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Perceived Value of a VR (Virtual Reality) Tourism Experience: A Scale Development

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PERCEIVED VALUE OF A VR (VIRTUAL REALITY) TOURISM EXPERIENCE: A SCALE DEVELOPMENT

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ABSTRACT

Firms are skeptical about what values travelers anticipate obtaining from a Virtual Reality (VR) experience in tourism, and the valuation of trade-offs they are willing to make. This scale development aimed to fill this gap in the literature by creating a scale that can capture the perceived value derived from a VR experience in tourism. This research study adhered to well-established, mainstream psychometric scale creation and validation methods as demonstrated by several authors. This study provides a key step in developing measurement theory related to the perceived value derived from a VR experience in tourism and identifies four value dimensions: 1) hedonic value, 2) immersion and presence, 3) ease of use, and 4) virtual environment. Simultaneously, its theoretical relationships help tourism practitioners that confront high competition in the industry look for answers on how to increase differentiation through value creation and increase sales and loyalty.

DEDICATION

To my family and friends.

ACKNOWLEDGMENTS

To all my Professors and Committee members.

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CHAPTER I

INTRODUCTION

Technological innovations impact tourism in the short and long term, affecting how customers demand and consume travel (Buhalis, 2003; Buhalis & Law, 2008; Ma et al., 2003). As an example, many modern visitors use different technologies as their source of information for their journeys (Buhalis & Law, 2008), while online companies have been created to fulfill tourists' needs (Ma et al., 2003). These advances have been and are reshaping the travel and tourism industry, up to the point where with a little help from technology, consumers can travel almost anywhere without physically moving to a real destination or visiting places that do not even exist in the real world.

One of the most recent and popular examples of these technological innovations is the development and use of Virtual Reality (VR), an already widely employed tool in a variety of fields, such as gaming, sports, productivity, health, commerce, simulation training, among many others (Burdea & Coiffet, 2017; Kardong-Edgren et al., 2019). In the tourism industry, VR is already being used in a variety of ways (Guttentag, 2010). For example, it is used to virtually travel to remote destinations, showcase hotel and airport facilities to prospective travelers, and offer training to new hospitality employees, among many others. It is expected that it will be

more demanded by society soon, making it a mainstream technology, and even more frequently used for travel and tourism purposes (Boyd & Koles, 2019; Wohlgenannt et al., 2020).

To put these words into numbers, according to the Forecast and Analysis Report by Technavio (2022), "the metaverse market size in the travel and tourism industry is expected to be valued at USD 188.24 billion in 2026 with a progressing CAGR (Compound Annual Growth Rate) of 26.01%." During the projection period, North America will account for 37% of market growth, and the main markets in North America for VR technology in the travel and tourist sector are and will be the US and Canada (Technavio, 2022). This report also suggests that the main reason for this increase in this market trend is the demand growth of VR technology, and the augmented interest of consumers to use VR in the booking phase of their purchase behavior.

In academia, this interconnection between tourism and technology is sometimes referred to as "e-Tourism" (Buhalis & Deimezi, 2004; Buhalis & Law, 2008), a term that does not have a clear definition up to date. It has evolved very rapidly, and thus constantly caused it to reinvent itself in the marketing and management literature (Buhalis & Egger, 2008). Additionally, because many significant innovations are not designed specifically for tourism, many tourism scholars and practitioners are unaware of these changes and hence are not ready for its acceptance, use, and research within academia or industry. However, scholars and professionals should gain from comprehending new technologies and technological trends to best prepare themselves to face future issues and seize the value that technology presents.

To determine the value that new technologies bring to us, it seems important too to understand the concept of perceived value, a notion that has drawn much consideration from

both the business and the scholarly community in the past years (Tussyadiah, 2014). This recent source of fascination with the concept of perceived value is because modern organizations have given importance to generating value for their various intended markets. The creation and diffusion of value from firms to vacationers have become the key element in situations characterized by worldwide rivalry and increasing guest demands (Flagestad & Hope, 2001). When consumers feel high value in consumption, they are more inclined to offer positive feedback and repurchase the product or service (Chen & Chen, 2010; Gallarza et al., 2021).

Despite its importance, experts have yet to agree on a perceived value definition, particularly in the setting of travel and tourism (Holbrook, 1994, 1999; Shen, 2016; Woodruff, 1997; Zeithaml, 1988). Although many studies harmonize that perceived value is a multiple- rather than a one-layered construct, there is no consensus on which dimensions to include in the definition. These discrepancies make it challenging to comprehend the perceived value and contribute to research on value and tourism. For example, tourism firms are skeptical about what values travelers anticipate obtaining and the valuation of trade-offs they are willing to make (Holbrook, 1999).

Most research in the hospitality and travel and tourism industries on perceived value has used broadened and distorted versions of scales by lightly altering the wording of some sentences or by modifying the dimensions. However, Gallarza, Maubisson, and Riviere (2020) recommend researchers to use the exact number of items and variables and make the fewest modifications to the scales' phrasings. At the same time, even though it is known that VR significantly affects (and will affect) the travel industry, to the best of the author’s knowledge no scale measures the

perceived value derived from a VR tourism experience. Therefore, this scale development aims to fill this gap in the literature by creating a scale that can capture the perceived value derived from a VR experience in tourism.

Another motivation for conducting this study is the influence that VR has on tourism, in terms of the market after the COVID-19 pandemic. The United Nations World Tourism Organization (UNWTO) (2022) identified tourism as the industry that was most adversely affected internationally and predicted a $450 billion yearly reduction in international tourism earnings in 2020. Dube et al. (2021) warned that it may take years, if not more, for demand for traveling to foreign countries, staying at hotels, taking cruises, and engaging in other travel interrelated experiences to entirely recover. The shutting of international borders, international travel restrictions, the insolvency of tourism suppliers, and tourists' perceptions of risk are among the main obstacles anticipated to impede the revival of the tourism industry (Godovykh et al., 2021). Thus, there is a need to provide new services that enable safe travel experiences during this time of "forced hibernation" (Bausch et al., 2021), and VR in tourism needs to understand it due to the increasing forecasted market demand.

