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How should a metaverse be designed to attract consumers going for a virtual vacation?

Submitted to Dr. Jason Stienmetz

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Affidavit

I hereby affirm that this Bachelor's 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.

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Abstract

Background and purpose

The advancement of technology seems to have removed all physical restrictions on travel. Instead, virtual travel in the metaverse may become a new niche. The metaverse is a 3D virtual world where users may engage and socialize while using the virtual representation of themselves that they create or choose to utilize. The research aimed to identify the factors that affect people's decision to vacation virtually in the metaverse. Examine the design elements in further detail to draw attention. The benefits of the metaverse, feelings of contentment, and potential design components were all examined in the research. Finally, the designer would be aware of the factors that could influence a customer to engage in virtual travel in the metaverse.

Methodology

The method employed in this research was an online survey through social media platforms, which allowed the researcher to understand various people's perspectives on the metaverse virtual vacation. The information gathered from the survey was then used to develop suggestions for the virtual vacation's design. By employing judgemental sampling, the researcher picked 105 respondents. After that, Jamovi was used to evaluate the data and provide suggestions.

Table of Contents

List of figures

List of tables

1 Introduction

The buildings and the music in *Assassin's Creed II*, Ubisoft Montréal developed and published action-adventure video game in 2009 (Miller, 2009), enchanted me when I stepped into the city of Florence in 2010. They were so realistic that they attracted me to dream of someday visiting the city in real life. In 2019, I landed from the top of Arasaka Tower of the Night City in a game called *Cyberpunk 2077*, an action role-playing video game developed and published by CD Projekt Red (CD PROJEKT RED, 2022), where non-player characters use high-tech parts to transform their bodies. In 2020, due to the COVID-19 pandemic, traveling back home seemed to be complicated. Another game called *Genshin Impact*, an action role-playing game developed and published by miHoYo (COGNOSPHERE, 2022), came out. There are many areas in that game in which Liyue is a place that was designed according to traditional Chinese culture. Many students who were unable to fly home could go online and meet there, seeing the scenery of their hometowns.

At that moment, the idea of diving into a virtual reality entertainment universe like the OASIS in the movie *Ready Player One*, a 2018 American science fiction action film based on Ernest Cline's novel of the same name, came into my mind. In the last decade, the development of virtual reality, augmented reality, and mixed reality quickly brought the concept of the metaverse back to people's eyes. As a result, they have become convenient tools that influence consumers' decision-making when choosing products and services.

Meanwhile, they have been regarded as a new form of tourism (Verkerk, 2022). According to Verkerk's point of view, one form of metaverse tourism, virtual reality-based tourism, should be considered as a tourism niche instead of a subtitle of conventional tourism (Verkerk, 2022). The author compared Leiper's tourism model and Butler's tourism area life cycle model with adapted models from both replaced with virtual reality elements The result of the analysis shows that virtual reality tourism includes similar characteristics to those in Leiper's model. As for the Butler's

tourism area life cycle, all the other phases can be applied to virtual reality tourism except the stagnation stage (Verkerk, 2022).

1.1 Metaverse

1.1.1 What is the metaverse

Though the metaverse is still in its early stages of development, many people believe that the metaverse has the potential to change the way we live our lives. The term "metaverse" is derived from Neal Stephenson's novel *Snow Crash* in 1992, in which people are able to explore an imaginary 3D world remotely through the use of virtual reality goggles (Revfine, 2021). The metaverse is a virtual world created by developers while centered on social relations. It can take different forms, including virtual reality (Revfine, 2021), the metaverse experiences will not be the same as existing virtual reality experiences, but it is unclear how they will differ. According to the widely accepted definition of the 'metaverse,' it is a digital platform that offers immersive experiences for users in a decentralized environment (Revfine, 2021). Interacting with virtual objects and other users can be done with motion-sensing controllers and microphones. Mark Zuckerberg and other enthusiasts might be tempted to dismiss the metaverse concept as a rebranding and personalization of virtual reality. This may be true to a certain extent, but it's worth exploring the differences between these concepts. As a concept, the metaverse is distinguished from virtual reality by its broadness and utility (Revfine, 2021). There is no doubt that virtual reality games are fun, but they are limited in scope; users explore a defined game world, engage in a defined range of actions, and follow a script. A metaverse involves engaging in a wider range of activities, such as attending meetings, exploring the world, and interacting with people in the same part of the metaverse.

The metaverse refers to a 3D world with an online presence that combines many virtual places (SoluLab, 2022). It can be thought of as a futuristic version of the internet. Using the metaverse, users will be able to collaborate, socialize, play, and interact with each other in 3D environments (SoluLab, 2022). Based on this definition,

it is clear that the metaverse is different from a normal video game, as the metaverse must allow users to socialize, and interact with each other. Although some games already allow users to socialize, they rarely have all the elements needed by being the metaverse. For example, an online virtual platform, *VRChat,* is very much like the early stage of the metaverse. *VRChat* is a social virtual reality application created by Graham Gaylor and Jesse Joudrey and released by *VRChat*, Inc in 2014. Regardless of whether they have virtual reality equipment, it lets users chat and experience community-created worlds and experiences. On this platform, users can interact with each other with 3D avatars and worlds created by themselves.

1.1.2 Accessibility to the metaverse

There are currently a variety of ways to access the metaverse, including general-purpose computers, smartphones, augmented reality, mixed reality, and virtual reality (Antin, 2020). It has been difficult for the metaverse to develop or become widely adopted due to its dependence on virtual reality technology. At the same time, the lack of high-quality graphics and mobility is due to limitations of portable hardware and balancing cost and design (Wood, 2021). The retina display pixel density required for visual immersion has remained a challenge for lightweight wireless headsets. In addition to cost, consumer virtual reality headsets are expected to range in price from $300 to $3500 by 2021 (Brown, 2021). The current focus is on improving haptic technology, virtual reality headsets, and sensors to overcome the limitations of these devices (Lewis et al., 2022).

A special technique called brain-computer interface (BCI, also known as brain-machine interface) is being researched in current years. Different from the human interface we are using every day on smartphones or computers, the brain-computer interface is a direct pathway of communication that connects one‘s brain's electrical activities with an external device (TechTarget Contributor, n.d.). An example of a brain-computer interface is called Neuralink, a brain-computer interface that aims to connect human brains with AI developed by Neuralink Corporation, co-founded by Elon Musk (Neuralink, 2022).

Meanwhile, a standardized technical specification for metaverse implementations has not been widely adopted, and existing implementations primarily use proprietary technology. A major concern in metaverse development is interoperability, which stems from concerns about transparency and privacy (D'Anastasio, 2021). Metaverse Roadmap, for example, is one project that aims to standardize virtual environments (ExtremeCreative, 2009). Even though, Facebook Horizon was a virtual reality world launched by the social network company in 2019 (Constine, 2019). The company's chairman Mark Zuckerberg declared a commitment to building a metaverse in 2021 after Facebook was renamed "Meta Platforms." (Milmo, 2021)

1.2 Metaverse tourism

In an interconnected virtual space, the metaverse defines new methods for experiencing digital content and connecting with other human beings. Many advantages can be realized by applying metaverses to different use cases, such as tourism (Weston, 2022). It is essential to understand the metaverse and tourism industry distinctively in order to develop a credible understanding of metaverse tourism. Hotels can harness the power of the metaverse to achieve plausible improvements in sales and marketing strategies (Weston, 2022). The metaverse can also help in enhancing daily operating procedures alongside revenue management techniques (Weston, 2022). At the same time, hotels can seek new roads for expanding their audience reach alongside connecting with a new target market of virtual tourists (Weston, 2022).

The metaverse as video games may help tourists choose their destinations because in-game experiences form the potential of visiting the location in the real world, and it is an alternative to traditional tourism (Junko et al., 2022). As one existing usage applied with the technology of augmented reality, virtual reality, and mixed reality, video games have become not only games for fun but great tools for destination management (Rainoldi et al., 2022). One research based on the case of *Assassin's Creed Odyssey* has shown that gaming experience influenced destination management (Rainoldi et al., 2022). According to Rainoldni, Van den Winckel, Yu, &

Neuhofer (2022), because Assassin's Creed Odyssey, an action role-playing video game developed by Ubisoft Quebec and published by Ubisoft in 2018, is featured with the map of Greece in the real world and many elements are adopted. Meanwhile, players are able to explore and discover in the virtual world, which is based on a real location. The game experience influenced players and created intentions to visit Greece in real life as a result. In the meantime, augmented reality, virtual reality, and mixed reality have been used in tourism already for some time. Research has shown that usage of virtual reality positively influenced destination management (Prodinger & Neuhofer, 2022). Enabling tourism providers with the ability to design technology-enhanced customer experiences leads to not only higher levels of technology acceptance, enhancing the virtual reality experience of travelers, but also the overall experience of the travel (Prodinger & Neuhofer, 2022). Another research showed similar results, even though the current compatibility of mixed reality is limited, respondents agreed that mixed reality is a proper tool to cocreate tourism, and it can work well, especially regarding building heritage experience (Buhalis & Karatay , 2022).

The metaverse itself may also help create tourism, for example, places of interest can be duplicated into mixed reality, which allows users to travel all around the world without stepping out of their homes. *Ready Player One*, a 2018 American science fiction adventure movie based on a novel of the same name written by Ernest Cline, displayed a world where a virtual reality simulation metaverse named OASIS exists, people live in the OASIS just like they have escaped from the real world.

This research is aimed to discover possible designs that might attract consumers going into the metaverse to spend a virtual vacation. With the impact of the COVID-19 pandemic, physical traveling becomes different from before, research has shown that people are anxious about their vulnerability in physical and economic (Kock et al., 2020). As the metaverse carries great capability creating easier ways to travel. By answering the following 3 specific research questions, the possible designs that attract consumers will be discovered.

Research questions:

1. Why would consumers want metaverse tourism rather than traditional tourism?

2. How would different emotions influence satisfaction with virtual vacations?

3. How would different design elements influence satisfaction with virtual vacations?

2 Literature review

2.1 The metaverse and metaverse tourism

2.1.1 The metaverse and video game

The metaverse is a 3D virtual environment that allows users to socialize and interact with each other with the virtual model they choose or build to represent themselves. It was American writer Neal Stephenson who coined the term 'metaverse'. In 1992, he published a novel based on it, known as *Snow Crash*, which was a dystopian cyberpunk novel. Though many video games, especially virtual reality games, contain aspects of the metaverse, it is clear that the metaverse is different from them because the metaverse is an environment for society rather than only a regular video game. According to SoluLab (2022), Metaverses are 3D cosmos with online presences that integrate many virtual places, meaning the internet could be viewed as a futuristic version. At the same time, users will be able to collaborate, socialize, play, and interact in these 3D environments based on the metaverse (SoluLab, 2022).

A video game, also known as a computer game, is an electronic game in there is an interaction between the user and the game software through a user interface or input devices. With the improvement of gaming hardware, virtual reality (VR), augmented reality (AR), and mixed reality (MR) have become known to consumers. Typically, the virtual reality we are using is non-immersive virtual reality, which indicates a simulated experience of a virtual world, which functions through a virtual reality headset and other hardware worn on the user's body (Bardi, 2019). With different applications, users can have different experiences with virtual reality, including entertainment, education, and business. Users experience virtual reality in a fully closed virtual world, where there is no sense of the real world (Schueffel, 2017). With augmented reality, elements generated by the computer or extracted from the real world are superimposed on sensory input, including sound, video, graphics, and haptics (Schueffel, 2017). It is different from virtual reality because users are

experiencing the real world, while there is additional information or details provided by augmented reality equipment.

