	<.001	—		
	Spearman's rho	0.373 *	0.549 ***	0.545 ***	0.494 ***	0.830 ***	—		
	p-value	0.012	<.001	<.001	<.001	<.001	—		
G VR Efficiency	Pearson's r	0.519 ***	0.480 ***	0.882 ***	0.841 ***	0.823 ***	0.731 ***	—	
	p-value	<.001	<.001	<.001	<.001	<.001	<.001	—	
	Spearman's rho	0.453 ***	0.512 ***	0.833 ***	0.788 ***	0.786 ***	0.664 ***	—	
	p-value	<.001	<.001	<.001	<.001	<.001	<.001	—	
G AR Efficiency	Pearson's r	0.462 ***	0.447 ***	0.769 ***	0.867 ***	0.704 ***	0.626 ***	0.834 ***	—
	p-value	<.001	<.001	<.001	<.001	<.001	<.001	<.001	—
	Spearman's rho	0.425 ***	0.500 ***	0.702 ***	0.818 ***	0.603 ***	0.522 ***	0.788 ***	—
	p-value	<.001	<.001	<.001	<.001	<.001	<.001	<.001	—

Note. * p < .05, ** p < .01, *** p < .001

Table 7 - Correlation Matrix of all Computed Variables

Below there is Figure 7, in which the correlation matrix from Table 7 is presented in the form of a scatter plot. It shows the distribution of the answers which are represented by individual bullets and a straight line which indicates the trend line of the correlation. On the top of the figure as well as on the side, all computed variables are listed which are compared. Each of the scatter plots has on the x-axis and y-axis the integer numbers 1 to 5 which represent the answer options of the likert-scaled questions. All trend lines in the scatter plot start on the left side down and go up to the right side. This indicates a positive correlation between the compared variables. The steeper the slope is, the more the product increases.

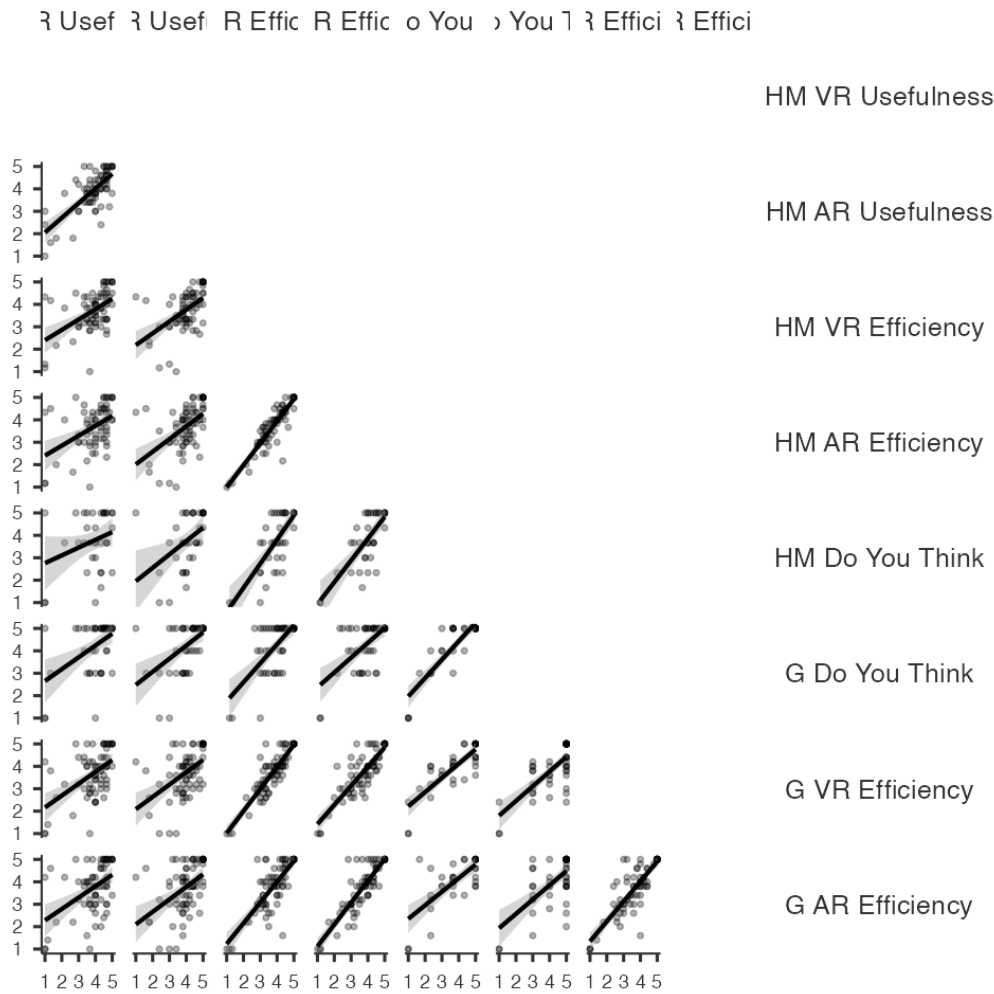


Figure 7 - Scatter Plot of Correlation Matrix Including Trend Line

As mentioned before, the guest perspective was not asked about the perceived usefulness of VR and AR in the hotel industry since they cannot judge and assess it. Therefore, there are two computed variables less for the perspective of the hotel guest. Yet, for a better comparison and understanding, the relevant computed variables for this study will be each compared individually in a correlation matrix. This will help analyze the groups in much more detail. In addition, each correlation analysis will be accompanied by the corresponding scatter plot. This will help visualize the results even better. The first two computed variables to be analyzed are the perceived efficiency of VR by hotel managers and the perceived efficiency of VR by hotel guests. As can be seen in Table 8 below, the value for Pearson's r is 0.882 with three stars which indicates that there is a strong linear correlation between the two compared variables. Moreover, the value for Spearman's ρ is 0.833, with three stars indicating a strong monotonic relationship.