This research study adheres to well-established, mainstream psychometric scale creation and validation methods as demonstrated by several authors (Babin et al., 2000; Boateng et al., 2018; Churchill, 1979; Gerbing & Anderson, 1988; Rauschnabel et al., 2016). This scale explains the theoretical latent variables behind the behavioral use of VR in the travel and tourism industry. Simultaneously, their theoretical relationships help tourism practitioners that confront

high competition in the industry, looking for answers on how to increase differentiation through value creation, and therefore increase sales and loyalty.

The rest of this dissertation is structured as follows. Section 2 provides a review of the literature about VR, VR technology, VR and tourism, and perceived value. In section 3 the methods are discussed, while in section 4 the results are reported. Finally, section 5 presents the discussion.

CHAPTER II

LITERATURE REVIEW

2.1 VR Definition

No consensus exists regarding the conceptualization of VR, as different propositioned characterizations vary while portraying the features that are thought important to define an encounter as VR (Boyd & Koles, 2019; Kardong-Edgren et al., 2019; Wohlgenannt et al., 2020). However, this research utilizes a conceptualization of VR that comes from books devoted exclusively to VR, described by Burdea and Coiffet (2017), Vince (2012), and Gutierrez, Vexo, and Thalmann (2008). These authors agree that VR is characterized as the technology that produces a three-dimensional setting created by a computer normally referred to as a virtual environment (VE), where people can move and/or explore, and conceivably interact with; achieving a constant experience that involves at least one of their senses. As indicated by this conceptualization, the exploration component implies the mobility capacity users have to discover the setting, while the interaction element alludes to the capacity to pick, move, touch or talk with any element inside the environment (Gutierrez et al., 2008; Vince, 2012).

It is vital to highlight that this is a broader definition of VR which includes possible movement and interaction, and therefore, this definition does not make it mandatory to move or

interact to be defined as a VR experience. While Gutierrez et al. (2008) and Vince (2012) determined interactivity as an essential part of VR, the current study's definition uses it as non-compulsory, as this more adaptable conceptualization allows the conversation of a more extensive cluster of innovations that are pertinent to the travel industry and still are firmly related (Guttentag, 2010). Even though this research uses a wider meaning of VR, the conceptualization unmistakably continues to separate VR from different sorts of comparative technologies. As an example, special effects in movies would not be categorized as virtual reality since they don't take into consideration any type of navigation that is controlled by the user.

Any experience in virtual reality can be valued through the ability to give physical submersion or “immersion”, and the mental presence or “presence” to its users (Gutierrez et al., 2008). In this case, submersion denotes how much a consumer is separated from the current reality and how much immersion has in the virtual environment. As an example, in a completely immersive environment customers are fully submersed in the virtual environment and thus have no connection or reminder of the present reality; whereas in a non-fully immersive environment, clients hold some contact with the current reality and might not feel fully submersed in the virtual environment (Burdea & Coiffet, 2017). The degree of submersion presented during a VR experience is a single component that might impact the client's sensation of presence (Baños et al., 2006), a concept that will be defined next.

Similar to VR itself, presence likewise has been conceptualized in different ways (Felnhofer et al., 2012), yet, the usual understanding of the notion of presence is the feeling of actually sensing one’s self in the virtual environment instead of the real physical space where the

user's body is physically placed (Sanchez-Vives & Slater, 2005; M. Slater & Wilbur, 1997). An indication of presence can be denoted when individuals act in a virtual environment similarly as they would act in a comparable circumstance in a non-virtual experience (Gutierrez et al., 2008). The perception of presence is normally individual and is related to the participant's psychological cognition, yet without a doubt is affected by the capacity of delivering high-quality virtual environments to the user (Barfield & III, 1995; Felnhofer et al., 2012; K. M. Lee, 2004).

The ability to give high quality to virtual environments, which enhances the feeling of presence, upgraded significantly from the time when the first types of virtual reality innovations were created during the sixties (Burdea & Coiffet, 2017; Gutierrez et al., 2008), making current virtual environments very hi-tech and sophisticated. Therefore, due to its importance, the current technologies in VR will be discussed in the following section.

2.2 VR technology

Each VR system needs a gadget that deciphers the participant's activities and helps enter that information into the computer so that the virtual environment could be able to react appropriately. The majority of these systems trace the movement of hands, head, and/or other extremities of the user; then this data is sent to a processor which in turn will use that information to decide what the participant is going to see next, where is going to navigate next, or which items will the user be in contact with (Burdea & Coiffet, 2017; Sagayam & Hemanth, 2017). The sorts of gadgets that VR systems use fluctuate to a great extent yet can be as basic as

a small handheld device. However, more complex gadgets are also utilized, e.g. intelligent gloves, sensor controls, voice recognition computer programs, and wands among others (Guttentag, 2010). Additionally, the participant's figure may be traced by utilizing special clothes that have point estimation apparatuses set on different body parts, or tracing devices that do not make body contacts, such as the use of cameras, sound, or magnetics. Those gadgets that are not in contact with the body, might utilize just a solitary tracker point that is situated in a particular area, for example, on the upper location of the user's figure, or they might focus on various essential body parts, or all the individual's anatomy (Burdea & Coiffet, 2017; Gutierrez et al., 2008; Guttentag, 2010; Sagayam & Hemanth, 2017).

Because of the participant's input information, the VR system will portray a proper view of the virtual environment, causing the optical component to be a paramount element for the use of this technology. Therefore, it has been the component that has gotten the most attention, study, and development (Gutierrez et al., 2008; Guttentag, 2010). A virtual environment should deliver a picture in 3D and let it be seen according to any perspective, as controlled by the participant's view. Even so, current advances go at a greater distance. For instance, certain systems imitate ordinary visualization as it is displayed a different view for the right and left eye, helping the user to experience "stereoscopic vision" (Vince, 2012). Another important element that creates practical and lively environments is the incorporation of a scheme that addresses the crash between various items with the goal that things don't combine as one when they impact together. Additional systems utilize a method identified as "3D clipping" that shows only things inside the client's vision area (Vince, 2012).