Mixed reality is the technic that combines both the real world and virtual world to provide new environments and visualizations, where physical and digital objects co-exist and interact in real-time. According to Milgram (1994), mixed reality is a hybrid of augmented reality and virtual reality, which does not take place in either the real world or the virtual world. Mixed reality provides the user with a realistic experience that makes it impossible to distinguish between real and virtual content, providing for a seamless transition from physical to digitally constructed environments (Buhalis & Karatay , 2022). An example of mixed reality is an online virtual platform named VRChat created by Graham Gaylor and Jesse Joudrey in 2014. VRChat is a social virtual reality application that lets users, regardless of whether they have virtual reality equipment, chat and experience community-created worlds and experiences. On this platform, users can interact with each other with 3D avatars and worlds created by themselves. During the covid-19 pandemic, the amount of users increases steadily (Lang, 2020). There is a function in VRChat where users are allowed to create their own maps, which are called Worlds, as they wish and invite other users to visit, this creates great capacity as there are also maps created based on places of interest in the real world.

2.1.2 Metaverse tourism

Of course, video games are made up of virtual stores and locations. But Xu, Tian, Buhalis, Weber-Sabil, & Zhang (2015) found that education, health, and other non-gaming businesses, such as tourism, had taken notice of video games. One of their exploratory research projects has stated that gaming engages the tourist in a fun, informative, and memorable way throughout the entire travel experience, including before, during, and after the trip (Xu et al., 2015). Before traveling, it is innovative of marketing a destination with a game. It attracts potential tourists and allows them to engage deeply with the destination. Gaming also allows tourists to explore specialized aspects and help develop their prospective experience. During the trip, games can

help tourists gain more fun on the journey and enhance experiences onsite. After the trip, games can help tourists recall the journey, and it is also used to show off to other people, as a game player is usually looking for challenges to receive a sense of achievement after handling them. Meanwhile, games attract players to keep on playing and engaging with other destinations furtherly.

One study based on a virtual learning tool, Second Life, has shown relevant aspects of the virtual world and the real world regarding education and tourism. It is thought that the 3D virtual world environment will gain more attention and become more pervasive as a new educational/training tool in the travel and tourism industries due to the virtual revolution taking place in media environments (Huang et al., 2013). According to Huang et al. (2013), Second Life can be an ideal educational platform as a virtual world with real-world simulations, social interactions, and collaborative spaces. Virtual learning in Second Life has also begun to be explored by educators in the travel and tourism industry who are taking advantage of its effective virtual environment for the best results (Huang et al., 2013). It is also mentioned that the videos on the virtual site illustrating Maasai culture and traditions allow virtual tourists to feel connected to the Maasai village, thus enhancing the perception of relatedness. Professionals and educators in the tourism industry may find 3D virtual environments useful for educational and training purposes (Huang et al., 2013). With virtual learning, time and space barriers are overcome to accommodate the specific working conditions of the tourism industry. However, it is still necessary to identify and fully explore the potential of the 3D virtual learning experience as the applications and opportunities of virtual worlds in education continue to emerge quickly (Huang et al., 2013).

2.1.3 Metaverse tourism and traditional tourism

Although it is stated by SoluLab (2022), that metaverses are 3D cosmos with online presences that integrate many virtual places, Buhalis and Karatay (2022) had a further understanding of it. Metaverses are parallel and virtual universes that use ambient intelligence to enhance physical spaces, products, and services. Essentially, it is a

virtual shared space for cocreating value collectively. By combining MR and physical reality, the metaverse in Tourism creates a shared virtual space that combines all stakeholders' needs, transforming the internet into a parallel virtual universe. (Buhalis & Karatay , 2022) Based on the research done by Ning et al. (2021), the smart city is forecasted as one of the most possible application areas of the metaverse. According to research done by Buhalis & Karatay (2022). A great deal of functionality is introduced through mixed reality that allows for the co-creation of tourism and cultural heritage experiences. This study used qualitative research methods to explore generation Z's interactions with technology and determine their perceptions and needs. The results revealed that most participants agreed that mixed reality brings a new form of tourism where cultural heritage plays a key role.

Furthermore, metaverse tourism may have advantages in sustainable development. A study done by Park & Kim (2022) has shown the potential of the metaverse in sustainable development. On the one hand, the metaverse brings a gameful experience to users, which is expected to affect users' motivation to learn positively. On the other hand, applying metaverses into education can help achieve the fourth goal of the sustainable development goals by the UNWTO, which is the equity of learning. (Park & Kim , 2022) At the same time, similar to applying metaverses to education, it also helps to fulfill the sustainable development goals of tourism. When tourists do not physically visit the locations, pollution during transportation will no longer exist. Instead, wastes and pollution to the destinations reduce as conventional tourism decrease.

There is another point of view, one form of metaverse tourism, virtual reality-based tourism, should be considered as a tourism niche instead of a subtitle of conventional tourism (Verkerk, 2022). The author compared Leiper's tourism model and Butler's tourism area life cycle model with adapted models from both replaced with virtual reality elements. The result of the analysis shows that virtual reality tourism includes similar elements to those in Leiper's model, which are tourists, geographical elements, and the tourism industry. As for the Butler's tourism area life cycle, all the other

phases can be applied to virtual reality tourism except the stagnation stage. Because there is only a virtual destination in virtual reality tourism, instead of a real and conventional tourism destination. Another study states the relationship between virtual tourists' experience and the sense of the information they have taken. It was verified that the virtual reality experience of audio-visual in the area of escapism positively influences the haptic and olfactory components. Furthermore, although participants felt more immersed in the virtual world, the overall virtual reality experience in the post-travel phase was not enhanced by additional sensory stimuli (Prodinger & Neuhofer, 2022). However, Verkerk (2022) also states that there are two major problems of virtual reality tourism. A major disadvantage of virtual reality is that there is no chance for virtual tourists to interact with local virtual reality developers in person. In addition, virtual reality tourism does not offer virtual tourists the full experience of conventional tourism since virtual tourists cannot experience the destination with all their senses.

It is easy to conclude that when traveling on a virtual vacation in the metaverse, the user does not need to visit the location physically, which offers incredible convenience for the user. Similar to the remote or smart office, users can sit at their homes and visit different places wherever they want. Even in a situation like the COVID-19 pandemic, users can easily travel and meet each other in the metaverse while physically sitting in their homes. According to the research carried out by Kanematsu et al. (2014), his team taught students how to conduct radioactive experiments using the metaverse virtual classroom known as Second Life. The results of the experiments demonstrated that the initiative met the intended objectives from the perspectives of STEM education and pre-secondary nuclear safety education (Kanematsu et al., 2014).

H1a: The perceived convenience of a virtual vacation positively impacts the intention of taking a virtual vacation.

While traveling on a virtual vacation in the metaverse, the partners are chosen or invited by the user, which brings reasonable control to the user. At the same time, one element of the metaverse is users presenting themselves with the virtual model

either chosen or built by them, which means they are free to be who or whatever they want to be. This element offers excellent alternatives for users. When users are not presenting themselves with their real faces and bodies, this may make them feel at ease. A study shows that the number of encouraging interactions in the metaverse and the individual's loneliness was mediated by social self-efficacy, where the social presence that individuals experience on the metaverse platform significantly predicts the number of supportive interactions they engage in the metaverse; subsequently, the number of supportive interactions in the metaverse positively predicted individuals' perception of social self-efficacy (Oh et al., 2023).

H1b: The perceived control of a virtual vacation positively impacts the intention of taking a virtual vacation.

Nevertheless, as the metaverse is a 3D environment designed and built artifactually, the designer can build the environment in whatever he or she wants. Building a fantasy world is possible as well. For example, locations from the past, current, or future can be built in the metaverse for tourists to visit. According to Buhalis & Karatay (2022), innovation and technology have increasingly impacted the tourism industry over the past decades, particularly in cultural heritage. Thus, the cultural technology field has evolved to reflect, enhance, widen, and transform innovative systems and services in the fields of cultural heritage using digital technology. The researchers also mentioned that the biggest obstacle to digital technologies' practical application is the continued lack of a viable user interface design in the tourist sector (Buhalis & Karatay , 2022).

H1c: The perceived escapism of a virtual vacation positively impacts the intention of taking a virtual vacation.

2.2 The influence of emotions on satisfaction

2.2.1 Satisfaction in traveling

Tourist satisfaction is one of the most important topics in tourism. As a matter of fact, it has been studied for years, as it is one of the key factors in retaining a tourist's loyalty (Lee et al., 2011). As it has been claimed by Verkerk (2022), in terms of the emotional influences between traditional tourism and metaverse tourism, there are considerable similarities between virtual reality-based tourism and traditional tourism as part of the emotional influences between traditional tourism and metaverse tourism may be the same. A study done by Lee et al. (2011)has shown the importance of satisfaction during the tour in building the tourists' loyalty to the destination. In their study, path analysis was used to examine the causal relationship between tourists' expectations and motivations, tour quality, tourist satisfaction, and tourist complaints. In order for a destination tourism development to be successful, it relies heavily on attracting tourists to return to the destination and recommending it to others. As a result of their investigation, the authors finally concluded that when tour quality and tourist satisfaction are improved through an understanding of tourist expectations and motivations, there will be fewer complaints from tourists, a key factor in building loyalty among tourists (Lee et al., 2011).

2.2.2 Impact of emotions on customer satisfaction

In another study, a different researcher showed that contentment with travel and emotion had a favorable link (Pestana et al., 2020). As the authors stated, there remains a gap in understanding what motivates seniors to travel. Motivations, emotions, and behavioral intentions are mediated by satisfaction. The beneficial effect of pleasure on an elder's purpose is moderated by their prior experience. The elder, the tourist in this case, could be specifically targeted in this situation to assist the tourism industry in overcoming seasonality challenges because of their flexibility, which emphasizes the significance of the outcomes in creating travel options for tourists based on motivation, emotions, satisfaction, prior experiences, and intentions (Pestana et al., 2020). Therefore, in order to enhance tourists' experiences when

visiting the destination and provide it with a competitive edge, destination administrators should show a more remarkable dedication to its tourism-related resources.

2.2.2.1 Impact of visual

It is true that traditional tourism and metaverse tourism have many similarities. However, when a user is taking a virtual vacation in the metaverse, only a few of their senses are available to the user for taking in information as a result of taking this virtual vacation. A study by Tong et al. (2022) aimed to find the connections between live background visual complexity, emotional states, and buying intention. As a result, that study shows a strong relationship between visual income and emotional states, which finally influences consumer buying intention (Tong et al., 2022). That study further stated that male consumers experienced the most pleasure when dealing with moderately complicated situations. However, female consumers respond to situations of intermediate complexity with more positive feelings and higher purchasing intentions (Tong et al., 2022). Though the senses available in the metaverse are limited, visual, as one of the remaining senses, plays an essential role in attracting and satisfying the consumer. As it has been claimed by Verkerk (2022), there is a great similarity between virtual reality-based tourism and traditional tourism, as one important part of traditional tourism, the emotional influences between traditional tourism and metaverse tourism may be similar. Virtual vacations are not yet able to fulfill all of the senses of a tourist. However, a study of how 4D movies satisfy users by influencing their emotions has identified that emotional arousal and the response to motion influence perceived emotions and effects expressed by a scene based on the emotional arousal and response to the motion (Jeong et al., 2021). 4D films are different from traditional 2D and 3D theaters as audiences in 4D movie theaters can experience sensory stimulation that is richer than in them. The most commonly used motion effects are those that involve the seats moving. Audiences can passively move their bodies when watching a movie with motion effects (Jeong et al., 2021). Moreover, the metaverse offers interactivity,

which is not a part of the traditional 4D film experience at all, so a virtual vacation on the metaverse will likely influence the user's emotions and satisfaction more readily.