Correlation Matrix

		HM VR Efficiency	G VR Efficiency
HM VR Efficiency	Pearson's r	—	
	p-value	—	
	Spearman's rho	—	
	p-value	—	
	N	—	
G VR Efficiency	Pearson's r	0.882 ***	—
	p-value	<.001	—
	Spearman's rho	0.833 ***	—
	p-value	<.001	—
	N	78	—

Note. * p < .05, ** p < .01, *** p < .001

Table 8 - Correlation Matrix of HM VR Efficiency & G VR Efficiency

As a result, the author concludes that both groups consider the VR technology to be efficient for different aspects and procedures in the hotel industry and an implementation could be beneficial for both parties. As for the next comparison, the following computed variables were compared: HM AR Efficiency and G VR Efficiency. They both describe the perceived efficiency of AR in the hotel industry from the point of view of a hotel manager and from hotel guests' view.

Correlation Matrix

		HM AR Efficiency	G AR Efficiency
HM AR Efficiency	Pearson's r	—	0.867 ***
	p-value	—	<.001
	Spearman's rho	—	0.818 ***
	p-value	—	<.001
	N	—	74
G AR Efficiency	Pearson's r	0.867 ***	—
	p-value	<.001	—
	Spearman's rho	0.818 ***	—
	p-value	<.001	—
	N	74	—

Note. * p < .05, ** p < .01, *** p < .001

Table 9 - Correlation Matrix of HM AR Efficiency & G AR Efficiency

From Table 9, it can be seen that the Pearson's r value is 0.867 with stars indication. This signals a strong positive correlation between the two compared variables. In addition, the value for Spearman's rho value is 0.818 with three stars right next to it. As mentioned above, this indicates a strong monotonic relationship among the two

computed variables. Again, it can be stated that both the hotel managers and the guests think that AR could be an efficient tool for the hotel industry and several aspects such as the check-in or check-out could be made more efficient using this technology.

For the next correlation matrix, the author identifies again a strong correlation and relationship within the compared variables.

Correlation Matrix

		HM Do You Think	G Do You Think
HM Do You Think	Pearson's r	—	
	p-value	—	
	Spearman's rho	—	
	p-value	—	
G Do You Think	Pearson's r	0.873 ***	—
	p-value	<.001	—
	Spearman's rho	0.830 ***	—
	p-value	<.001	—

Note. * p < .05, ** p < .01, *** p < .001

Table 10 - Correlation Matrix of HM Do You Think & G Do You Think

Pearson’s r is 0.873 with three stars next to it, which flags a significant positive correlation. Spearman’s rho is a bit smaller with just 0.830 and three stars, which is still a strong monotonic relationship. As aforementioned for the previous comparisons, the respondents of both groups, hotel managers and hotel guests share the same opinion regarding aspects such as the future usage of VR and AR in the booking process.

For the following two comparisons, the author decided to compare the two variables that were not posed to the hotel guests. These are the perceived usefulness of VR and AR for internal matters such as marketing and sales as well as the guest satisfaction. Since there are no computed variables for this aspect for the group hotel guests, they were compared to the computed variables “G VR Efficiency” and “G AR Efficiency”. This displays the correlation between the perceived guest efficiency and the perceived usefulness by hotel managers. As a result, it can be analyzed whether the efficiency has any impact on the usefulness and vice versa. The results of the correlation matrix are displayed in two tables that will be described in more detail below.

Correlation Matrix

		HM VR Usefulness	G VR Efficiency
HM VR Usefulness	Pearson's r	—	
	p-value	—	
	Spearman's rho	—	
	p-value	—	
	N	—	
G VR Efficiency	Pearson's r	0.519 ^{***}	—
	p-value	<.001	—
	Spearman's rho	0.453 ^{***}	—
	p-value	<.001	—
	N	74	—

Note. * p < .05, ** p < .01, *** p < .001

Table 11 - Correlation Matrix of HM VR Usefulness & G VR Efficiency

For Table 11, the circumstances are similar. The values for both Pearson's r and Spearman's rho are quite low with 0.519 and 0.453, respectively. Still, both values have the three stars next to each other which flags the significance. As mentioned above, the two computed variables are dependent on each other, yet if any differences occur, the changes are not that great.

Correlation Matrix

		HM AR Usefulness	G AR Efficiency
HM AR Usefulness	Pearson's r	—	
	p-value	—	
	Spearman's rho	—	
	p-value	—	
	N	—	
G AR Efficiency	Pearson's r	0.447 ^{***}	—
	p-value	<.001	—
	Spearman's rho	0.500 ^{***}	—
	p-value	<.001	—
	N	76	—

Note. * p < .05, ** p < .01, *** p < .001

Table 12 - Correlation Matrix of HM AR Usefulness & G AR Efficiency

As can be seen in Table 12 above, the value for Pearson's r is 0.447, which is a quite low correlation. Yet, the three stars next to the value flag indicate that the correlation is still a significant one. As for the Spearman's rho, the value is 0.500 with three stars, which also flags a significant monotonic relationship even though the value is quite

low. Therefore, it can be assumed that the two computed variables are positively influencing one another, but not that considerably.

At the beginning of the chapter, it was mentioned that two open-ended questions were asked in order to determine the perceived challenges and benefits of the implementation of VR and AR in the hotel industry by the two groups: hotel managers and hotel guests.