Throughout the past years, the nature of delivered images to the users has increased significantly in quality as innovations have been made in reproducing graphic prompts like surfaces, shades, and translucence. However, the continuous necessity to refresh images in three dimensions instantaneously restricts the capacity to imitate intricate sensations such as light refraction, to give an example (Gutierrez et al., 2008; Guttentag, 2010; Vince, 2012). It is important to say that even the quality of rendered images is very important for the virtual reality experience; its importance is diminished by the concept of "latency" which is the deferral between the participant moves and the update in the image that is being displayed to the user. When an environment presents elevated levels of latency, the user's perception of presence decreases, and it is probable the induction of motion sickness to the user. Thus, to eliminate latency and enhance the experience, VE's should respond to movements in milliseconds (Burdea & Coiffet, 2017; Meehan et al., 2003; Sanchez-Vives & Slater, 2005; Vince, 2012).

As previously stated, virtual environments are shown to the participants through the use of optical gadgets, which are very different from one another these days (Burdea & Coiffet, 2017). The most common example of an optical gadget is the "head-mounted display (HDM)" which commonly takes the form of a protective cap, goggles, or glasses, and shows the virtual environment in front of the user's eyes. Another common optical gadget is the "hand-supported display (HSD)" which typically is some sort of binoculars that the user needs to hold with their hands. The least common type of optical gadget is the "floor-supported display (FSD)" which usually is similar to an HMD but connected to an articulated mechanical arm that is supported from the floor (Gutierrez et al., 2008). These three types of optical gadgets are intended to be

used only by one user; however other gadgets permit few clients to encounter a VE at the same time. For instance, there are huge panoramic screens that allow multiple users to encounter virtual reality at the same time; or special rooms that showcase images in three dimensions on all the walls of a room with the use of projectors or other types of technology (Guttentag, 2010; Vince, 2012).

It is relevant to note that the optical components of VR gadgets are the ones that have gotten the most consideration, however, the auditory components are vital in creating convincing virtual environments (Gutierrez et al., 2008). The most common way to include an auditory component to the experience in virtual reality is with the use of earphones, headphones, or speakers. Having good quality in the auditory system is naturally looked-for, but it is more important to provide spatial qualities to it (Tsingos et al., 2004). These spatial characteristics that are given to sound should provide direction and represent acoustic characteristics of what the user is experiencing in the virtual environment (Burdea & Coiffet, 2017). The most important characteristic is offering direction, this is because sounds should be felt by the user as if they come directly from the elements that the individual is observing or not observing. Nonetheless, giving acoustic characteristics to the environment is also imperative because the sound is heard diversely in various conditions, which might create sound prompts like resonations. It is also important to take into account that sounds that start in various areas are heard differently in each ear and it also depends on the personal physical state of the participant's figure, head, and ears (Gutierrez et al., 2008; Guttentag, 2010; Vince, 2012).

Another relevant component of any virtual environment is the enhancement of the sense of touch. This is the most difficult component to include since the feeling of touch includes complex components of the sensory system. All things considered; specialists have gained critical progress in reproducing specific feelings of touch. Vibrations, for instance, are produced effectively in an assortment of ways and are now generally utilized in numerous computer games. Likewise, scientists have created haptic gadgets, for the most part coming as gloves, however occasionally covering a participant's whole part of their body could trigger the force feedback feeling (Guttentag, 2010; Vince, 2012). In any case, duplicating the sense of touch will be difficult to solve, featuring an impediment for numerous virtual reality systems.

Finally, taste and olfaction are the senses that regularly are viewed as not as important as the ones previously discussed, however, they could be great enhancers of the VR experience. Olfactory stimuli are able to improve presence in the virtual environment (Dinh et al., 1999), regularly with the incorporation of devices that spray specific scents to the user or the physical environment (Gutierrez et al., 2008; Washburn & Jones, 2004). A few difficulties that these devices face should ease their incorporation with the whole VR system, should make realistic fragrances, guarantee that one aroma is taken out before another fragrance is presented, and represent the shifting olfactory abilities of various people (Washburn & Jones, 2004). Although studies that relate virtual reality and smell are fairly restricted, research that relates it with tasting is much scarcer (Gutierrez et al., 2008; Guttentag, 2010). However, research about the simulation of taste by inserting little quantities of fluid in the mouth of the participant has been an important step in this research area (Iwata et al., 2004).

When thinking about the present status of virtual reality, one must acknowledge the system's capacity for arousing specific senses adequately and think about the main purposes for its use. As an example, precision in tactile components is relevant for an experience that reproduces a medical procedure for specialists in preparation, while excellent sound would be relevant for a VR system reenacting a symphony in a show (Guttentag, 2010). With respect to the travel industry, the audiovisual elements probably are the most essential, however, we should think about every system's specific use. Thus, depending upon the objective of the VR experience, the importance of highlighting one or different senses at the same time. In the following section, VR in tourism will be argued.

2.3 VR in tourism

As virtual reality improvements keep evolving, the opportunities for exploiting VR in the travel and tourism industry will progress. However, not considering in what way these improvements propagate, there are many applications in the tourism industry up to date. In this section, an examination of some of these relationships in the travel and tourism industry will be discussed, demonstrating that virtual reality fundamentally affects the travel industry and that virtual reality offers opportunities to both researchers and practitioners/managers.

The uses of virtual reality are to a great extent found in the early periods of the customer purchasing cycle in the travel industry since it helps process broad data about significant variables that have an important impact in the research stage of the decision making process (Kim et al., 2020). The sectors of the travel and tourism industry that could get benefit from this

technology are the planning and management areas, due to the exclusive testing capacities that it brings to customers (Sussmann & Vanhegan, 2000). Virtual reality in tourism can be recognized as a formation of different kinds of systems where travelers can encounter an experience ahead of time, for example, visiting a museum or airport, and/or get to know ahead of their travel the routes required to take to do what they want to achieve (Tussyadiah et al., 2017, 2018). These advances are, as of now, utilized in an arrangement of vacationers with VR sneak peeks of sites, destinations, and attractions like lodgings, cruises, and comparable experiences as a piece of its promotion (Guttentag, 2010), among many others.