H2a: The visual stimuli positively impact the intention to take a virtual vacation.

2.2.2.2 Impact of hearing

Consequently, paying attention to each sense available becomes even more critical than it should be in a traditional tourist destination. A study done by Parra-Gallego and Orozco-Arroyave (2022) has shown the influence of the acoustic environment on customer satisfaction. In this paper, different approaches typically used in the development of automatic speech recognition systems are compared, and a novel approach is proposed that focuses on modeling aspects of phonation, articulation, and prosody that may change when the emotional state of the speaker changes. The study evaluated different features used to classify speech emotions and presented a novel approach based on modeling phonation, articulation, and prosody changes as a function of speaker emotion (Parra-Gallego & Orozco-Arroyave, 2022). Thus, it is possible to conclude that this systematic research has identified a link between the acoustic environment and the customer's emotions. The emotion further impacts the customer's satisfaction with the experience. Finally, because the metaverse is a virtual world, compared with tourism in the real world, it is possiblely easier for designers to add different audio to influence the user's emotion, which further influences user satisfaction.

H2b: The hearing stimuli positively impact the intention to take a virtual vacation.

2.2.2.3 Impact of immersion

For the metaverse to be able to serve as a means of interacting with the user, immersion is one crucial element that will influence the user experience. Immersion, also known as the sense of presence, is one of the most widely assessed dimensions of the video game player's experience (Caroux, 2023). For example, in the study of Caroux (2023), it was discovered that playing games with a head-mounted display coupled with a motion controller had a significant effect on the global presence of an

individual in comparison with playing games with a monitor and non-motion controller (Caroux, 2023). As the result of the study, in terms of techniques for capturing and displaying input and output information, visual representation of information was of particular interest to researchers in terms of techniques for capturing and displaying input and output information (Caroux, 2023). In a meta-analysis of the effects of HMD's (versus monitors), which display visual information via a headset, it was found that HMD's had a relatively small effect on global presence and a moderate effect on the spatial presence (Caroux, 2023). In addition, the author notes that the effect size of VR game systems combined with motion controllers on global presence is much greater when combined with motion controllers than when the motion controllers are used alone.

H2c: The immersion positively impacts the intention to take a virtual vacation.

2.3 Experience design

2.3.1 Designing experience in tourism

For tourism destinations to be able to manage their tourism experiences effectively, it is imperative that they understand the nature of tourism experiences. New insights into customer experiences, which are determined by moment-to-moment occurrences, are provided by the fields of psychology, economics, geography, marketing, and, more recently, services management (Stienmetz et al., 2021). According to Stienmetz et al. (2021), although tourist experiences mix conscious perceptions with cold feelings, the results vary on the individual and the environment. For instance, the idea of a "sensation" has gained popularity among academics since it offers unbiased and context-specific information about current events. According to certain research, sensations take place before conscious brains can judge or interpret them. Goals, emotions, previous experiences, cultures, or travel companions are just a few examples of psychological elements that are thought to affect how we perceive the world and how we react to it. Due to this, perception is determined by the way in which people interpret stimuli and interpret meaning from them.

Meanwhile, detecting environmental cues like light and sound waves and converting that data into neuronal energy that our brains can comprehend are both considered to be components of sensation (Stienmetz et al., 2021). As supposed in Figure 1, the sensory process begins with environmental stimuli coming into contact with the human body's sense organs during the tourism experience creation process (Stienmetz et al., 2021). According to this argument, tourism is composed of four subsystems of processes: 1) An unconscious sensory system; 2) a fully aware perceptual system for travelers; 3) a subsystem where travelers' brains, minds, and bodies react to their surroundings; 4) A subsystem responsible for transforming, learning, and remembering (Stienmetz et al., 2021).

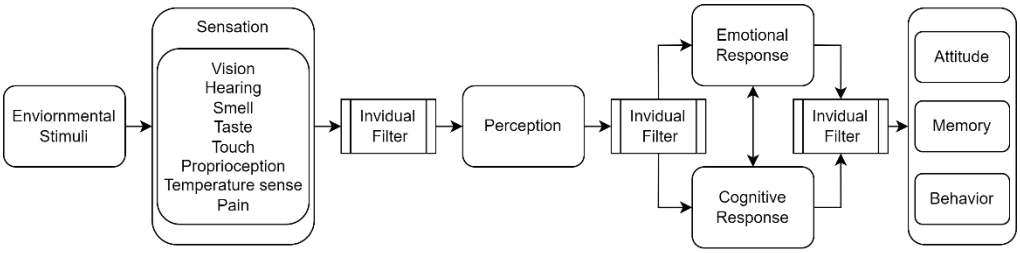

Figure 1 Framework of tourism experience creation (Adapted from Stienmetz et al., 2021).

Using technology as a tool also helps the designing experience. A study based on the influence of Instagram on the local experience of the destination states that in order to facilitate the design of better local experiences in the future, tourism design science should utilize social media platforms for the purposes of capturing virtual versions of peoples' experiences as well as to generate new knowledge for enhancing future local experiences with the help of social media platforms (Gon, 2021). Instagram is a social network that provides a platform for users to discuss and discover destinations and other points of interest through pictures and sometimes videos, which can be very useful to users from other parts of the world in order to understand what the location is like and how the local people live on a regular basis. By using the metaverse as a platform, the users could be able to view and listen to the destination and interact with it as they explore and fit into the destination more readily. In other words, a

virtual vacation in the metaverse would be similar to a traditional vacation in the real world since the experience would be similar.

There is no doubt that emotions have a significant impact on tourists' cognitive evaluations and behavioral responses. It is also important to recognize that emotions are both fleeting and powerful. In addition, emotions are shaped by individuals' experiences as well as influenced by their mental associations (Volo, 2021). In the study of Volo (2021), emotions play a vital role in the design of tourism experiences, and the role of emotions in tourism design is often discussed as a means to suggest ways to design better experiences that are able to elicit certain emotional responses from tourism stakeholders. Several questions need to be answered as tourism emotion research emerges as a tourism design science. As a result of the discussion in the previous sections of mainstream literature and the results of tourism studies, five basic principles are summarized: 1) A design that extends the breadth and depth of emotions; 2) All encounter contexts should be reevaluated; 3） Enhance emotional experiences by creating environments; 4) A design that turns inwards and looks outwards; 5) Irrespective of prepackaged emotions, elicit individual emotional outcomes (Volo, 2021).

While having a virtual vacation in the metaverse, it is clear that there is a limitation to the sensations the user can experience. Figure 1 illustrates how the sensation affects the perception that has been received by the person, which in turn influences the experience that the person has. In a virtual vacation in the metaverse, for instance, the user would mainly be able to experience vision and hearing. In contrast, the user may have limited access to touch based on the equipment he or she is wearing. Currently, there is not enough technology to allow for the full range of sensations, including smell, taste, proprioception, temperature sense, and pain, to continue functioning normally. In this case, building a presence in the virtual vacation is essential for the user to receive a memorable experience.

2.3.2 Design elements

As a major contributor to the success of tourism businesses and destinations, design is now considered to be a crucial activity (Xiang et al., 2021). Therefore, to make a memorable virtual vacation, it is essential to design the metaverse to make it a good destination for consumers as well. An overview of the progress is provided in Figure 2. In order to understand and shape tourists' experiences, the tourist is at the center, cycled by three layers of process that make up the tourism design system in order to recognize and outline how the tourist perceives the location (Xiang et al., 2021).

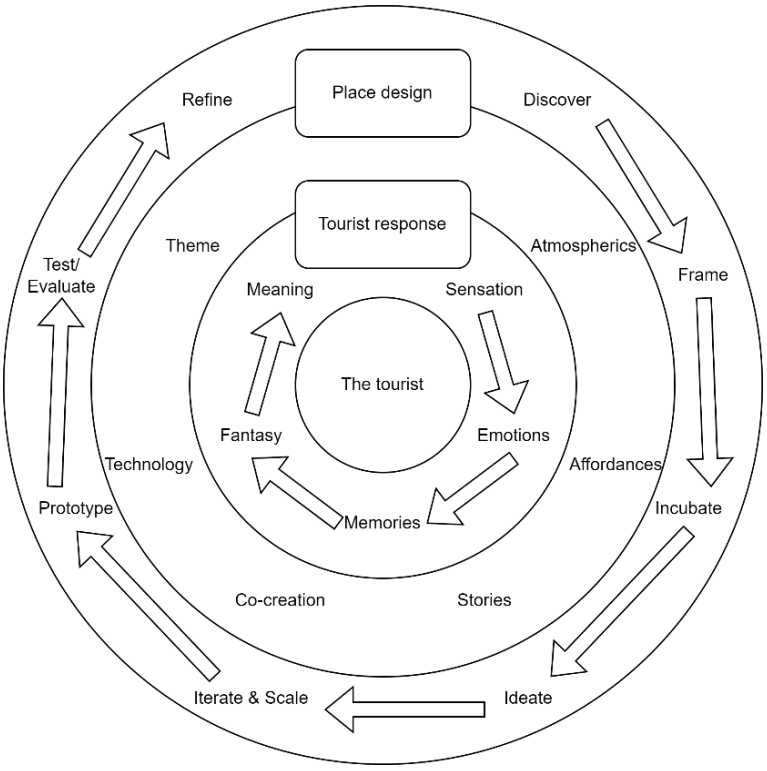

Figure 2 The tourism design system (Adapted from Xiang et al., 2021).

The first layer of the framework is to comprehend the tourist's reaction toward an experience, which is broken down into many stages. Numerous sub-processes, such as sense, emotion, memory, imagination, and meaning, are involved in the tourism experience (Xiang et al., 2021). Though subconscious sensations and conscious perceptions play a major role in these experience processes, the outcomes vary

according to the individual and the situation. As a result of environmental stimuli, basic sociopsychological factors as well as trip-related factors are affected (Xiang et al., 2021). As part of the tourism design framework, this phase encompasses the mechanisms that translate the objective into the subjective. The framework's second layer addresses the environmental and societal elements that affect tourists' experiences. Themes, narrative, atmospherics, technology, co-creation, and affordances are its six main components (Xiang et al., 2021). All of these components contribute to creating memorable visitor experiences. Design thinking is applied in the third layer of the tourism design system to help travelers understand the experience value of a location (Xiang et al., 2021). Designers may take into account the underlying principles of the society in which the location resides, whether in the physical world or the digital one, such as sustainability and resilience. Comprehension and discovering are the initial phases in the design thinking process, which is then followed by creating a prototype, assessing it, and revising it. Additionally, design thinking places a strong emphasis on ongoing review in order to enhance and even replace initial products. Design thinking may be used at all tiers in the tourist industry (Xiang et al., 2021).

2.3.2.1 Impact of atmospherics

In traditional tourism in the real world, a location's physical and service-related components that support the tourist experience are referred to as atmospherics (Xiang et al., 2021). The flow of the tourism experience, the meaning that tourists attach to the experience, the emotional attachment to the service provider, and the social activities with other customers are all significantly impacted by atmospherics, which provide optical, auditory, olfactory, and haptic stimuli (Xiang et al., 2021). Additionally, tourist destinations' physical designs that appeal to all five senses are significantly more likely to elicit emotional reactions to provide an unforgettable experience (Xiang et al., 2021). Although typically, only optical, auditory, and haptic stimuli are available in metaverse tourism due to the limitation of the technology. When reflexing this theory to designing a virtual vacation, due to the significant

similarity between metaverse tourism and traditional tourism, it is evident that atmospherics is a crucial element for experience design.