From the perspective of hotel managers, the survey respondents raised a handful of challenges that can come up before, during, and after the implementation of the aforementioned technologies. Starting with the implementation of VR, some of the participants responded that the maintenance of these technologies as well as the implementation itself could become very costly, which raises the question of feasibility. It was also mentioned that it is difficult to implement VR and AR in an already existing hotel due to the architectural and technological structure, and as a result it might be better to implement it into new buildings. Therefore, it might be more realistic to implement VR and AR only in large hotels so that the question of feasibility is no longer persistent. Others also mentioned that the security of these technologies cannot be certainly guaranteed especially in a time where cyber-attacks are more present than ever. Additionally, in case of a blackout or a network failure, a backup solution would be required. In addition, the software is in need of regular updates and investigations, which can also be time consuming and very costly. One respondent said that it would be difficult to develop the software so that the hotel mapping looks presentable. What might be the biggest challenge for this implementation would be to convince guests to use it and show them the benefits it has and how complex tasks can be facilitated. Furthermore, it was mentioned that guests will not easily accept this digital change and will have a hard time adapting to this new way of booking and traveling. Especially seniors will have a difficult time understanding and using these technologies, which is also known as technological resistance. In addition, putting the VR headset on and adjusting it every time the guest wants to communicate with the hotel is tedious and might discourage people from using it. The last-mentioned challenges might also lead to the destruction of the equipment since many do not know how to use and adjust them. Consequently, the hotel would need to instruct the guests upon arrival on how to use them. This would

mean that the check-, for instance, could be done only if an instruction was made prior, which would again, increase the expenses. Below is a table which includes all the above-mentioned challenges.

For the benefits seen by the hotel managers group, it was mentioned that VR and AR can be very useful tools which do not necessarily have to work against the employees but together with them, facilitating some parts of their work duties. For instance, the marketing department could use this to present the hotel premises and its facilities without having to write a detailed and complex description. This way guests do not create false impressions in their imagination but can directly see what they have searched for. Likewise, the surrounding of the hotel can be presented so that when the guests arrive, they know exactly where they can find interesting sites or shopping areas. The sales department could use it to present different types of rooms and convince guests to maybe upgrade their room and increase revenue. Also, it could be used as a unique selling proposition, also known as USP, to gain advantage over the competition. USPs are currently very sought by guests, especially those that include unique experiences. Besides, a digital hotel can be a demand generator itself and attract people who are interested in these technologies and are eager to use them. Similar situation can be experienced with generation Z, which is a very technological generation, and it might be an enormous advantage to have VR and AR as an appeal. This way they can explore the hotel from their rooms and if the children are still small, the parents could rest without having to entertain them. Since people appreciate new innovations, the acceptance might come quicker than actually expected. As for the AR, it can be easily used from a mobile device such as a smartphone without needing to provide the hardware. Every guest can use the software on their own device and therefore the risk of destruction is also minimized. On top of that, AR offers the great opportunity of enhancing the reality with additional digital information which facilitates the guests overall experience in the hotel. As everyone has it on their phone, it could also be used to introduce an interactive game which would also entertain the guests. The format of it could be, for example, a treasure hunt. The most important benefit that a respondent answered was that the guests have permanent accessibility to information which might relieve the workload of the guest service center. Table 13 below includes a summary of all the challenges and benefits that the respondents came up with from the perspective of a hotel manager.

Hotel Manager Benefits	Hotel Manager Challenges
Easy to present premises and facilities	Very costly (software + hardware)
Easy to present surroundings	Constant maintenance + updates
Useful tool for marketing & sales department	Destruction of gear through guests
Easy to use AR on own devices	Question of feasibility
Offer USPs with VR & AR	Technological resistance
Demand generator for different guest segments	Difficult to use for seniors
Entertainment for guests	Cyber security
Permanent accessibility to information	Difficult to properly develop the software needed for individual hotels
Enhanced reality through using AR	Complete shutdown in case of blackout & network failure

Table 13 - Benefits & Challenges of VR & AR from the perspective of hotel managers

From the perspective of the hotel guests, survey participants also found a couple of challenges and benefits. Starting with the challenges, the respondents mentioned that the technological resistance could be an obstacle to overcome. Since the majority of people are skeptical about using new technologies, it might be difficult to convince them to use VR and AR. Elderly guests might experience some difficulties using them, which can turn their stay into a digital nightmare. Some guests might enjoy having a chat with the front office staff or even have questions. To not have the ability to talk to a human, but just with a computer can discourage a lot of guests who plan to stay at that hotel. In addition, guests who would like to entirely disconnect from the online world and any electronic gadgets would not benefit from this implementation. They could not enjoy their stay as proposed. Another survey participant said that AR is not as precise as VR and therefore it should be carefully considered in which departments and for what tasks each of the technology is used. Guests planning and booking a stay at a hotel would need to have the appropriate gear in order to properly experience the fully digital information enquiry and booking process.

On the other hand, the ability to check out the hotel and its facilities prior to the booking is a huge benefit. Guests would know what to expect from their overstay and would not have any surprises or disappointments when arriving at the hotel. Moreover, guests have the ability to inform themselves about the surroundings of the hotel prior to making the booking. This can facilitate the decision-making of potential

guests and enhance the information enquiry. Not only it facilitates the research and booking process, but it also accelerates it. This can be both prior to the booking and also during the booking. Furthermore, as mentioned in the literature review, procedures such as check-in and check-out could be way faster. Another fairly big benefit is that AR can be used the guests’ own electronic devices. There is no need to buy any other gear and the software would be provided by the hotel in the form of an app, for instance. For a lot of guests, having VR and AR in the hotel can also be very entertaining for both adults and children. A form of gamification can be linked to a loyalty program in which guests are able to gain points and discounts. This might attract guests to come back and stay at your hotel. In table 14 below, all of the above-mentioned challenges and benefits are summarized in short bullet points.