Furthermore, virtual reality technologies and the actual technological climate allow the making of virtual touristic attractions at a viable expense, as it is exemplified with actual simulators, and virtual marketing destination experiences. Some illustrations of these experiences in the travel and tourism industry are the “Sensorama Simulator”, the “bike-rides through New York City”, and the “Cyber speedway in Las Vegas” (Gutierrez et al., 2008). It is expected that there will be more and more improvements in the virtual reality travel industry, as technology improves the generation of navigable and true-to-life environments.

VR is also recognized as a key element in the creation and development of public policies for travel and tourism (Cheong, 1995, Orru et al., 2019). To create management plans, practitioners should comprehend the customer’s array of time, place, and space, and VR could help in moving this problem from regions that have substantial usage to the ones that have less (Lew & McKercher, 2006). Distinguished patterns in the travel industry exist, to successfully and appropriately plan and manage virtual travel (Tussyadiah et al., 2017). One example is the

simple and meticulous routes made within the virtual reality that are promptly accessible for travelers, by helping them with their travel schedule and arranging procedures (Tussyadiah et al., 2018).

Another huge fashion in the virtual reality travel and tourism industry is usually recognized as virtual tours. These tours include managing virtual articles, interactive and immersive experiences to destinations or specific places, historical tours, and live documentaries, among many others. These virtual tours are normally utilized in historical sites, lodges, and museums that include displays of culture (Roussou, 2004), cultural heritage sites (Guttentag, 2010), zoo displays (Bowman & McMahan, 2007), interactive tours (Nayyar et al., 2018), or choices of touristic attractions (Linaza et al., 2008), among many others. Many hotels also have shown that virtual reality is very useful in "destination marketing" by causing changes in the processes involved in traditional room reservations (Neuburger et al., 2018). Prospective visitors can visit any hotel room and receive promotions in virtual reality, such as those offered by Marriott Hotels which include previews of local activities in certain destinations, providing potential travelers with insights into their future travel.

The perception and adoption of companies, investors, and clients towards virtual reality in tourism continue to increase, as a consequence of the developments and innovations in its technology (Ritchie et al., 2011). Therefore, virtual reality should fulfill the potential necessities of future travelers that are vast, and this is where research should take advantage in distinguishing the significant patterns in the travel industry concerning the future (Nayyar et al., 2018). One study that investigated the consumer behavior of VR in the travel industry used a

model that established that brands and travel companies can influence consumers' perceptions and choices directly and adequately through interactivity, experience, and immersion (Kim et al., 2020). As Hyun & O'Keefe (2012) stated, "virtual conative image usually results in potential purchase intention".

As technology continues to advance, VR in the travel industry gives a more complete representation of physical spaces and diminishes clients' perceived anxiety and risk by acquainting buyers with new unknown places (Lee & Oh, 2007; Wan et al., 2007). As an example, virtual reality in tourism could also help those individuals that might feel overwhelmed to travel to certain destinations or visit places that are impossible to travel to, such as destinations with possible geographical hazards or due to a person's reduced mobility (Pestek & Sarvan, 2020).

Technology has developed new techniques for either escaping reality or simulating a better future (Trufanova, 2021), and thus escapism has a very important role in our society. Escapism is a concept that is significant to the literature on VR in tourism and sometimes is related with a negative connotation. According to Pine et al., (1999) the traditional definition, escapism is an event that is so vivid and engrossing that it causes participants to momentarily forget about their regular lives. Kim, (2014) defined escapism as the tendency of the majority of individuals to emotionally and perceptually flee from their present reality as a result of uncomfortable or dissatisfied living circumstances. According to Ponsignon et al., (2020) "when people immerse in the experience, they escape from their reality".

Furthermore, Wulf et al., (2022) found that escapism can be a manifestation of negative public events, such as a pandemic, and uncertain times, such as an economic crisis. To give a recent example, Fernandes et al., (2020) found a rise in adolescent internet usage and gaming addiction from different countries which provoked a negative influence on the psychological well-being of adolescents due to the COVID-19 pandemic. High rates of depression, loneliness, escapism, poor sleep quality, and anxiety were reported by those adolescents who extraordinarily used social media, gaming, and the internet compulsively.

Numerous studies back up the notion that the concept of escapism plays a significant role in encouraging consumers to participate in activities that are common like shopping (Babin et al., 1994), or uncommon like extreme sports (Arnould & Price, 1993). It has been proved that escapism is crucial for defining and comprehending the tourism experience (Sheng & Chen, 2012). As an example, studies about cruise experiences and animal tourism experiences were viewed as “escapist experiences” that have been regarded as a dimension for evaluating “nature-based recreation experiences” (Hosany & Gilbert, 2009). Tourism is commonly seen as a way to briefly escape one's daily life, experience something novel, and momentarily forget about it (Barr et al., 2010). Allowing individuals to escape from a little environment into a larger one and let their minds go where their bodies can't is what “good escapism” does. However, escaping from the real world into one that is smaller or safer, and avoiding the unpleasant action your body may take are both negative forms of escapism. It is still questioned if the virtual and physical worlds are related, much like how escapism and reality are (Irimiás et al., 2021).

The areas that are behind the future growth of virtual reality in the travel industry are also interrelated such as marketing, consumer behavior, traveler demand forecast, and experience co-creation, just to mention a couple of examples. All these combined should aim to influence the connection, excoitement, and decision making progress of the final user: the traveler (Wei, 2019). However, as innovations in virtual reality keep developing, media outlets will figure out how to make these advancements exceptionally valuable for promoting entertaining vacation destinations and helping managers in endorsing destinations (Gutierrez et al., 2008).