H3a: The atmospherics positively impacts the intention to take a virtual vacation.

2.3.2.2 Impact of affordance

The metaverse as a virtual digital world provides more convenience regarding affordance. The term "affordance" refers to the characteristics and degree of understanding that tourists have of a given object—tangible or intangible—so that they may conduct activities to bring about the intended results. The concept of affordance depends not just on a user's physical capabilities but also his or her objectives, worldview, and prior experiences (Xiang et al., 2021). An existing example of enhancing affordance is using various interactive technologies accessible to museums, including VR applications, interactive kiosks, and augmented reality applications on smartphones (Dincelli & Yayla, 2022). According to Dincelli & Yayla (2022), though virtual reality provides genuine two-way interactions and engagement, its current usage is limited to basic UI interactions and other essential activities. In the metaverse, descriptions of any element can be displayed in front of the users in different ways, including a written description and a virtual tour guide explaining with voice. Another study claims that aligning the components of a tourism service with anticipated service experiences may be accomplished with the aid of the affordance concept, which captures the relationships between one's skills and the characteristics of one's surroundings (Tomej & Xiang, 2020). Although various options are provided to tourists by affordance, it does not determine the behavior the tourist finally acts. An affordance may, when seen by a human, result in behavior depending on the environment, the individual's capabilities, their interactions, and their learning context (Tomej & Xiang, 2020). As well as evolutionary processes, effort required for a given affordance, and cultural and personal factors, one affordance may be more tempting than another. Affordances generally permit some activities while inhibiting others unless the environment is artificially changed to generate new affordances, (Tomej & Xiang, 2020).

H3b: The affordance positively impacts the intention to take a virtual vacation.

2.3.2.3 Impact of story

To tell a story and let the player experience the story from a first-person perspective is widely used by video games nowadays. Similarly, telling the tourist a story during the virtual vacation in the metaverse may be beneficial. Stories provide the topic with its underpinning structure and bring it to life by creating links between the performers' actions and the emotions they arouse in the audience (Xiang et al., 2021). As a result, designers employ stories to help tourists categorize and analyze their experiences to give them meaning (Xiang et al., 2021). Furthermore, compared to a 2D viewing experience, watching a sporting event in virtual reality gives users greater satisfaction (Dincelli & Yayla, 2022). The entire sense that people experience when being fully engaged is described as the flow state. A greater flow made possible by immersion serves as the primary motivator for increased levels of satisfaction (Dincelli & Yayla, 2022). Therefore, it is likely that designing a story can influence the consumer experience. Furthermore, according to Moscardo (2020), stories are a crucial component in destination advertising and the entire tourism system since they allow tourists to develop and share stories about previous experiences and create and share their own stories. In addition, it has implications for the tourism industry in that places and businesses may increase their effectiveness by creating possibilities for encounters that use stories as their fundamental framework (Moscardo, 2020).

H3c: The story positively impacts the intention to take a virtual vacation.

Moscardo (2020) sets up three principles for using stories in tourism design. The first principle is to build a storyworld. This is described as identifying the essential components of the desired destination storyworld, where important overarching themes connect various relevant stories (Moscardo, 2020). In addition, the ability of new technology to facilitate co-creation between numerous stakeholders in the destination and tourists enhances the development of the destination story world (Moscardo, 2020). More particular stories can be related to when and why a story will be utilized once major overarching themes have been established and a pool of viable

stories has been discovered. Others can be utilized to build onsite experience opportunities (Moscardo, 2020). Finally, stories can be used as pre-experience stories to draw tourists' attention and convince them to visit (Moscardo, 2020). Meanwhile, as it is mentioned in Figure 2, themes direct the whole perceptual process, from how tourists subconsciously obtain information to how they interpret their entire experience (Xiang et al., 2021). The metaverse offers excellent capacity and freedom. The designer can easily adjust the metaverse to fulfill specific themes. In developing tourism experiences, strong themes are vital (Xiang et al., 2021). In the same way, themes can likely influence the consumer's experience when having a virtual vacation in the metaverse.

H3d: The story theme positively impacts the intention to take a virtual vacation.

The second principle is to identify the story's features. Different story features can be related to various audience responses according to psychology, social marketing, public education, and literary analysis (Moscardo, 2020). Perceptions of realism, narrative transportation, emotional engagement, and character identification frequently influence an audience's attention, engagement, and favorable reactions to stories. The idea that a story is credible or genuine is perceived realism (Moscardo, 2020). Rather than focusing on whether a story is fictional or not, causal or narrative consistency or cohesiveness is based on the fact that characters and their responses are compared with real people and the causal sequence of events is consistent and logical. Narrative transportation is supported by perceived reality, which in fact, is supported by it (Moscardo, 2020). In narrative transportation, the audience becomes engrossed in a story that they forget about their surroundings and merge with the storyworld (Moscardo, 2020). The emotional component of stories should also be vital. For perceived realism, narrative transportation, and emotional engagement, realistic characters must be sufficiently detailed for the audience to accept and understand them. Audience members may identify with characters and their actions and responses as they are similar to them, or they may idolize them and see them as desirable individuals to relate to (Moscardo, 2020).

H3e: The story feature positively impacts the intention to take a virtual vacation.

The third principle is to design the role of the tourist in the story. In Moscardo's (2020) words, the last principle may be broken down into two primary groups: those related to the tourist and those related to the destination community. By providing tourists more power, options, and challenges over the stories they are exposed to and how they perceive them, it is crucial to involve tourists in stories. Generally speaking, having more agency throughout a story is likely to lead to more good experiences, better learning from the event, and a higher propensity to tell the story to others (Moscardo, 2020). The destination community needs to pay attention to how these communities are portrayed in tourism-related stories and the part they play. It might be beneficial to give them a chance to share their own experiences of a place while trying to get them to participate in tourism. When leveraging tourism to provide creative possibilities for destination inhabitants and other stakeholders, it might be beneficial to think about how to inspire destination communities to engage in story co-creation with tourists.

H3f: The role in the story positively impacts the intention to take a virtual vacation.

2.4 Research model

2.4.1 Hypothesis

H1a: The perceived convenience of a virtual vacation positively impacts the intention of taking a virtual vacation.

H1b: The perceived control of a virtual vacation positively impacts the intention of taking a virtual vacation.

H1c: The perceived escapism of a virtual vacation positively impacts the intention of taking a virtual vacation.

H2a: The visual stimuli positively impact the intention to take a virtual vacation.

H2b: The hearing stimuli positively impact the intention to take a virtual vacation.

H2c: The immersion positively impacts the intention to take a virtual vacation.

H3a: The atmospherics positively impacts the intention to take a virtual vacation.

H3b: The affordance positively impacts the intention to take a virtual vacation.

H3c: The story positively impacts the intention to take a virtual vacation.

H3d: The story theme positively impacts the intention to take a virtual vacation.

H3e: The story feature positively impacts the intention to take a virtual vacation.

H3f: The role in the story positively impacts the intention to take a virtual vacation.

2.4.2 Conceptual framework

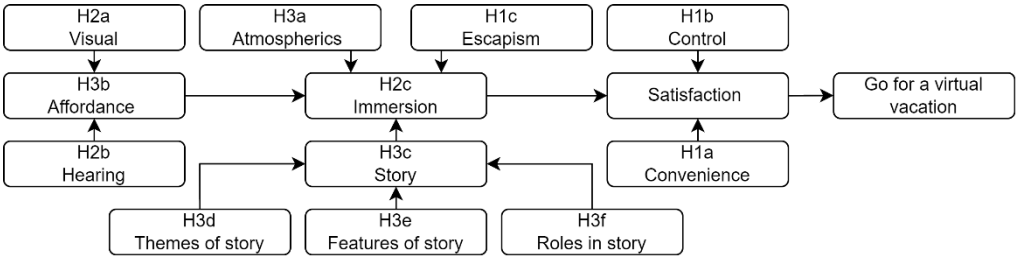

Figure 3 Conceptual framework.

3 Methodology

3.1 Research design

For the purpose of researching and exploring the relationship between different elements and the satisfaction of taking a virtual vacation in the metaverse, quantitative research is applied. Due to the limitation of current technology, it is difficult to offer a personal experience of virtual vacation in the metaverse. Therefore, qualitative research, for example, will not be applied to invite participants to experience metaverse and do interviews. Therefore, judgmental sampling is used to effectively understand the impacts while collecting data.

The researcher uses the survey as a controlled measurement, and data is collected through online survey platforms in the Winter of 2022. One hundred samples are planned to be collected. In the case of the existing invalid surveys, over 100 responses will be collected. The survey is sent to participants of backgrounds through online social media. Meanwhile, an invitation to participate in the survey for further participants, such as the family members or friends of the current participant, is provided, which allows the participant to invite other people to participate.

The survey starts with a short video of the metaverse, for example, a shortcut of the movie *Ready Player One*, which will help the participant know the metaverse. After that, questions about their attitude to the survey are added. Meanwhile, catch-up questions like "what is 2+2" will be added in the mid of the survey to ensure that the data collected is valuable.

3.2 Measures

The survey questions are divided into two different types by the scale of the answers. A small part of questions is answered on an ordinal scale, only with yes or no answers. Most other questions are designed and asked in the Likert scale, and an ordinal measurement scale is used to measure the response. The answers are divided into five stages: strongly agree, somewhat agree, neither agree nor disagree, somewhat

disagree, and strongly disagree. These questions with different measurement scales provide the researcher with a better understanding of the impacts of metaverse on participants. Information will be collected by filling out the questionnaire, and analysis will be made in statistical ways based on that.

Survey development

In Table 1, the construct of the questionnaire is shown. To begin with, after a short video description of *Ready Player One*, questions about virtual, mixed and augmented reality are asked to know whether the participant has already experienced these three technologies. After that, the definition of the metaverse is described, and then the metaverse is introduced as a platform for creating virtual vacations. As the COVID-19 pandemic has influenced the tourism industry since 2019, questions about how COVID-19 influenced the participant are asked first. Following this, questions about participants' ideas and imagination of the metaverse are asked regarding convenience traveling, control during traveling, and location rebuilding. Next, questions about visual, hearing, and immersion of virtual vacations in the metaverse are asked to understand how different aspects impact the participant's emotions. Finally, questions about atmospherics, affordance, and story are asked to understand better how different design elements influence satisfaction and immersion. Meanwhile, different story elements are asked further due to the differences between the metaverse and traditional tourism. Please find the questionnaire in Appendix 1.

List of variables and items.		
COVID-19's influence (Garaus & Hudáková, 2022)	COI1	In the current situation, it would not be safe to travel.
	COI2	In the current situation, it would not be safe to travel physically.
Traveling convenience	TCV1	It is convenient to visit a city in the virtual world.
	TCV2	It is easier to go to virtual cities than to physical cities.
Traveling control	TCT1	I think staying with someone I choose during the virtual vacation makes me feel good.
	TCT2	My virtual image may help me imagine being someone else.
	TCT3	A virtual vacation may help me release myself.
	ESC1	I think rebuilding cultural heritage is attractive.