Hotel Guest Benefits	Hotel Guest Challenges
Ability to hotel & facilities beforehand	Technological resistance
Ability to check out the surroundings beforehand	Not being able to interact with people in different procedure like Check-in/Check-out
Easy information enquiry	Difficult to use for seniors
Know what to expect & no surprises	AR is not as precise as VR
Entertainment & Gamification	Not having the proper technology to view the hotel beforehand
AR can be used on own devices	Hindering guests from entirely disconnecting & enjoy the stay
Faster & Facilitated procedures	

Table 14 - Benefits & Challenges of VR & AR from the perspective of hotel guests

The key findings of the research are the results of the descriptive analysis of the computed variables. They showed that on average the respondents are seeing VR and AR as a positive innovation for the hotel industry. Both perspectives of hotel managers and hotel guests presented a positive attitude towards these technologies, considering them to be useful and efficient for different processes and procedures. For hotel managers they can be a great marketing and sales tool which helps the hotel display itself properly and therefore increase bookings and consequently revenue and profit. Hotel guests consider that the ability to check out the property prior to making the boosing as well as seeing the surroundings of the premises is a somewhat useful benefit. This can also be concluded from the answers that the survey participants gave

during the open-ended questions of the survey. As mentioned in the last two tables, there are both challenges and benefits of such an implementation. Yet, one can conclude that the benefits outweigh the challenges, because the challenges are not impossible to overcome. These are just some obstacles that in a few years will be obsolete when technology will further improve and almost every citizen will have and use VR and AR in their homes. AR is already being used in day-to-day activities such as interactive games like Pokémon Go. Another few examples were mentioned in the literature review chapter. The correlation matrices were also good indicators that the computed variables have a significant positive correlation. This means that they positively influence each other no matter which of them changes. In addition to the analysis, the research in the literature review was also very important to be able to understand where exactly VR and AR can be used. Some examples from world-known brands like Marriott or Shangri-La were provided by the author to show that some hotels already use these technologies for their hotels. This shows that the hotels overlooked the challenges and focused on the benefits that VR and AR have.

5 Conclusion and Recommendations

This research has great implications for the future of the hotel industry and the implementation of VR and AR in this industry. Augmented reality and virtual reality are currently a very discussed topic, and more and more hotels are adopting these technologies, which shows the importance of this research. The thesis provides insight into a topic that has not yet been fully investigated and analyzed. Therefore, some research was made, and the results will further help the hotels by easing up the decision-making process about the implementation of VR and AR. The main goal was to identify the challenges and benefits that such an implementation brings. By weighing the challenges and the benefits of such an implementation, the hotels can then decide whether they think that these technologies could be a useful and efficient tool for their premises. This research provides a better overview of the participants involved in this process and the effects it has on the users, both hotels and guests. The analysis has shown positive results for the implementation of the researched technologies, with both hotel managers and hotel guests being open towards such a technological change. Even though they were not fully aware of these technologies already being used in the hotel industry, they perceive both VR and AR as useful tools not only for the hotels and their employees but also for the guests. Yet also many challenges were identified and observed. Nevertheless, those challenges are possible to overcome and it is up to every hotel to decide whether they consider implementing VR and AR.

Recommendations for further research would be to analyze the impact of AR and VR on the guest satisfaction as well the employee satisfaction. The initial booking process can be closely looked at, followed by the overstay, the guest activities inside the hotel and finishing with the overall experience. This applies to both guests and employees as well as to the hotel as a whole. For a better understanding, an experiment could be conducted in which this implementation is simulated, tested, and analyzed. This way data can be collected from first-hand research, making the results of this experiment vital for the decision-making process of hotels with regards to the implementation of virtual and augmented reality. With this experiment, also, guest's and employee's behavior can be closely monitored by experts in order to better forecast behavioral acceptance and changes towards a more digitalized experience. In addition, a survey

with a more specified target group as well as a larger sample of observations can be conducted for a more detailed and accurate result. The survey used for this thesis is sufficient for the start, but more in-depth research can be conducted to get a more meaningful view on the research topic. Moreover, two separate surveys can be conducted, one for the hotels and their employees and one for the guests. The target group at the hotel should include hotel managers, operations managers, the front office department as well as the sales and marketing department. For the target group of guests, different guest segments should be asked. These segments could be business travelers or leisure travelers; families traveling with kids or seniors. In the end, if all this information is put together, the researchers could get a clearer understanding of the process and implementation of VR and AR in the hotel industry. Furthermore, they would also have an essential understanding of the challenges and benefits that come with such an implementation as well as the operating processes.

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Appendix

Appendix A – Survey questions

1. On average, how many stays do you have in an accommodation in a year?

- 1-2 stays
- 3-5 stays
- 6-8 stays
- 9-10 stays
- More than 10

2. On average, how many nights are included in those stays?

3. Have you ever heard about Virtual Reality (VR) being used in the hotel industry?

- Yes
- No
- Not sure

4. Have you heard about Augmented Reality (AR) being used in the hotel industry?

- Yes
- No
- Not sure

5. Have you already used these technologies in a hotel? (Ex. for guidance in the hotel or recommended sights)

- Yes
- No

6. If yes, please describe them shortly below.

7. Do you think that implementing Virtual Reality (VR) in the hotel industry will be a useful tool for:

	Very useful	Somewhat useful	Neutral	Somewhat useless	Very useless	Not sure
Guest satisfaction						

Very useful Somewhat useful Neutral Somewhat useless Very useless Not sure

Booking time efficiency
Increasing bookings
Marketing
Presentation of the premises & facilities
Presentation of the surrounding area