The application of virtual reality as a marketing tool is another significant and much debated issue in tourism marketing, up to the point that some authors believe that marketing tourism's future lies in VR (Beck & Egger, 2018). Even though studies have proved that conventional travel guides are seen to be more potent than VR experiences (Tussyadiah & Pesonen, 2016; Tussyadiah & Wang, 2017), more recent research reveals that VR is a successful marketing strategy for the travel industry (Griffin et al., 2017; Tussyadiah et al., 2017, 2018). In these studies, the use of VR as a marketing tool led to stronger interest (Griffin et al., 2017), and was related to a positive attitude toward the destination (Tussyadiah et al., 2017). The main reason behind these relationships is that VR is able to create curiosity and willingness to view the advertisements (Marchiori et al., 2017). If a destination is advertised in VR as opposed to on a website with static images or 2D films, the intention to recommend the place or to share the promotional experience with others is higher (Griffin et al., 2017). VR may be used to enhance websites or provide interactive information to visitors, which will benefit the tourist more (Potter

et al., 2016). Virtual reality (VR) may be used to supplement in-person tourist experiences as well as to improve them (Jung et al., 2016).

All these trends suggest that virtual reality is here to stay, and probably will be one of the most used technologies in the future (Barnes, 2016), therefore it will lead hospitality managers and researchers to tailor these experiences depending on the final user type to meet their needs most efficiently. It is well known that the tourism industry is in continuous change and adding technology such as VR, will bring together opportunities and difficulties. However, these complications and possibilities can only be handled and exploited with a better understanding and awareness of the links between them. Fortunately, despite its drawbacks, VR has a wide range of interesting uses, from development and administration to enjoyment. Furthermore, virtual reality can produce alternative experiences that, in some cases, may be incredibly valuable for cultural preservation. As new and better innovations in virtual reality are created, the amount and relevance of imaginable VR use in the tourist sector are going to increase, therefore tourism academics and experts will be tasked with utilizing VR for the unique opportunities it brings. In the following section, some theories of perceived value will be discussed, to have a wider understanding of how a VR experience in tourism can bring value to consumers.

2.4 Perceived Value

The idea of perceived value became a key corporate subject in the 1990s and has piqued researchers' interest in the twenty-first century. The topic of value creation has increased the interest of marketing experts in both academia and business as seen by the vast number of

publications (Mizik & Jacobson, 2003; Spiteri & Dion, 2004). Certainly, creating customer value must be the purpose of any organization and, without a doubt, the heart of its triumph (Slater, 1997). Customer value generation is an important requirement when creating and maintaining any competitive advantage (Wang et al., 2004). Therefore, the notion of consumer value became the primary problem that needs to be faced in all activities related to marketing, since it has been shown that loyalty and returns are intimately tied to what is provided to consumers (Holbrook, 1994, 1999; Khalifa, 2004).

Regardless of its widespread curiosity, the idea of value is frequently misunderstood in academic research. It is a concept that very often is "overused" and "distorted", specifically in managerial knowledge. In the marketing literature, many definitions of perceived value have been proposed (Holbrook, 1999; Woodruff, 1997; Zeithaml, 1988), however one of the most referenced conceptualizations is the one provided by Zeithaml (1988). She expressed value as "the consumer's total evaluation of the utility of a product based on perceptions of what is received and what is offered" (Zeithaml, 1988). According to her perspective, perceived value has one dimension, and can be quantified by requesting to state the value that was received with the transaction in terms of the exchange amongst benefits and costs. On the other hand, some authors argue that this interpretation of value is a limited view of the concept; they argue that perceived value is a concept that has multiple dimensions (Babin et al., 1994; Holbrook, 1994, 1999; Mathwick et al., 2001, 2002; Sinha & DeSarbo, 1998; Sweeney & Soutar, 2001).

The absence of consensus between academics on the definition and measurement of perceived value stems from its unclear nature. An examination of the academic work indicates

that two major approaches could operationalize value. Perceived value is viewed as a one-dimensional concept in the first approach. Perceived value, in this view, is conceptualized as a sole general idea that may be assessed with a self-declared measurement item to assess the buyer's perception of value (Agarwal & Teas, 2002; Brady & Robertson, 1999; Sweeney et al., 1999). With this view, it is possible to assume that perceived value is the result of several antecedents, but it excludes the idea that value is a composite concept made up of various components. The second view sees perceived value as a concept formed with multiple dimensions that have interconnected properties and that together provide a comprehensive picture of a complicated concurrence (Babin et al., 1994; Holbrook, 1994, 1999; Sweeney & Soutar, 2001). Below, I go through each of these study areas in further depth.

2.4.1 Unidimensional (Utilitarian) Approach

This view represents the beginnings and initial phases of the study of perceived value. This approach understands perceived value from a utilitarian standpoint, with monetary and rational thinking employed by analyzing the associated advantages and costs. This view comes from the psychological construct where it is thought that an increase in wealth, without giving importance to its size, would constantly bring a rise in the individual's utility that is contrarily proportional to the number of commodities previously held (Bernoulli, 2011). This utility is measured and characterized in this context as an individual's emotional personal "value of money" in face of risk and uncertainty. According to the expected utility theory (Neumann & Morgenstern, 2007), "price is the value of a service, and clients spend their money to maximize

the value they receive from services". As a result, the perceived value was defined as a tradeoff between "utility" and "disutility" when a consumer gets and uses any service. Monroe (2003) goes on to say that customers' perceptions of value are based on comparisons between several pricing structures, however, evaluating it only with price neglects the multidimensional and complicated side of the view of perceived value (Boksberger & Melsen, 2011; Chang & Wildt, 1994; Naylor & Frank, 2001; Zeithaml, 1988).

The utilitarian approach to perceived value has been examined, updated, and extended over time (Boksberger & Melsen, 2011). The ground-breaking conceptualization of Monroe (2003) evolved into Parasuraman and Grewal's (2000) four-component model of perceived value. These authors stated that even though the price is strongly connected and commonly utilized with the notions of benefits and sacrifice, the definition of perceived value based merely on price is an essential but inadequate conceptualization. Thus, the proportion between total benefits and sacrifices became a very well-accepted conceptualization of perceived value (Zeithaml, 1988). Notwithstanding the benefits of the conceptualization that compares only "benefits" and "sacrifices" seems to be very rational, in the following section the approach that defines perceived value as a concept with multiple dimensions will be discussed.