Escapism (Buhalis & Karatay , 2022)	ESC2	I think recreating disappeared objects is attractive.
(Jordan et al., 2019)	ESC3	I think a virtual vacation can preserve cultural/historical sites.
Visual impact	VSI1	Visual intake is important to me when traveling.
	VSI2	I would expect to see the same aspects during the virtual vacation as in the real world.
	VSI3	I would expect to see what is not from the real world in the virtual vacation, e.g., Flying with UFOs.
Hearing impact	HRI1	I'm not interested in the background sounds when traveling.
	HRI2	I would listen carefully to the background sounds during my tour.
	HRI3	I would immerse myself in conversations.
Immersion impact	IMI1	I think having a sense of being in the scenes displayed helps me immerse myself.
	IMI2	I think I like the feeling of being involved (in the displayed environment).
	IMI3	I think the temperature of the real world may distract me.
Atmospherics	ATM1	The atmosphere of a location is important to me.
	ATM2	I enjoy staying in the atmosphere which is familiar to me.
Affordance	AFD1	I think it is very beneficial to use the metaverse to explore virtual vacation.
	AFD2	Using the metaverse may help me better obtain information during the virtual vacation.
	AFD3	I think use the metaverse to explore locations during a virtual vacation would be interesting.
Story	STO1	I often hear people around me talking about their stories of different destinations they have been to.
	STO2	I think a story of the destination may bring me a feeling of belonging when I am at the place.
	STO3	I think a story of the destination can offer me opportunities to participate in local culture.
	STO4	I think it is important that a destination has stories.
Story themes (Moscardo, 2020)	STM1	When there are stories about the destination, I think it is important that the stories have specific themes.
	STM2	It makes me happy if the stories of the destination are in themes I like.
	STM3	I will be happy to be a part of stories with themes I like.
Story features (Moscardo, 2020)	STF1	The feature in the stories of the destination is important to me.
	STF2	I will be happy if the story of the destination contains features I like.
	STF3	I will be happy if the story contains features I am familiar with, e.g., Features from my hometown.
Story roles (Moscardo, 2020)	SRO1	It is important to me that I feel involved in the story of the destination.
	SRO2	It is important to me to have many options when participating in a story of the destination.

	SRO3	I want to be the main character of the story.
	SRO4	I may create own stories after visiting a destination.
Intension	INT1	I am interested in a virtual vacation in the metaverse.
	INT2	I am willing to take a virtual vacation.
	INT3	I am looking forward to taking a virtual vacation.

Table 1 List of variables and items

3.3 Data collection

Participants will be approached to complete the survey through judgmental sampling. The survey will be sent to participants via online platforms. A type of convenience sampling known as "judgmental sampling" chooses population components depending on the researcher's judgment (Stienmetz, 2022). According to Saunders et al. (2012), In a convenience sample, a non-probability sampling technique, the sample is drawn from a group of individuals who are simple to get in touch with or locate. Grab sampling and availability sampling are other names for this kind of sampling. The sampling approach's only need is for participants to be accessible and willing. Additionally, since the only need for this kind of sampling method is whether the participant consents, no simple random sample has to be created. Because the virtual reality equipment is pricey, and not many users own it (Alsop, 2022), the researcher chose judgmental sampling. The target population of this research is any person who has knowledge about the metaverse. The target amount of samples from the target population is 100. The target population has basic augmented, virtual, and mixed reality knowledge. In addition, the focused participants would be asked the same questions but in different languages. The data collection would take place from 12th December to 25th December 2022, lasting two weeks. The survey consists of 50 questions, which means 50 variables will be collected and tested.

In order to analyze the data collected from surveys, descriptive statistics will be applied. The reason for using descriptive statistics is because the objectivity and neutrality. (Baha, 2016) In this research, normal distribution will be used to analyze the data collected from surveys, and correlation analysis will be used to find out the relationships between variables and the hypothesis. Figures and charts, such as the normal distribution graph, will be added to describe the results. All answers will be

transformed into numbers which can be used for analysis. For example, the answers to Likert scale questions, which are “strongly agree”, “somewhat agree”, “neither agree nor disagree”, “somewhat disagree”, and “strongly disagree” will be transformed into 5, 4, 3, 2, and 1.

As mentioned in previous sections, catch-up questions like “what is 2+2” will be added to the survey, which helps identify the survey by answering it randomly or lining up. Once a questionnaire is regarded as invalid, the answers will not be used in the analysis. Meanwhile, for unanswered questions within a valid survey, the mean value of the same question from the other valid surveys will be added for analysis.

3.4 Limitations

It may be problematic to acquire a precise and concrete outcome since the survey will be distributed using a nonprobability sampling method, namely, judgmental sampling, a kind of convenience sampling. When convenience sampling is used, there is a great likelihood that the sample group will not match the wider population, creating a "low-set" and "high-set" mismatch of populations and invalidating the initial tests (Sexton, 2022) Another restriction that the researcher will encounter is that most individuals dislike having to type their replies to questions when using the question-and-answer format, mainly when the research requires respondents to provide a written text to describe their opinions on the issue or topic. As a result, many respondents will find it time-consuming and eventually get bored with the required writing, which would lead them to quit the survey.

3.5 Research ethics

The American Psychological Association's ethics code, published by Smith (Smith, 2003), provides some fundamentals and basics within a particular direction for survey operations, including a guarantee that participants are actively participating in the research and are fully aware of the risks and rewards. While the survey was being conducted, the researchers behaved cautiously in telling and explaining to participants how their answers would be utilized. The researchers also took care to

protect the respondents' identities and privacy. A time estimate for finishing the questionnaire was also provided, and participants had the choice of participating voluntarily or not at all. Additionally, the survey did not contain any misleading or too personal questions that were outside the scope of the research.

4 Results

4.1 Descriptive statistics

Data from the questionnaires are examined by Jamovi in order to evaluate created hypotheses, but it is first essential to investigate the details of the samples. A total of 105 people responded to the survey. The table below shows the basic information of the participants. 58.1% of participants are male, 30.5% are female, 8.6% prefer not to say, and 2.9% said they are non-binary. Meanwhile, most participants were born between 1990-1999, and more than one-third were born between 2000-2009.

Gender			
Levels	**Counts**	**% of Total**	**Cumulative %**
Male	61	58.1 %	58.1 %
Female	32	30.5 %	88.6 %
Prefer not to say	9	8.6 %	97.1 %
Non-binary	3	2.9 %	100.0 %
Age			
Levels	**Counts**	**% of Total**	**Cumulative %**
Before 1980	6	5.7 %	5.7 %
1980-1989	2	1.9 %	7.6 %
1990-1999	60	57.1 %	64.8 %
2000-2009	36	34.3 %	99.0 %
After 2010	1	1.0 %	100.0 %

Table 2 Participants information 1

The table below displays the participants' experience in augmented, virtual, and mixed reality. No more than half of the participants have experienced augmented reality, about two-thirds of participants have experienced virtual reality, and only more than one-tenth of participants have experienced mixed reality.

Have you ever tried AR (augmented reality)?			
Levels	**Counts**	**% of Total**	**Cumulative %**
Yes	48	45.7 %	45.7 %
No	57	54.3 %	100.0 %
Have you ever tried VR (virtual reality)?			
Levels	**Counts**	**% of Total**	**Cumulative %**
Yes	71	67.6 %	67.6 %
No	34	32.4 %	100.0 %
Have you ever tried MR (mixed reality)?			
Levels	**Counts**	**% of Total**	**Cumulative %**
Yes	12	11.4 %	11.4 %
No	93	88.6 %	100.0 %

Table 3 Participants information 2

The table below displays the proportion of respondents who intend to take a virtual vacation in the metaverse. Results show that although 59 participants,58.4% out of 105, are interested in a virtual vacation, 76 participants, 74.5% out of 105, are willing to take a virtual vacation. Nevertheless, 65 participants, 63.7% out of 105, are looking forward to taking a virtual vacation in the metaverse.

Frequencies of INT1			
Levels	**Counts**	**% of Total**	**Cumulative %**
Strongly agree	22	21.8 %	21.8 %
Agree	37	36.6 %	58.4 %
Neither agree nor disagree	34	33.7 %	92.1 %
Disagree	4	4.0 %	96.0 %
Strongly disagree	4	4.0 %	100.0 %
Frequencies of INT2			
Levels	**Counts**	**% of Total**	**Cumulative %**
Strongly agree	22	21.6 %	21.6 %
Agree	54	52.9 %	74.5 %

Neither agree nor disagree	23	22.5 %	97.1 %
Disagree	1	1.0 %	98.0 %
Strongly disagree	2	2.0 %	100.0 %

Frequencies of INT3

Levels	Counts	% of Total	Cumulative %
Strongly agree	25	24.5 %	24.5 %
Agree	40	39.2 %	63.7 %
Neither agree nor disagree	32	31.4 %	95.1 %
Disagree	2	2.0 %	97.1 %
Strongly disagree	3	2.9 %	100.0 %

Table 4 Travel intention of virtual vacation

The characteristics of variables on travel intention of a virtual vacation is determined through mean and skewness value from the critical factor data. From the perspective of mean value, escapism-related factor ESC1, rebuilding cultural heritage, is the highest. Then, two factors follow this, the immersion factor IMI1, having a sense of being in the scenes, and the atmospheric factor ATM1, the atmosphere of a location. The Shapiro-Wilk test shows that the data are not normally distributed. Therefore, Spearman's correlation will be applied when testing the hypothesis.

Variables	Mean	Skewness	Kurtosis	Shapiro-Wilk W	Shapiro-Wilk p
TCV1	3.80	-0.987	1.096	0.857	< .001
TCV2	4.11	-1.605	3.857	0.766	< .001
TCT1	3.60	-0.958	0.860	0.868	< .001
TCT2	3.77	-0.764	-0.241	0.840	< .001
TCT3	3.45	-0.904	0.545	0.878	< .001
ESC1	4.37	-2.007	6.677	0.705	< .001
ESC2	4.27	-1.944	6.474	0.724	< .001
ESC3	3.66	-0.928	0.600	0.866	< .001
VSI1	4.27	-1.847	5.645	0.735	< .001
VSI2	3.76	-1.443	2.203	0.802	< .001
VSI3	3.81	-1.248	1.560	0.827	< .001
HRI1	3.36	-0.944	0.245	0.844	< .001

Variables	Mean	Skewness	Kurtosis	Shapiro-Wilk W	Shapiro-Wilk p
HRI2	3.62	-1.308	2.457	0.823	< .001
HRI3	3.46	-1.027	1.555	0.856	< .001
IMI1	4.28	-2.583	10.985	0.643	< .001
IMI2	4.26	-1.695	5.390	0.750	< .001
IMI3	3.18	-0.407	-0.368	0.919	< .001
ATM1	4.28	-2.350	9.370	0.683	< .001
ATM2	3.90	-1.282	1.980	0.820	< .001
AFD1	3.63	-1.184	2.170	0.837	< .001
AFD2	3.60	-1.273	2.068	0.830	< .001
AFD3	3.81	-1.498	2.714	0.799	< .001
STO1	3.89	-1.699	3.932	0.767	< .001
STO2	3.92	-1.639	4.505	0.780	< .001
STO3	4.06	-1.888	6.876	0.741	< .001
STO4	4.16	-1.725	5.676	0.753	< .001
STM1	3.83	-1.668	4.088	0.777	< .001
STM2	4.21	-2.188	8.582	0.704	< .001
STM3	4.01	-1.660	3.753	0.775	< .001
STF1	3.93	-2.012	6.002	0.724	< .001
STF2	4.08	-2.336	7.449	0.675	< .001
STF3	3.76	-1.178	1.853	0.840	< .001
SRO1	3.84	-1.607	3.652	0.787	< .001
SRO2	3.93	-1.685	4.518	0.776	< .001
SRO3	3.39	-0.788	0.863	0.878	< .001
SRO4	3.72	-1.521	2.328	0.786	< .001

Table 5 Ranking of important variables of travel intention

Reliability statistics is applied to test the reliability of the data collected. As Cronbach's α shows α = 0.952 > 0.9, indicating an excellent internal consistency. Reliability statistics are also applied to each item. All of them show excellent internal consistency as well.