8. Do you think that implementing Augmented Reality (AR) in the hotel industry will be a useful tool for:

Very useful Somewhat useful Neutral Somewhat useless Very useless Not sure

Guest satisfaction
Booking time efficiency
Increasing bookings
Marketing
Presentation of the premises & facilities
Presentation of the surrounding area

9. What do you think would be a challenge/benefit of using VR in the hotel industry? Describe in a few sentences.

10. What do you think would be a challenge/benefit of using AR in the hotel industry? Describe in a few sentences.

11. VR could improve the efficiency for:

Very beneficial Somewhat beneficial Neutral Not beneficial Hindering Not sure

Booking assistance
Check-in
Check-out

Very beneficial Somewhat beneficial Neutral Not beneficial Hindering Not sure

Guest assistance

Complain management

Display of the hotel
occupancy

12. AR could improve the efficiency for:

Very beneficial Somewhat beneficial Neutral Not beneficial Hindering Not sure

Booking assistance

Check-in

Check-out

Guest assistance

Complain management

Display of the hotel
occupancy

13. Do you think:

Yes No Not sure

VR is a threat for the employees in the hotel industry?

AR is a threat for the employees in the hotel industry?

The usage of VR facilitates the booking process?

The usage of AR facilitates the booking process?

An AR app could help guests to better come around on the hotel premises?

VR will be used predominantly for bookings in the future?

14. What do you think would be a challenge/benefit of using Virtual Reality (VR) in the hotel industry? Describe in a few sentences.

15. What do you think would be a challenge/benefit of using Augmented Reality (AR) in the hotel industry? Describe in a few sentences.

16. Do you think:

Yes No Not
 sure

- The booking process will be easier using VR?
- The booking process will be easier using AR?
- An AR app could help guests to better come around on the hotel premises?
- VR will be used predominantly for bookings in the future?

17. VR could improve the efficiency for:

Very Somewhat Neutral Not Hindering Not
 beneficial beneficial beneficial sure

- Booking assistance
- Check-in
- Check-out
- Guest assistance
- Complain management

18. AR could improve the efficiency for:

Very Somewhat Neutral Not Hindering Not
 beneficial beneficial beneficial sure

- Booking assistance
- Check-in
- Check-out
- Guest assistance
- Complain management

19. What is your age?

20. What is your gender?

- Female
- Male
- Non-binary
- Prefer not to say

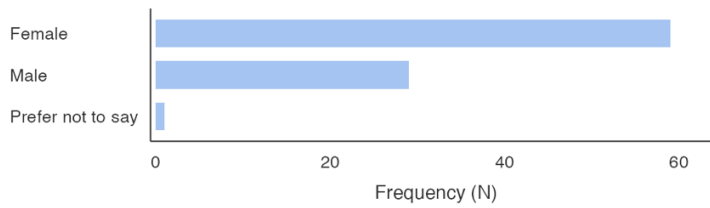
21. Current employment status

- Hotel Manager
- BBA/BSc Student
- MBA/MSc/PhD Student
- MU Alumni
- Professor/Lecturer
- Other:

Appendix B – Survey Analysis Results (Tables & Figures)

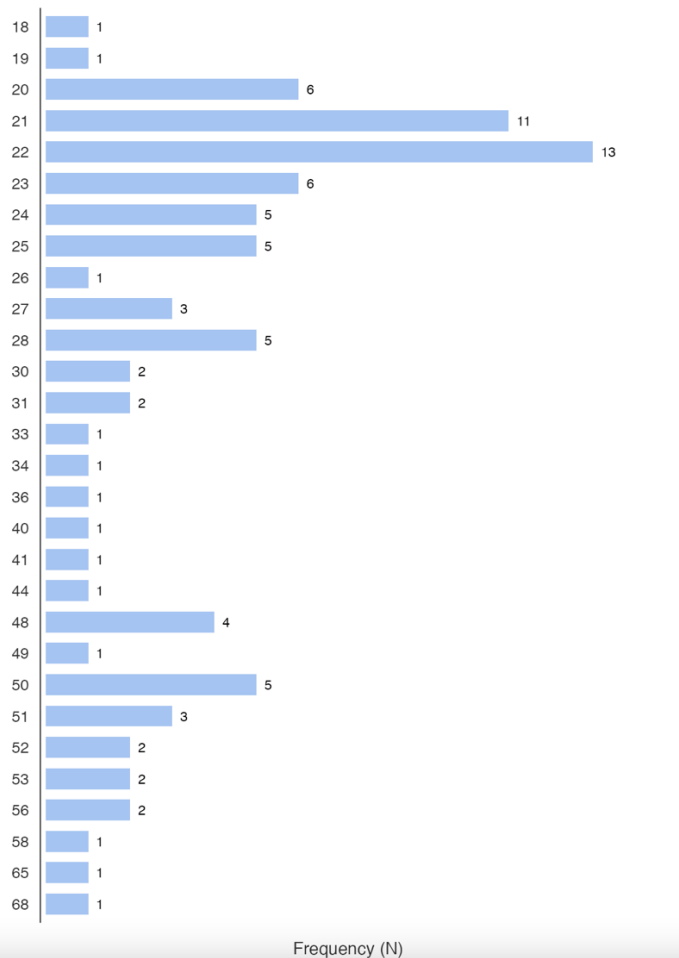
I. Gender Distribution

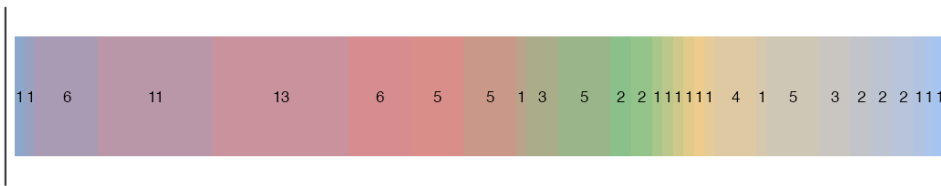
Levels	Counts	% of Total	Cumulative %
Female	59	66.3%	66.3%
Male	29	32.6%	98.9%
Prefer not to say	1	1.1%	100.0%



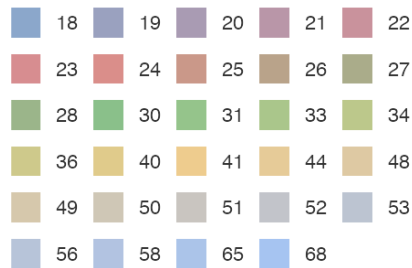
II. Age Distribution

D02. What is your age?