2.4.2 Multidimensional (Behavioral) Approach

In comparison to utilitarian benefits and sacrifices, the multidimensional or behavioral viewpoint of perceived value addresses it more holistically and strives to enlighten it more thoroughly. As of now, the multidimensional approach is favored over the utilitarian. The main

premise of the behavioral approach of perceived value is based on the "social exchange theory", and believes that any transaction that is made between two parties is reciprocal and social (Emerson, 1976; Thibaut & Kelley, 1959). According to the theory, social contact comprises a trade relation of events and returns/expenses, since consumers constantly justify their behavior by citing the advantages and sacrifices it brings them (Homans, 1961).

Some authors further developed the conceptualization of perceived value. Woodruff and Gardial (1998) and Woodruff (1997) created a "value hierarchy" based on the expectation-disconfirmation paradigm, which included a judgment of desired and received values; Hartman (1967) found three types of perceived value; Mattson (1991) posited three basic perceived values; Seth et al. (1991) suggested a model based on four different types of value; and Holbrook (1994, 1999) expressed perceived value as an "interactive relativistic preference experience". The idea of multidimensional conceptualization was embraced, and typologies of perceived value were established in subsequent studies. Perceived value in these typologies normally refers to a subject's assessment of a concept, and as a result, these values can be defined as interactive and preferable.

Sweeney and Soutar (2001) created a multi-item measure named the Perceived Value Scale (PERVAL) based on the consumption value paradigm proposed by Sheth et al. (1991). In the post-purchase setting, Petrick (2002) created a multi-item survey (SERV-PERVAL) that proved to be trustworthy and valid specifically for services. Sanchez et al. (2006) created a multi-item instrument (GLOVAL) where perceived value was seen in several concurrent points in the buying and/or consuming cycle, including before buying, during purchase, during usage,

and lastly after use. Additionally, the Experiential Value Scale (EVS) developed by Mathwick, Malhotra, and Rigdon (2001) is by far one of the most popular value scales, particularly in retailing and tourism (Gallarza, Maubisson & Riviere, 2020).

This general visualization intends to explain the customer's perceived value considering cognitive and affective systems. On the contrary, the unidimensional approach stays short by only using costs and benefits. Even though unidimensional techniques enjoy the advantage of being simple, they neglect to catch the intricacy of the buyers' value perspectives; specifically, they neglect to represent the vast amount of psychological, intrinsic, and immaterial aspects that make up the concept. Therefore, several researchers argue that models that are based on a trade-off between two constructs for consuming experiences are excessively simple because they neglect the construct's multi-dimensionality. When the perceived value is seen as a blend of utilitarian and hedonic reactions (Babin et al., 1994), it should reflect an emotional element that includes amusement, entertainment, and emotive values. Notwithstanding their disparities, the two distinct approaches are not opposed to each other, instead, they address basic and complicated points of view of this construct.

2.5 Perceived Value (PV) of a Virtual Reality (VR) tourism experience

Because usually customers' cognitive loyalty is defined as future behavioral intentions (Chen & Chen, 2010), researching it might provide insights for tourist firms on finding ways to increase customer loyalty, and hence contribute to the continuous growth of their revenues. At the same time, researchers have found that perceived value has a direct beneficial influence on

behavioral intentions and is identified as a significant motivator for future expected conduct (Kim, 2014), however, any previous travel experience is possible to alter it (Morgan, 2006). Still, previous research into the linkages between perceived value, travel experience, and behavioral intention has been lacking (Shen, 2016).

To understand purchase behavior, leisure activities such as tourism must rely on imagination, sensations, and emotions. Beyond tangible features, perceived quality, or price, many elements of travel and tourism products and experiences have symbolic connotations too. Therefore, a multidimensional approach that understands value as a construct that changes over time (prior, during, and after purchase and use) is more adequate in the conceptualization of value for this study since the valuation determined at each of these points might be different (Gardial et al., 1994). In this same sense as an example, the characteristics of a tourism experience and the price may be decisive factors at the time of purchase, while the repercussions and outcomes gained during and after usage are the aspects valued by the tourist in other stages.

When measuring perceived value, PERVAL and EVS are found to be a couple of the most well-known value scales, especially in retailing and the travel industry (Gallarza, Maubisson & Riviere, 2020). Both scales have different dimensions, EVS is more service-oriented while PERVAL is product-oriented, even though their final goal is to measure value. Nevertheless, ironically, PERVAL has been used more in travel and tourism than EVS (Walsh, Shiu, & Hassan, 2014), even though the tourism industry has proved that travel has a great deal of the experiential construct (Spielmann, Babin, & Manthiou, 2018). The differing customer experience settings drove researchers in the hospitality and tourism industry to build up a wide

number of scales, a significant number of which share minimal substance with the originals (Gallarza, et al., 2020). Even though most research in the hospitality and travel and tourism industries has used "broadened" (distorting) versions of the PERVAL and EVS scales by only modifying some wording, phrases, or variables, Gallarza, Maubisson, and Riviere (2020) suggest that researchers should use the exact number of items and variables and make the fewest modifications to the scales' phrasings.

Based on the different theories and views on VR, PV, and tourism that were previously discussed in the literature review, for this study, the customer's perceived value (PV) derived from a Virtual Reality (VR) tourism experience is defined as reflected by consumer perceptions of generalized utility derived from an immersive (virtual) tourism encounter including elements of playfulness and/or usefulness. Now that the construct to be measured for this study has been defined, it is time to talk about the methodology.

CHAPTER III

METHODOLOGY

3.1 Overview

The methodology used for this scale development followed recognized and conventional psychometric scale creation and validation approaches (Bentler, 1985; Boateng et al., 2018; Churchill, 1979; Gerbing & Anderson, 1988; Peter, 1979). This research was conducted with five different studies that represent the different phases and steps suggested for scale development (see Table 1). These phases and steps are put together based on the work of Churchill (1979) who suggested a technique for developing improved measures in marketing research; the work of Gerbin and Anderson (1988) who revised the paradigm for scale development by including Confirmatory Factor Analysis (CFA) for the evaluation of one-dimensionality; and the methodology and best practices for developing and validating scales published by Boateng, Neilands, Frongillo, Melgar-Quiñolez and Young (2018).