	Cronbach's α
scale	0.952

Table 6 Reliability analysis

4.2 Hypothesis testing

4.2.1 Hypothesis 1

H1a: The perceived convenience of a virtual vacation positively impacts the intention of taking a virtual vacation.

This hypothesis investigates whether the perceived convenience of a virtual vacation in the metaverse positively influenced the intention of taking a virtual vacation. Spearman's test received a correlation value of 0.620 between INT3 and TCV1, indicating a strong and positive relationship between these two variables. For TCV2, Spearman's test received a correlation of 0.448, showing a moderate and positive relationship between INT3 and TCV2. Furthermore, since the $p < .001$ of both variables is less than 0.05, the null hypothesis is rejected, indicating a significant positive relationship between travel intention and the perceived convenience of a virtual vacation.

Correlation matrix		INT3
INT3	Spearman's rho	—
	p-value	—
	N	—
TCV1	Spearman's rho	0.620
	p-value	< .001
	N	105
TCV2	Spearman's rho	0.448
	p-value	< .001
	N	105

Note. H_a is positive correlation

Table 7 Spearman correlation hypothesis 1a N=105

H1b: The perceived control of a virtual vacation positively impacts the intention of taking a virtual vacation.

This hypothesis investigates whether the perceived control of a virtual vacation in the metaverse positively influenced the intention of taking a virtual vacation. Spearman's

test received a correlation value of 0.601 between INT3 and TCT1, indicating a strong and positive relationship between these two variables. For TCT2, Spearman's test received a correlation of 0.554, showing a moderate and positive relationship between INT3 and TCT2. A correlation value of 0.625 between INT3 and TCT3 indicates a strong and positive relationship between these two variables. Furthermore, since the $p < .001$ of all variables is less than 0.05, the null hypothesis is rejected, indicating a significant positive relationship between travel intention and the perceived control of a virtual vacation.

Correlation matrix		INT3
INT3	Spearman's rho	—
	p-value	—
	N	—
TCT1	Spearman's rho	0.601
	p-value	< .001
	N	105
TCT2	Spearman's rho	0.554
	p-value	< .001
	N	105
TCT3	Spearman's rho	0.625
	p-value	< .001
	N	105

Note. H_a is positive correlation

Table 8 Spearman correlation hypothesis 1b N=105

H1c: The perceived escapism of a virtual vacation positively impacts the intention of taking a virtual vacation.

This hypothesis investigates whether the perceived escapism of a virtual vacation in the metaverse positively influenced the intention of taking a virtual vacation. Spearman's test received a correlation value of 0.383 between INT3 and ESC1, indicating a weak but positive relationship between these two variables. For ESC2, Spearman's test received a correlation of 0.345, showing a weak but positive relationship between INT3 and ESC2. A correlation value of 0.279 between INT3 and

ESC3 indicates a weak and positive relationship between these two variables. Furthermore, ESC1 and ESC2 received a $p < .001$, and ESC3 received a p-= .002. Since The p-value for all variables is less than 0.05, the null hypothesis is rejected, indicating a significant positive relationship between travel intention and the perceived escapism of a virtual vacation. However, the influence may not be huge.

Correlation matrix		INT3
INT3	Spearman's rho	—
	p-value	—
	N	—
ESC1	Spearman's rho	0.383
	p-value	< .001
	N	105
ESC2	Spearman's rho	0.345
	p-value	< .001
	N	105
ESC3	Spearman's rho	0.279
	p-value	0.002
	N	105

Note. H_a is positive correlation

Table 9 Spearman correlation hypothesis 1c N=105

4.2.2 Hypothesis 2

H2a: The visual stimuli positively impact the intention to take a virtual vacation.

This hypothesis investigates whether the visual stimuli during a virtual vacation in the metaverse positively influenced the intention of taking a virtual vacation. Spearman's test received a correlation value of 0.387 between INT3 and VSI1, indicating a weak but positive relationship between these two variables. For VSI2, Spearman's test received a correlation of 0.150, showing a positive relationship between INT3 and ESC2, though the strength is very weak. A correlation value of 0.585 between INT3 and VSI3 indicates a moderate and positive relationship between these two variables. Furthermore, since the $p < .001$ of VSI1 is less than 0.05, the null hypothesis is rejected,

indicating a significant positive relationship between travel intention and the visual stimuli of a virtual vacation. For VSI2, the p = .064 is bigger than 0.05, and the null hypothesis is accepted, meaning that there is no significant positive relationship between travel intention and expectation of seeing the same aspects of the real world during the virtual vacation. Instead, as the p < .001 of VSI3 is less than 0.05, rejecting the null hypothesis and showing a significant positive relationship between travel intention and expectation of seeing aspects that are not from the real world (e.g., the flying UFOs) during the virtual vacation.

Correlation matrix		INT3
INT3	Spearman's rho	—
	p-value	—
	N	—
VSI1	Spearman's rho	0.387
	p-value	< .001
	N	105
VSI2	Spearman's rho	0.150
	p-value	0.064
	N	105
VSI3	Spearman's rho	0.585
	p-value	< .001
	N	105

Note. H_a is positive correlation

Table 10 Spearman correlation hypothesis 2a N=105

H2b: The hearing stimuli positively impact the intention to take a virtual vacation.

This hypothesis investigates whether the hearing stimuli during a virtual vacation in the metaverse positively influenced the intention of taking a virtual vacation. Because VSI1 is asked, "I don't think I would be interested in the background sounds during the virtual vacation." The value of this variable is reversed during analysis. Spearman's test received a correlation value of 0.116 between INT3 and HRI1, indicating a very weak but positive relationship between these two variables. For HRI2, Spearman's

test received a correlation of 0.518, showing a positive relationship with moderate strength between INT3 and HRI2. A correlation value of 0.525 between INT3 and HRI3 indicates a moderate and positive relationship between these two variables. Furthermore, although the p = .119 of HRI1 is bigger than 0.05, the null hypothesis is accepted, indicating no significant positive relationship between travel intention and interests in the background sounds during the virtual vacation. The p < .001 of HRI2 is less than 0.05, and the null hypothesis is rejected, showing a significant positive relationship between travel intention and background sounds. Meanwhile, as the p < .001 of HRI3 is less than 0.05, rejecting the null hypothesis and showing a significant positive relationship between travel intention and expectation of communicating during the virtual vacation.

Correlation matrix		INT3
INT3	Spearman's rho	—
	p-value	—
	N	—
HRI1	Spearman's rho	0.116
	p-value	0.119
	N	105
HRI2	Spearman's rho	0.518
	p-value	< .001
	N	105
HRI3	Spearman's rho	0.525
	p-value	< .001
	N	105

Note. H_a is positive correlation

Table 11 Spearman correlation hypothesis 2b N=105

H2c: The immersion positively impacts the intention to take a virtual vacation.

This hypothesis investigates whether the immersion of a virtual vacation in the metaverse positively influenced the intention of taking a virtual vacation. Spearman's test received a correlation value of 0.440 between INT3 and IMI1, indicating a moderate positive relationship between these two variables. For IMI2, Spearman's

test received a correlation of 0.456, showing a moderate positive relationship between INT3 and IMI2. A correlation value of 0.360 between INT3 and IMI3 indicates a weak but positive relationship between these two variables. Furthermore, ESC1 and ESC2 received a $p < .001$, and ESC3 received a $p = .002$. Since The $p < .001$ for IMI1 is less than 0.05, the null hypothesis is rejected, indicating a significant positive relationship between travel intention and immersion during a virtual vacation. As the $p < .001$ of IMI2 is also less than 0.05, the null hypothesis is rejected, showing a significant positive relationship between travel intention and the feeling of being involved in the virtual world. However, the $p < .001$ of IMI3 is less than 0.05 and rejects the null hypothesis, meaning that the temperature in the real world significantly positively influences the travel intention of a virtual vacation in the metaverse.

Correlation matrix		INT3
INT3	Spearman's rho	—
	p-value	—
	N	—
IMI1	Spearman's rho	0.440
	p-value	< .001
	N	105
IMI2	Spearman's rho	0.456
	p-value	< .001
	N	105
IMI3	Spearman's rho	0.360
	p-value	< .001
	N	105

Note. H_a is positive correlation

Table 12 Spearman correlation hypothesis 2c N=105

4.2.3 Hypothesis 3

H3a: The atmospherics positively impacts the intention to take a virtual vacation.

This hypothesis investigates whether the atmospheric aspects during a virtual vacation in the metaverse positively influenced the intention of taking a virtual vacation and furtherly develops possible relevant design elements in this area. Spearman's test received a correlation value of 0.253 between INT3 and ATM1, indicating a weak but positive relationship between these two variables. For ATM2, Spearman's test received a correlation of 0.277, showing a positive relationship between INT3 and ATM2, though the strength is weak. Furthermore, since the p = .05 for ATM1, the null hypothesis is rejected, indicating a significant positive relationship between travel intention and the atmosphere of the metaverse during a virtual vacation. However, there is a 5% possibility that the null hypothesis is correct. For ATM2, the p = .002 is less than 0.05, rejecting the null hypothesis and showing a significant positive relationship between travel intention and the familiar atmosphere for the participants during the virtual vacation.

Correlation matrix		INT3
INT3	Spearman's rho	—
	p-value	—
	N	—
ATM1	Spearman's rho	0.253
	p-value	0.005
	N	105
ATM2	Spearman's rho	0.277
	p-value	0.002
	N	105

Note. H_a is positive correlation

Table 13 Spearman correlation hypothesis 3a N=105

H3b: The affordance positively impacts the intention to take a virtual vacation.

This hypothesis investigates whether the affordance aspects during a virtual vacation in the metaverse positively influenced the intention of taking a virtual vacation and furtherly develops possible relevant design elements in this area. Spearman's test received a correlation value of 0.600 between INT3 and AFD1, indicating a moderately positive relationship between these two variables. For AFD2, Spearman's test received a correlation of 0.643, showing a strong and positive relationship between INT3 and AFD2. A correlation value of 0.734 between INT3 and AFD3 indicates a strong and positive relationship between these two variables. Furthermore, since the $p < .001$ of AFD1 is less than 0.05, the null hypothesis is rejected, indicating a significant positive relationship between travel intention and using the metaverse as the platform of taking a virtual vacation. For AFD2, the $p < .001$ is less than 0.05, and the null hypothesis is rejected, meaning that there is a positive relationship between travel intention and a better understanding of the location built in the metaverse during a virtual vacation. Meanwhile, as the $p < .001$ for AFD3 is less than 0.05, rejecting the null hypothesis and showing a significant positive relationship between travel intention and using the metaverse to explore the location in the real world where the participant has not been to.

Correlation matrix		INT3
INT3	Spearman's rho	—
	p-value	—
	N	—
AFD1	Spearman's rho	0.600
	p-value	< .001
	N	105
AFD2	Spearman's rho	0.643
	p-value	< .001
	N	105
AFD3	Spearman's rho	0.734
	p-value	< .001
	N	105

Note. H_a is positive correlation

Table 14 Spearman correlation hypothesis 3b N=105

H3c: The story positively impacts the intention to take a virtual vacation.