Frequency (N)



III. Employment Status Distribution



Frequency (N)



IV. Heard about AR in the hotel industry?

Levels	Counts	% of Total	Cumulative %
No	60	67.4%	67.4%
Not sure	7	7.9%	75.3%
Yes	22	24.7%	100.0%

V. Heard about VR in the hotel industry?

Levels	Counts	% of Total	Cumulative %
No	59	66.3%	66.3%
Not sure	4	4.5%	70.8%
Yes	26	29.2%	100.0%

VI. Reliability Analysis of all sub questions

Scale Reliability Statistics

Cronbach's α	
scale	0.972

VII. Individual Reliability Analysis of every sub question of the matrix

Item Reliability Statistics

	if item dropped
	Cronbach's α
B01-1	0.972
B01-2	0.971
B01-3	0.972
B01-4	0.972
B01-5	0.972
B01-6	0.972
B02-1	0.972
B02-2	0.971
B02-3	0.972
B02-4	0.973
B02-5	0.973
B05-1	0.971
B05-2	0.971
B05-3	0.971
B05-4	0.971
B05-5	0.972
B05-6	0.971
B06-1	0.971
B06-2	0.971
B06-3	0.971
B06-4	0.971
B06-5	0.971
B06-6	0.972
B07-1	0.973
B07-3	0.973
B07-2	0.973
B07-4	0.972
B07-5	0.972
B07-6	0.973
C03-1	0.972
C03-3	0.972
C03-2	0.971
C03-4	0.972
C04-1	0.971
C04-2	0.971
C04-3	0.972
C04-4	0.971
C04-5	0.972
C05-1	0.971
C05-2	0.971
C05-3	0.971
C05-4	0.971
C05-5	0.972

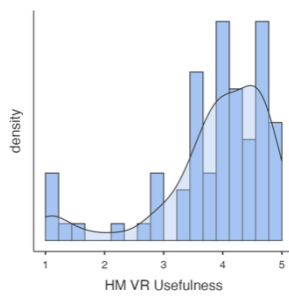
VIII. Descriptive Data of Hotel Manager (HM) Computed Variables

Descriptives

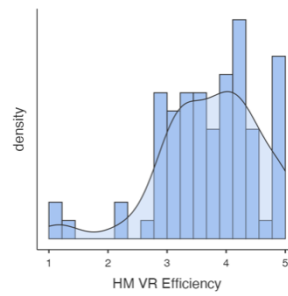
	HM VR Usefulness	HM AR Usefulness	HM VR Efficiency	HM AR Efficiency	HM Do You Think
N	77	79	81	76	40
Missing	11	9	7	12	48
Mean	3.87	3.97	3.75	3.70	3.72
Median	4.00	4.00	3.83	3.83	3.67
Standard deviation	0.984	0.852	0.856	0.958	1.26
Minimum	1.00	1.00	1.00	1.00	1.00
Maximum	5.00	5.00	5.00	5.00	5.00
Skewness	-1.58	-1.21	-0.858	-0.803	-0.717
Std. error skewness	0.274	0.271	0.267	0.276	0.374
Kurtosis	2.26	1.83	1.37	0.529	-0.392
Std. error kurtosis	0.541	0.535	0.529	0.545	0.733
Shapiro-Wilk W	0.827	0.898	0.935	0.937	0.862
Shapiro-Wilk p	<.001	<.001	<.001	<.001	<.001