According to Boateng et al. (2018), there are numerous articles devoted to scale development and validation which causes it to be an area of knowledge that can sometimes be burdensome, full of specific technical terminology, unacquainted and requires a lot of resources. Nevertheless, these authors reviewed the scale development process and created some best

practices, as well as proposed a methodology that is suggested to be followed. They identified three phases that include nine steps in total. The first phase is called “item development”, where step one is the identification of domain and item generation, and the second step is the revision of content validity. The second phase is named “scale development” which includes the third step of pre-testing of questions; the fourth step sampling and survey administration; the fifth step item reduction; and the last step extraction of factors. The last phase is the “scale evaluation” which includes the seventh step tests of dimensionality, the eight step tests of reliability, and the ninth step tests of validity. The five studies proposed for this research cover the three phases and nine steps that were proposed by Boateng et al. (2018) and appear below in Table 1 for better visualization and understanding.

Table 1. Proposed phases, studies and steps.

Phase	Study	Step
1. Item development	Study 1: Item pool creation study	1. Identification of the domain and item generation
	Study 2: Expert validation study	2. Content validity
2. Scale development	Study 3: Pilot study	3. Pre-testing of questions
	Study 4: Item reduction study (PCA)	4. Sampling and survey administration
		5. Item reduction
		6. Extraction of factors
3. Scale evaluation	Study 5: Confirmatory study (CFA)	7. Tests of dimensionality
		8. Tests of reliability
		9. Tests of validity

The scale construction starts by developing a definition of the construct of interest. At this phase, the researcher must be precise in defining what is included and what is omitted from

the definition. Following the specification of the construct's domain, it is required to create a complete pool of measurement items. Study 1 looked at the current literature for measurement items on perceived value, experience, technology acceptance, and VR-related topics. The suggested item pool was validated and reduced by expert judges in Study 2. Quantitatively investigating the dimensional space and refining and purifying specific scales are the main objectives of the second phase. Study 3 was a pilot study that examined how successfully respondents worked with the questionnaire, and small modifications to the survey were made before collecting the first sample that helped to find the definition's dimensions. Principal Component Analysis (PCA) used the collected data to reveal the dimensional structure and number of factors from the list of measurement items in Study 4. The suggested measurement theory, found in the previous stage, had to be confirmed in the third stage. Thus, Study 5 validated the factorial structure among participants with a new sample and the use of Confirmatory Factor Analysis (CFA). Reliability and validity were examined in this study too. The following section provides more details on the methodology used for each study.

3.2 Phase 1: Item development phase

Creating a definition of the target construct is the first step in the scale creation process. At this phase, the researcher must define precisely what is included in the definition and what is excluded. It is necessary to generate a pool of measurement items once the domain of the construct has been specified. To find measuring items on perceived value, experience,

technological adoption, and VR-related issues, Study 1 searched the most recent literature. In Study 2, qualified expert judges assessed and trimmed the indicated item pool.

3.2.1 Study 1: Item pool creation study

Specifying the scope of the construct is the first step in the recommended approach for constructing better measurements (Churchill, 1979). In this step, the researcher must be precise in defining what is included and what is omitted from the definition. Because the value generated from a Virtual Reality (VR) experience in tourism is a concept that researchers haven't precisely assessed so far, a comprehensive list of theories, elements, and variables should be included and specified. When conceptualizing constructs and specifying domains, researchers should explore the literature in this stage. Definitions of constructs are, without a doubt, means rather than ends in themselves (Gerbing & Anderson, 1988). However, the use of diverse definitions makes it impossible to compare and aggregate data, making it difficult to construct syntheses of what is already known. Given the abundance of existing measures for most constructs of interest, researchers should have excellent grounds for suggesting further new measures and those publishing should be expected to provide their explanation. As a result, the researcher should perform a comprehensive analysis of the literature in which the variable is employed and offer a full definition of the reason as well as evidence for why the new measurement is worthwhile (Boateng et al., 2018; Churchill, 1979).

The generation of items that capture the construct as stated is the following step in the approach to building better measures according to Boateng et al. (2018). Such techniques as

literature review, experience surveys, and insight simulating instances are commonly used in exploratory research and are frequently effective in this step (Maesen, 1978). For this study, a literature review technique was used. Due to the nature of this approach, importance is given to stating how the variables were originally defined and how many dimensions or components they have. Early in the item development process, the goal is to create a group of items that covers all the dimensions of the construct (Churchill, 1979).

Furthermore, because the initial list was revised to generate the final measure, the researcher is likely to wish to include items with varying significance. The researcher creates a better basis for the final measure by integrating somewhat different subtleties of meaning in statements in the item pool (Churchill, 1979). The attention should turn to item editing near the end of the statement formulation stage. Each statement should be scrutinized to ensure that it was written as precisely as possible. Double-barreled statements should be broken into two single-idea statements, and if that is not possible, the statement should be eliminated. Some of the statements would be rewritten to be more positive, while others should be rewritten to be more negative. The researcher's focus should also be on purifying those statements that have a recognizable socially acceptable response (Hair et al., 2005).

3.2.2 Study 2: Expert validation study

Escobar-Pérez & Cuervo-Martinez (2008) describe content validation by expert judgment as an educated view from persons with a significant level of knowledge in the subject who are considered competent experts and who can give data, verification, conclusions, and evaluations.

The process of evaluating an instrument through expert judgment is asking a group of people to make a decision or express their opinion on a certain feature (Almenara & Cejudo, 2013). Content validations are typically performed during the development of a scale or to ensure that an instrument's translation and standardization for usage in a different culture is accurate. Experts are critical in both circumstances for explaining, adding, and/or altering the relevant items (Garrote & Rojas, 2015). Therefore, authorities in the field should judge face and content validity (Diamantopoulos, 2005; Rossiter, 2002).