This hypothesis investigates whether the story aspects during a virtual vacation in the metaverse positively influenced the intention of taking a virtual vacation and furtherly develops possible relevant design elements in this area. Spearman's test received a correlation value of 0.267 between INT3 and STO1, indicating a weak but positive relationship between these two variables. For STO2, Spearman's test received a correlation of 0.310, showing a weak but positive relationship between INT3 and STO2. A correlation value of 0.293 between INT3 and STO3 indicates a weak but positive relationship between these two variables. 0.324 is the correlation coefficient between INT3 and STO4, showing a weak but positive relationship between these two variables. Furthermore, since the p = .003 for STO1 is less than 0.05, the null hypothesis is rejected, indicating a significant positive relationship between travel intention and listening to others' travel stories. For STO2, the p < .001 is less than 0.05, and the null hypothesis is rejected. There is a positive relationship between travel intention and a sense of belonging that a destination story offers. Meanwhile, as the p = .001 for STO3 is less than 0.05, rejecting the null hypothesis and showing a significant positive relationship between travel intention and opportunities to participate in the local culture offered by a destination story. Meanwhile, the p < .001 for STO4 is less than 0.05, showing a significant positive relationship between travel intention and the destination story.

Correlation matrix		INT3
INT3	Spearman's rho	—
	p-value	—
	N	—
STO1	Spearman's rho	0.267
	p-value	0.003
	N	105

Correlation matrix		INT3
STO2	Spearman's rho	0.310
	p-value	< .001
	N	105
STO3	Spearman's rho	0.293
	p-value	0.001
	N	105
STO4	Spearman's rho	0.324
	p-value	< .001
	N	105

Note. H_a is positive correlation

Table 15 Spearman correlation hypothesis 3c N=105

H3d: The story theme positively impacts the intention to take a virtual vacation.

This hypothesis investigates whether the story's theme during a virtual vacation in the metaverse positively influenced the intention of taking a virtual vacation and further develops possible relevant design elements in this area. Spearman's test received a correlation value of 0.424 between INT3 and STM1, indicating a moderate positive relationship between these two variables. For STM2, Spearman's test received a correlation of 0.420, showing a moderate positive relationship between INT3 and STM2. A correlation value of 0.469 between INT3 and STM3 indicates a moderate positive relationship between these two variables. Furthermore, since the $p < .001$ for STM1 is less than 0.05, the null hypothesis is rejected, indicating a significant positive relationship between travel intention and there is a specific theme of the destination story. For STM2, the $p < .001$ is less than 0.05, and the null hypothesis is rejected. There is a positive relationship between travel intention and the theme that meets the participant's preference. Meanwhile, as the $p < .001$ for STM3 is less than 0.05, rejecting the null hypothesis and showing a significant positive relationship between travel intention and being able to participate in the theme that meets the participant's preference.

Correlation matrix		INT3
INT3	Spearman's rho	—
	p-value	—
	N	—
STM1	Spearman's rho	0.424
	p-value	< .001
	N	105
STM2	Spearman's rho	0.420
	p-value	< .001
	N	105
STM3	Spearman's rho	0.469
	p-value	< .001
	N	105

Note. H_a is positive correlation

Table 16 Spearman correlation hypothesis 3d N=105

H3e: The story feature positively impacts the intention to take a virtual vacation.

This hypothesis investigates whether the story's feature during a virtual vacation in the metaverse positively influenced the intention of taking a virtual vacation and further develops possible relevant design elements in this area. Spearman's test received a correlation value of 0.364 between INT3 and STF1, indicating a weak but positive relationship between these two variables. For STF2, Spearman's test received a correlation of 0.528, showing a moderate positive relationship between INT3 and STF2. A correlation value of 0.271 between INT3 and STF3 indicates a weak but positive relationship between these two variables. Furthermore, since the $p < .001$ for STF1 is less than 0.05, the null hypothesis is rejected, indicating a significant positive relationship between travel intention and there are features in the story of the destination. For STF2, the $p < .001$ is less than 0.05, and the null hypothesis is rejected. There is a positive relationship between travel intention and the story feature that meets the participant's preference. Meanwhile, as the $p = .003$ for STM3 is less than 0.05, rejecting the null hypothesis and showing a significant positive relationship between travel intention and the familiar story feature to the participant.

Correlation matrix		INT3
INT3	Spearman's rho	—
	p-value	—
	N	—
STF1	Spearman's rho	0.364
	p-value	< .001
	N	105
STF2	Spearman's rho	0.528
	p-value	< .001
	N	105
STF3	Spearman's rho	0.271
	p-value	0.003
	N	105

Note. H_a is positive correlation

Table 17 Spearman correlation hypothesis 3e N=105

H3f: The role in the story positively impacts the intention to take a virtual vacation.

This hypothesis investigates whether the participant's role in the story during a virtual vacation in the metaverse positively influenced the intention of taking a virtual vacation and furtherly develops possible relevant design elements in this area. Spearman's test received a correlation value of 0.403 between INT3 and SRO1, indicating a weak but positive relationship between these two variables. For SRO2, Spearman's test received a correlation of 0.520, showing a moderately positive relationship between INT3 and SRO2. A correlation value of 0.312 between INT3 and SRO3 indicates a weak but positive relationship between these two variables. 0.504 is the correlation coefficient between INT3 and SRO4, showing a moderately positive relationship between these two variables. Furthermore, since the $p < .001$ for SRO1 is less than 0.05, the null hypothesis is rejected, indicating a significant positive relationship between travel intention and the feeling of involvement of the destination story. For SRO2, the $p < .001$ is less than 0.05, and the null hypothesis is rejected. There is a positive relationship between travel intention and having multiple

options during the participating destination story. Meanwhile, as the $p < .001$ for SRO3 is less than 0.05, the null hypothesis is rejected, showing a significant positive relationship between travel intention and being the main character of the destination story. Meanwhile, the $p < .001$ for STO4 is less than 0.05, showing a significant positive relationship between travel intention and creating own destination stories.

Correlation matrix		INT3
INT3	Spearman's rho	—
	p-value	—
	N	—
SRO1	Spearman's rho	0.403
	p-value	< .001
	N	105
SRO2	Spearman's rho	0.520
	p-value	< .001
	N	105
SRO3	Spearman's rho	0.312
	p-value	< .001
	N	105
SRO4	Spearman's rho	0.504
	p-value	< .001
	N	105

Note. H_a is positive correlation

Table 18 Spearman correlation hypothesis 3f N=105

5 Conclusion and findings

The questionnaire helped gather the information that would help us better understand how the travel intention and virtual vacation components relate to one another. The following chapter will discuss the results from the preceding sections to support current theories or provide fresh insights on design components.

Variables	*p*-value	Spearman's rho
TCV1	< .001	0.620
TCV2	< .001	0.448
TCT1	< .001	0.601
TCT2	< .001	0.554
TCT3	< .001	0.625
ESC1	< .001	0.383
ESC2	< .001	0.345
ESC3	0.002	0.279
VSI1	< .001	0.387
VSI2	0.064	0.150
VSI3	< .001	0.585
HRI1	0.119	0.116
HRI2	< .001	0.518
HRI3	< .001	0.525
IMI1	< .001	0.440
IMI2	< .001	0.456
IMI3	< .001	0.360
ATM1	0.005	0.253
ATM2	0.002	0.277
AFD1	< .001	0.600
AFD2	< .001	0.643
AFD3	< .001	0.734
STO1	0.003	0.267
STO2	< .001	0.310
STO3	0.001	0.293
STO4	< .001	0.324
STM1	< .001	0.424
STM2	< .001	0.420
STM3	< .001	0.469
STF1	< .001	0.364
STF2	< .001	0.528
STF3	0.003	0.271
SRO1	< .001	0.403
SRO2	< .001	0.520
SRO3	< .001	0.312
SRO4	< .001	0.504

Table 19 Spearman's correlation result

This section analyzes the previous test to identify variables influencing travel intention significantly. As the data suggests from Table 19, VSI2, *"I would expect to see the same aspects during the virtual vacation as in the real world. "* did not significantly influence travel intention, as the p = .064 for VSI2. To compare with VSI2, the VSI3, "*I would expect to see what is not from the real world in the virtual vacation, e.g., Flying UFOs.*" showed a significant positive relationship between travel intention and itself. Though Spearman's pho of VSI3 is 0.585, indicating a moderate strength of the relationship, this may be the answer to why VSI2 is not significant. By visiting the metaverse to have a virtual vacation, participants expect to view things that are not from the real world to gain better visual stimuli.

Another variable that will be discussed is HRI1: *"I don't think I would be interested in the background sounds during the virtual vacation."* However, it does not significantly influence travel intention as p = .119. As it was suggested in HRI3, "*I think I would listen carefully to the background sounds during the virtual vacation.*" Participants show a significant intention of catching the background sounds, even though they might not be interested in them.

The researcher will explore and explain the most critical elements influencing travel intentions in the following part. Starting with the perceived convenience, TCV1 shows a strong strength of correlation between travel intention and the convenience that a virtual vacation in the metaverse offers. It suggested that participants intend to take a virtual vacation because it is convenient to travel in the metaverse. TCV2 is more specific, asking about the convenience of visiting virtual cities and receiving a moderate strength correlation coefficient.

The perceived control of the vacation is another aspect that participants concern about. It positively influences the travel intention of participants in general. For example, a virtual vacation offers opportunities for users to have a better-controlled vacation, including choosing the location and partners. All three variables of TCT received moderate or greater Spearman's pho, showing a positive relationship between travel intention and the perceived control that a virtual vacation brings.

Even though the data suggested that the perceived escapism of a virtual vacation significantly positively influences the travel intention of participants, Spearman's pho of all three ESC variables showed a weak relationship. This weak relationship might be caused by low accessibility to the metaverse. As mentioned, no more than half of the participants have experienced augmented reality, about two-thirds of participants have experienced virtual reality, and only more than one-tenth of participants have experienced mixed reality. So, participants might not be able to imagine escapism.

Regarding sensory stimuli, it was defined that VSI1, VSI3, HRI2, and HRI3 significantly positively influence the participant's travel intention. Although Spearman's pho of VSI1 suggested a weak relationship between travel intention and it, VSI3, HRI2, and

HRI3 had a better correlation with moderate strength. In general, perceived visual and hearing stimuli during the virtual vacation significantly positively influence travel intention. When coming to the part of the immersion, the combination of visual and hearing stimuli, data suggested that bringing participants a feeling of being in a sense might help participants immerse themselves. This feeling of being involved would positively influence the participants' emotions, finally influencing the travel intention. However, results also showed that the temperature in the real world might distract participants during the virtual vacation.

It is identified that atmospherics significantly positively influenced the intention to take a virtual vacation in the metaverse. However, data suggested that the correlation between them was weak, in which Spearman's pho was 0.253 for ATM1 and 0.277 for ATM2.

One part that seemed to play an essential role was a virtual vacation's affordance. All three AFD variables were tested moderately or even strongly correlated with the travel intention in the metaverse. Based on the data, it is clear that the metaverse was a platform for participants to explore and obtain information. As a digital platform, the metaverse could be adjusted to fulfill users' desired functions. For instance, users could add functions like tour guides to obtain any information they want to know about the place during the virtual vacation.