IX. Histograms of Computed Variables Hotel Manager Including Density Curves

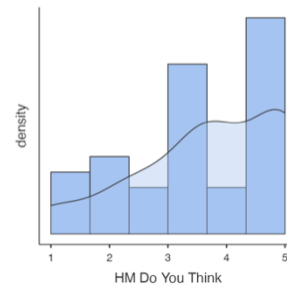
HM VR Usefulness



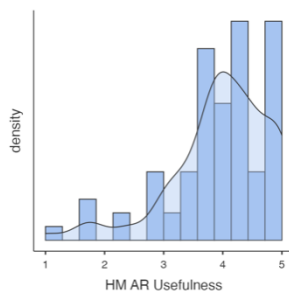
HM VR Efficiency



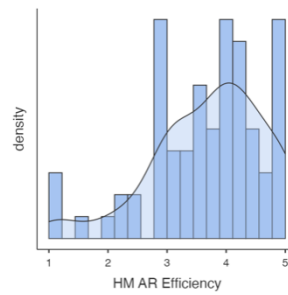
HM Do You Think



HM AR Usefulness



HM AR Efficiency

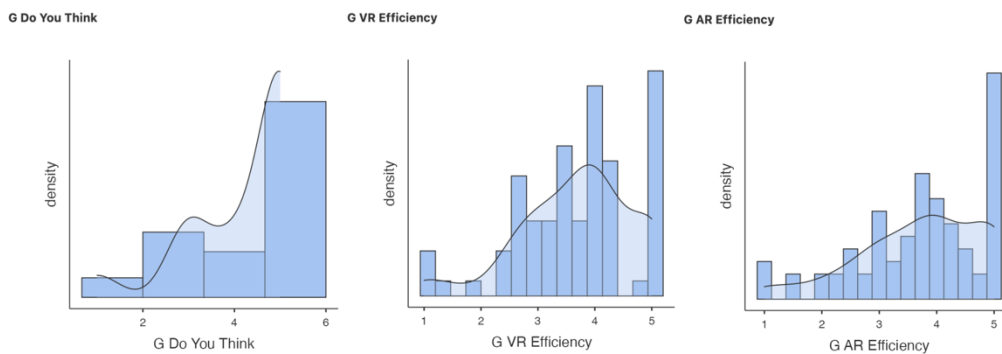


X. Descriptive Data of Hotel Guest (G) Computed Variables

Descriptives

	G Do You Think	G VR Efficiency	G AR Efficiency
N	50	80	78
Missing	38	8	10
Mean	4.22	3.69	3.73
Median	5.00	3.80	3.80
Standard deviation	1.15	1.00	1.09
Minimum	1.00	1.00	1.00
Maximum	5.00	5.00	5.00
Skewness	-1.46	-0.708	-0.717
Std. error skewness	0.337	0.269	0.272
Kurtosis	1.53	0.423	-0.0582
Std. error kurtosis	0.662	0.532	0.538
Shapiro-Wilk W	0.700	0.929	0.914
Shapiro-Wilk p	<.001	<.001	<.001

XI. Histograms of Computed Variables Hotel Manager Including Density Curves



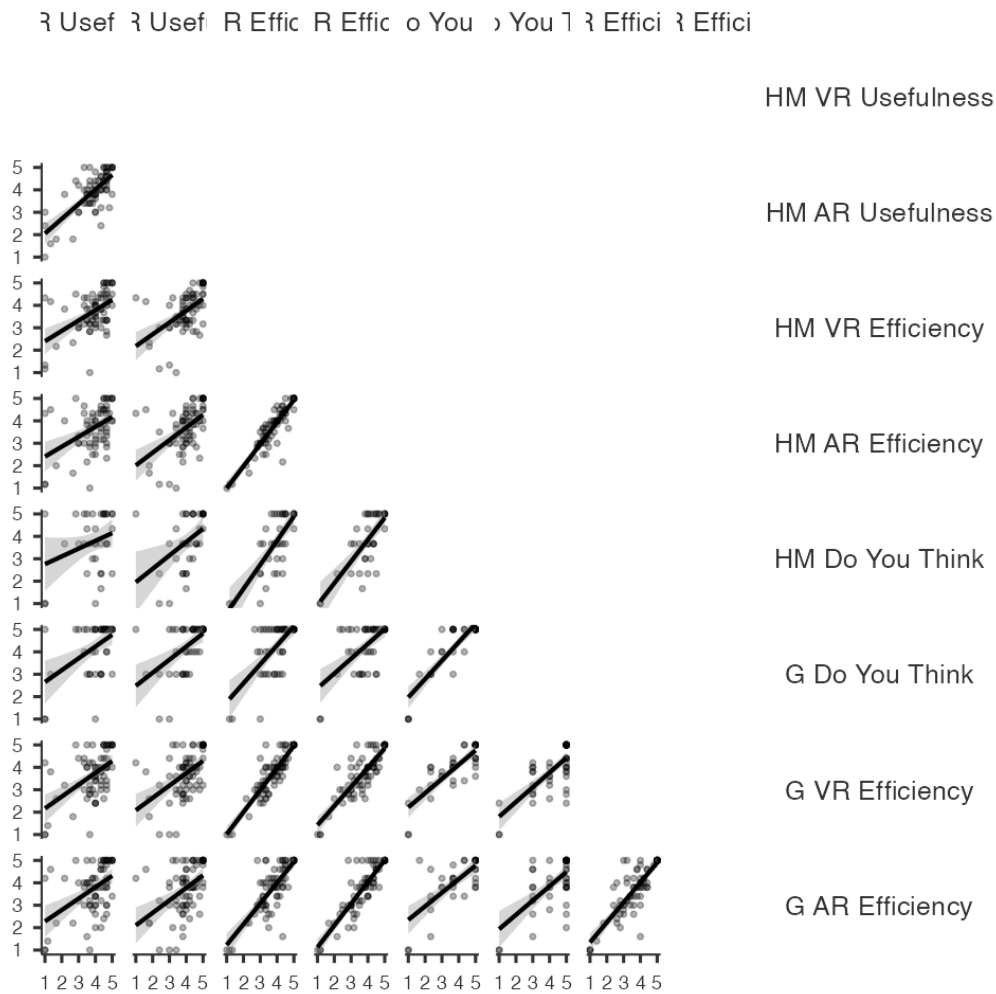
XII. Correlation Matrix

Correlation Matrix

		HM VR Usefulness	HM AR Usefulness	HM VR Efficiency	HM AR Efficiency	HM Do You Think	G Do You Think	G VR Efficiency	G AR Efficiency
HM VR Usefulness	Pearson's r	—							
	p-value	—							
	Spearman's rho	—							
	p-value	—							
HM AR Usefulness	Pearson's r	0.715 ***	—						
	p-value	<.001	—						
	Spearman's rho	0.618 ***	—						
	p-value	<.001	—						
HM VR Efficiency	Pearson's r	0.503 ***	0.515 ***	—					
	p-value	<.001	<.001	—					
	Spearman's rho	0.480 ***	0.569 ***	—					
	p-value	<.001	<.001	—					
HM AR Efficiency	Pearson's r	0.442 ***	0.507 ***	0.902 ***	—				
	p-value	<.001	<.001	<.001	—				
	Spearman's rho	0.415 ***	0.581 ***	0.876 ***	—				
	p-value	<.001	<.001	<.001	—				
HM Do You Think	Pearson's r	0.293	0.426 **	0.733 ***	0.740 ***	—			
	p-value	0.083	0.008	<.001	<.001	—			
	Spearman's rho	0.203	0.532 ***	0.664 ***	0.673 ***	—			
	p-value	0.234	<.001	<.001	<.001	—			
G Do You Think	Pearson's r	0.472 **	0.503 ***	0.653 ***	0.607 ***	0.873 ***	—		
	p-value	0.001	<.001	<.001	<.001	<.001	—		
	Spearman's rho	0.373 *	0.549 ***	0.545 ***	0.494 ***	0.830 ***	—		
	p-value	0.012	<.001	<.001	<.001	<.001	—		
G VR Efficiency	Pearson's r	0.519 ***	0.480 ***	0.882 ***	0.841 ***	0.823 ***	0.731 ***	—	
	p-value	<.001	<.001	<.001	<.001	<.001	<.001	—	
	Spearman's rho	0.453 ***	0.512 ***	0.833 ***	0.788 ***	0.786 ***	0.664 ***	—	
	p-value	<.001	<.001	<.001	<.001	<.001	<.001	—	
G AR Efficiency	Pearson's r	0.462 ***	0.447 ***	0.769 ***	0.867 ***	0.704 ***	0.626 ***	0.834 ***	—
	p-value	<.001	<.001	<.001	<.001	<.001	<.001	<.001	—
	Spearman's rho	0.425 ***	0.500 ***	0.702 ***	0.818 ***	0.603 ***	0.522 ***	0.788 ***	—
	p-value	<.001	<.001	<.001	<.001	<.001	<.001	<.001	—

Note. * p < .05, ** p < .01, *** p < .001

XIII. Scatter Plot Correlation Matrix Including Trend Line



XIV. Correlation Matrix of HM VR Efficiency and G VR Efficiency

Correlation Matrix		HM VR Efficiency	G VR Efficiency
HM VR Efficiency	Pearson's r	—	—
	p-value	—	—
	Spearman's rho	—	—
	p-value	—	—
	N	—	—
G VR Efficiency	Pearson's r	0.882 ***	—
	p-value	<.001	—
	Spearman's rho	0.833 ***	—
	p-value	<.001	—
	N	78	—

Note. * p < .05, ** p < .01, *** p < .001

XV. Correlation Matrix of HM AR Efficiency and G AR Efficiency

Correlation Matrix		HM VR Efficiency	G VR Efficiency
HM VR Efficiency	Pearson's r	—	
	p-value	—	
	Spearman's rho	—	
	p-value	—	
	N	—	
G VR Efficiency	Pearson's r	0.882 ^{***}	—
	p-value	<.001	—
	Spearman's rho	0.833 ^{***}	—
	p-value	<.001	—
	N	78	—

Note. * p < .05, ** p < .01, *** p < .001

XVI. Correlation Matrix of HM Do You Think and G Do You Think

Correlation Matrix		HM Do You Think	G Do You Think
HM Do You Think	Pearson's r	—	
	p-value	—	
	Spearman's rho	—	
	p-value	—	
G Do You Think	Pearson's r	0.873 ^{***}	—
	p-value	<.001	—
	Spearman's rho	0.830 ^{***}	—
	p-value	<.001	—

Note. * p < .05, ** p < .01, *** p < .001

XVII. Correlation Matrix of HM VR Usefulness and G VR Efficiency

Correlation Matrix		HM VR Usefulness	G VR Efficiency
HM VR Usefulness	Pearson's r	—	
	p-value	—	
	Spearman's rho	—	
	p-value	—	
	N	—	
G VR Efficiency	Pearson's r	0.519 ^{***}	—
	p-value	<.001	—
	Spearman's rho	0.453 ^{***}	—
	p-value	<.001	—
	N	74	—

Note. * p < .05, ** p < .01, *** p < .001

XVIII. Correlation Matrix of HM AR Usefulness und G AR Efficiency

Correlation Matrix

		HM AR Usefulness	G AR Efficiency
HM AR Usefulness	Pearson's r	—	
	p-value	—	
	Spearman's rho	—	
	p-value	—	
	N	—	
G AR Efficiency	Pearson's r	0.447 ^{***}	—
	p-value	<.001	—
	Spearman's rho	0.500 ^{***}	—
	p-value	<.001	—
	N	76	—

Note. * p < .05, ** p < .01, *** p < .001

XIX. Benefits & Challenges of VR & AR from the perspective of the hotel manager

HM Benefits	HM Challenges
Easy to present premises and facilities	Very costly (software + hardware)
Easy to present surroundings	Constant maintenance + updates
Useful tool for marketing & sales department	Destruction of gear through guests
Easy to use AR on own devices	Question of feasibility
Offer USPs with VR & AR	Technological resistance
Demand generator for different guest segments	Difficult to use for seniors
Entertainment for guests	Cyber security
Permanent accessibility to information	Difficult to properly develop the software needed for individual hotels
	Complete shutdown in case of blackout & network failure

XX. Benefits & Challenges of VR & AR from the perspective of the hotel guest

Hotel Guest Benefits	Hotel Guest Challenges
Ability to hotel & facilities beforehand	Technological resistance
Ability to check out the surroundings beforehand	Not being able to interact with people in different procedure like Check-in/Check-out
Easy information enquiry	Difficult to use for seniors
Know what to expect & no surprises	AR is not as precise as VR
Entertainment & Gamification	Not having the proper technology to view the hotel beforehand
AR can be used on own devices	Hindering guests from entirely disconnecting & enjoy the stay
Faster & Facilitated procedures	