The usage of destination stories significantly influenced participants' travel intentions in a positive direction. However, all four STO variables were tested, resulting in correlation coefficients less than 0.41, indicating a weak correlation between travel intention and the destination story. The theme of the destination story seemed to play a crucial role in generating the intention to take a virtual vacation, which was supposed by the data. All three STM variables resulted in Spearman's pho between 0.41 and 0.60, meaning there is a moderate relationship between travel intention and these three variables. The feature of the destination story was also an aspect that influenced travel intention significantly positively. Although STF1 and STF3 had a weak correlation with travel intention, STF2, "*I think I would be happy if the story of the destination contained features I like,*" was tested moderately correlated to taking a

virtual vacation. The role participant would participate in the destination story was another element that could help create travel intention, especially when there were multiple options for participants to choose from while taking part in the destination story.

5.1 Theoretical implication

The research aimed to determine the components influencing travel intention for a virtual vacation and further examine design features to attract intention. The research investigated the advantages of the metaverse, feelings of contentment, and potential design components. Finally, the designer would understand what elements may encourage a consumer to travel virtually in the metaverse.

The research confirmed that the virtual world generates perceived convenience when applying it in daily life. This result showed similar outcomes to the result carried out by Kanematsu et al. (2014), where the metaverse is used as a classroom to help students learn knowledge that is not convenient in real classrooms in the real world.

The data also identified the perceived control during the virtual vacation in the metaverse obtained intention to travel virtually. The ability to choose how users want to present themselves offers excellent alternatives for them. This further showed that the number of encouraging interactions in the metaverse and the individual's loneliness were mediated by social self-efficacy (Oh et al., 2023).

Regarding the perceived escapism, results from Buhalis & Karatay (2022) that over the past few decades, innovation and technology have had a growing influence on the tourist business, particularly on cultural heritage, were also confirmed in the research. However, the data furtherly suggested that respondents were more interested in discovering items that were not from real life.

Relevant to the study of Jeong et al. (2021), this research also observed that the impacts on individuals' senses influenced their emotions. Although the data indicated that the participants would not be curious about the background sounds, the sounds would still have an emotional impact. In addition, the data suggested that the

participants favored seeing objects that were not from the real world. It was discovered that immersion during the virtual vacation would also impact the participants' emotions., which confirmed the results from Caroux (2023). The emotions further influenced their satisfaction, leading to their intention to take a virtual vacation.

As one of the design elements, the data of atmospherics showed that it would influence the experience during the travel, which also confirmed the concept of tourism design system (Xiang et al., 2021).

The second design element, affordance, also confirmed the result of Dincelli & Yayla (2022). The statistics demonstrate that the metaverse served as a platform for individuals to explore and gather knowledge. The metaverse might be modified to provide the appropriate functions for users as a digital platform. For example, users might, for instance, add features like tour guides to obtain any information about the location while on a virtual vacation.

As the third design element, the destination story was also crucial. According to the theory of Moscardo (2020), stories enable travelers to produce and share their own stories and stories about prior experiences, making them an essential part of destination advertising and the entire tourism system. The theory of Moscardo (2020) focuses more on tourism in the real world, but data suggested that this theory was also applicable to metaverse tourism. More particularly, data showed that story themes, story features, and the role of the tourist in the story also accorded with the theory of Moscardo (2020).

5.2 Design elements

As the data suggested, the main design elements can be summarized as affordance and story. When designing a virtual vacation, the convenience and control that the tourist will perceive should also be considered.

The affordance of the metaverse was the most potential design element. This element is similar to taking benefit of perceived convenience of the metaverse tourism

mentioned by Verkerk (2022). The use of affordance can be discussed in two dimensions: to enhance the experience in the real world and to explore the virtual world. Similar to the example of a museum using virtual reality to enhance the experience of the tourists (Dincelli & Yayla, 2022), It would be beneficial if the metaverse included tools to assist users in finding information more quickly during daily life. Another use of affordance in the metaverse is to explore something the users do not know. For example, to visit a place they have not been to, a short virtual vacation helps the user explore the location and allows them to know more information which requires extra time looking for.

After that, building a destination story that allows consumers to participate was also suggested. Compared to the 2D viewing experience, watching a sporting event in virtual reality gives users greater satisfaction (Dincelli & Yayla, 2022). To personally take part in a story helps the tourist feel involved in the local culture. Having more agency throughout a story is likely to lead to more good experiences, better learning from the event, and a higher propensity to tell the story to others (Moscardo, 2020). The story's theme is one element that can be considered to enhance the perceived experience, which helps gain travel intention from consumers. It is necessary to pay attention to the story's features, especially those features preferred by the target group. Meanwhile, placing the tourist in the proper role should also be considered. Making tourists feel involved in the story helps them receive a more extraordinary experience. Then, they will later create their own stories and tell them to others.

Nevertheless, a proper atmosphere during the virtual vacation influences the tourist's experience during the virtual vacation. Although the data suggested that participants were not interested in the background sounds, the hearing and visual stimuli still influenced the perceived feeling of the atmosphere.

5.3 Limitation

As seen in the results section and Appendix 2, Cronbach's α of all items is above 0.94. This might be caused by judgmental sampling, a kind of convenience sampling. When

convenience sampling is utilized, there is a strong possibility that the sample group will not match the larger population, resulting in "low-set" and "high-set" populations that are mismatched and invalidating the initial tests (Sexton, 2022). Due to the subjective selection of participants, causing the samples were not random, finally causing errors in results. Meanwhile, when employing the question-and-answer format, another constraint that the researcher will run into is that most participants detest having to write their responses, particularly when the research asks respondents to supply written prose to convey their perspectives on the subject or topic. However, due to the time commitment, many responders may ultimately become weary of the needed writing and abandon the survey.

Moreover, due to reasons such as limitations of the technology and unaffordable hardware, not all participants have experienced augmented, virtual, and mixed reality. Meanwhile, as it is the early stage of metaverse development, few metaverse platforms currently exist.

5.4 Future research

The analysis of what customers with experience in the metaverse might anticipate from a virtual vacation should receive more attention in future studies. Further than just taking a virtual vacation, another idea may be to create a metaverse where people can actually live. The ability to think and learn from many angles will one day make it possible to take a virtual vacation.

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Appendices

Appendix 1 Questionnaire

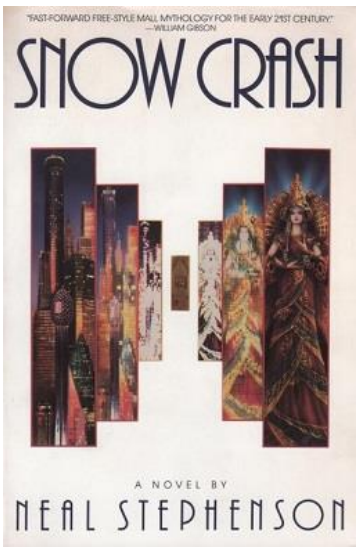
Questionnaire for a virtual vacation

Survery questionnaire for a virtual vacation in the metaverse. This questionnaire takes about 10 minutes.

The purpose of this questionnaire is to provide the researcher with information about how potential users of the metaverse think about virtual vacations and intend to help figure out the design elements. You would be asked general questions related to the virtual vacation in the metaverse. Personal data would be collected following privacy regulations.

Introduction to the metaverse

The metaverse is a 3D virtual environment that allows users to socialize and interact with each other with the virtual model they choose or build to represent themselves. *Snow Crash* (1992), a dystopian cyberpunk novel by Neal Stephenson, and *Ready Player One* (2018), an American science fiction action film based on Ernest Cline's novel of the same name, are two well-known examples that contain the metaverse.



Informed consent

1. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving a reason and without cost. I understand that I will be given a copy of this consent form. I voluntarily agree to take part in this study.

Question towards virtual vacations

Likert Scale (Strongly Agree, Somewhat Agree, Neither Agree nor Disagree, Somewhat Disagree, Strongly Disagree, Not Applicable)

2. I think it would not be safe to travel in the current situation.
3. I think it would not be safe to travel physically in the current situation.
4. I think it is convenient to visit a city in the virtual world.
5. I think it is easier to go to virtual cities than to physical ones.
6. I think staying with someone I choose during the virtual vacation may make me feel good.
7. I think my virtual image may help me imagine being someone else.
8. I think a virtual vacation may help me release myself.
9. I think rebuilding cultural heritage (e.g., those being destroyed during wars) is attractive.
10. I think recreating disappeared objects is attractive.
11. I think a virtual vacation can preserve cultural/historical sites.
12. I think the visual intake during the virtual vacation would be important.
13. I would expect to see the same aspects during the virtual vacation as in the real world.
14. I would expect to see what is not from the real world in the virtual vacation, e.g., Flying UFOs.
15. I don't think I would be interested in the background sounds during the virtual vacation.
16. I think I would listen carefully to the background sounds during the virtual vacation.
17. I think I would immerse myself in conversations during the virtual vacation.

18. 1+1=2

Question about virtual vacation elements

Likert Scale (Strongly Agree, Somewhat Agree, Neither Agree nor Disagree, Somewhat Disagree, Strongly Disagree, Not Applicable)

19. I think having a sense of being in the scenes displayed helps me immerse myself.
20. I think I like the feeling of being involved (in the displayed environment).
21. I think the temperature of the real world may distract me.
22. I think the atmosphere of a location is important to me.
23. I think I would enjoy staying in the atmosphere which is familiar to me.
24. I think it would be very beneficial to use the metaverse to explore virtual vacations.
25. I think using the metaverse would help me better obtain information during the virtual vacation.
26. I think using the metaverse to explore locations during a virtual vacation would be interesting.

Question about stories of destinations

27. I often hear people around me talking about their stories of different destinations they have visited.
28. I think a story of the destination may bring me a feeling of belonging when I am at the place.
29. I think a story of the destination can offer me opportunities to participate in local culture.
30. I think it is important that a destination has stories.
31. When there are stories about the destination, I think it is important that the stories have specific themes.
32. It makes me happy if the stories of the destination are in themes I like.
33. I think I would be happy to be a part of stories with themes I like.
34. I think the feature in the stories of the destination is important to me.
35. I think I would be happy if the story of the destination contained features I like.

36. I think I would be happy if the story contained features I am familiar with, e.g., Features from my hometown.
37. I think It is important to me that I feel involved in the story of the destination.
38. I think It is important to me to have many options when participating in a story of the destination.
39. I think I want to be the main character of the story.
40. I think I may create my own stories after visiting a destination.
41. I think I am interested in a virtual vacation in the metaverse.
42. I think I am willing to take a virtual vacation.
43. I think I am looking forward to taking a virtual vacation.

General questions

44. Have you ever tried AR (augmented reality)?
45. Have you ever tried VR (virtual reality)?
46. Have you ever tried MR (mixed reality)?
47. What is your gender?
48. When were you born?

Thank you for participating in this survey. We truly appreciate your feedback.

Appendix 2 Reliability analysis by item

	Cronbach's α
TCV1	0.951
TCV2	0.951
TCT1	0.950
TCT2	0.951
TCT3	0.951
ESC1	0.951
ESC2	0.951
ESC3	0.952
VSI1	0.950
VSI2	0.951
VSI3	0.951
HRI1[a]	0.956
HRI2	0.951

	Cronbach's α
HRI3	0.950
IMI1	0.950
IMI2	0.950
IMI3	0.952
ATM1	0.950
ATM2	0.952
AFD1	0.950
AFD2	0.950
AFD3	0.949
STO1	0.951
STO2	0.950
STO3	0.950
STO4	0.951

	Cronbach's α
STM1	0.950
STM2	0.950
STM3	0.950
STF1	0.949
STF2	0.949
STF3	0.950
SRO1	0.949
SRO2	0.949
SRO3	0.952
SRO4	0.951

[a] reverse scaled item