For this study, an email was sent to 14 expert judges asking for their help in purifying the measure. These expert judges are professors and/or researchers in universities in the United States, who work in marketing and/or hospitality management fields. These experts publish their academic research in top-tier academic journals and are part of academic associations and societies. Therefore they can be considered expert judges in the subject. This survey was developed on Qualtrics and distributed through email, where the experts were given a 3-point Likert scale where they had to choose from (1) Does Not Match / (2) Matches Somewhat / (3) Matches Very Well with the construct's definition that appeared in each section of the survey. The experts judged how well every measurement item generated for this study "matches" the definition of the construct.

3.3 Phase 2: Scale development

The major goals of the second phase are to quantitatively investigate the dimensional space and to refine and purify the scale. Study 3 was a pilot study that looked at how well

respondents interacted with the questionnaire. Before gathering the first sample, minor changes to the survey were made to help identify the definition's dimensions. Once data were collected, it was analyzed using Principal Component Analysis (PCA), which revealed the dimension and number of components from the list of measurement items in Study 4.

The target subjects for the scale development stage were individuals 18 years and older, who owned (at the time of the survey) a VR headset and resided (at the time of the survey) in the United States of America. A self-selection sampling method was employed using online surveys where participants were not asked their names or any other identifying information in both surveys. Their responses were recorded anonymously with no possibility to link them to the subject's identity. Participants in these studies were recruited with two self-administered surveys that were developed on Qualtrics and distributed through Prolific. Survey 2 helped to recruit a custom sample that met the requirements of the target subjects for this study and Survey 3 was used for the scale development. Surveys 2 and 3 are available in the Appendix at the end of this dissertation.

In Survey 2 participants were asked questions about their VR headset model and brand, how they use it, and if they were willing to participate in a follow-up study where they were asked to watch a 5-minute video on their VR headset and answer a 15-minute survey. Survey 3 served for item reduction and was sent to those participants who accepted to participate in the follow-up study. In this survey, participants were asked questions about their VR headset model and brand, and their main use. Subsequently, they were asked to consume a 5-minute tourism-related experience in VR. After that participants were presented with the measurement items that

remained after the expert judges' purification. These items asked study participants to rate their perceptions toward the VR tourism experience on a 5-point Likert scale ranging from 1 – Strongly Disagree to 5 – Strongly agree. In addition, the survey included ten items that measure satisfaction, intention to visit, and intention to use from existing validated scales. Finally, participants were asked some demographic and willingness to pay questions.

Survey 2 only served to identify a pool of participants who are qualified and willing to take part in this research, while Survey 3 was used for Studies 3 and 4, sample recruitment and item reduction respectively. At the beginning of each survey, participants first saw the study information sheet where they were asked for consent and if they are 18 years or older. Later, they were asked to type their Prolific ID that needed to match with Prolific. At the end of the survey, participants who completed received a code for compensation ($2.67) set according to Prolific suggested as the minimum rate ($8.00 per hour).

3.3.1 Study 3: Pilot study

After the purification of items obtained in Study 2 with expert judging, Study 3 was conducted. This was a brief research, using a small sample of 10 participants, that is "designed to test research methods, data collecting tools, sample recruitment tactics, and other research methodologies in advance of a larger study" (Schubert Research Clinic, n.d.). This study is carried out to discover any flaws and problems with the research tool and methodology before they are used in the entire study. After this study, small modifications to the survey are made before collecting the first sample that will help to find the definition's dimensions.

3.3.2 Study 4: Item reduction study (PCA)

Once the survey instrument was tested and ready for the next step, data were collected from a larger sample and subjected to Principal Component Analysis (PCA). PCA is a technique used by researchers to determine the number of dimensions underlying a concept or construct (Gerbin & Anderson, 1988). It may be used to suggest dimensions, and there are several publications in the marketing literature that support this claim (Churchill, 1979; Gerbing & Anderson, 1988). It is especially effective as an initial study when there isn't enough detail in the theory concerning the indicators' relationships to the underlying construct. A common application of this method in this context is to factor many items and then build scales based on the factor loadings. The items that load at least significantly on the same factor and do not load as substantially on other factors are assigned to the same scale (Hair et al., 2003).

Because each factor is constructed as a weighted total of all observable variables, PCA does not often give an explicit test of one-dimensionality because the factors “do not match directly to the constructs represented by each set of indicators” (Gerbin and Anderson, 1988). Therefore, its usage to confirm or deny components separated by other methods is far less common. Consequently, Confirmatory Factor Analysis (CFA) is necessary to validate it and was used in the last phase of this study.

According to Hair et al. (2003), this type of analysis includes seven stages: 1) clarifying the aims for doing the analysis, 2) scheming the analysis, which incorporates a choice of variables and sample size, 3) assumptions, 4) determining the number of factors and reviewing the whole fit, that comprises the factor model selection that will be used and the number of

factors, 5) selection of rotation and decoding the factors, and 6) validation of the results. Depending on the type of variation, there are two ways for constructing a solution. However, the total variance is included in PCA, which results in components that have an emphasis on the common variance but at the same time hold amounts of unique variance and sometimes error variance. When data reduction is the main aim and the researcher is convinced that unique variance is low enough to not affect the final components, PCA is favored. The unique and error variance are not of importance when establishing the structure of the variables, hence is based on common variance. Therefore, for this study PCA was utilized for the second phase of this study.

The number of components to keep for interpretation and later usage is a crucial issue in principal component analysis. The researcher must combine a conceptual basis with empirical data when choosing when to end factoring. According to Hair et al. (2003), the researcher usually starts with certain specified criteria, such as the total number of components and some practical relevance limits. These criteria are paired with empirical factor structure metrics. There is no precise quantitative foundation for determining the number of components to extract. The latent root criterion (elimination of factors with eigenvalues less than the unit), percentage of variance explained, scree test, and parallel analysis are some of the criteria that are required for selecting the number of variables to extract. The previous standards should be adjusted alongside the theory of the latent construct when determining the number of factors.

According to Hair et al. (2003), factor rotation may be the most significant technique for analyzing factors. The term rotation refers to the process of rotating the position of the factors' axes until they reach a new point. Orthogonal and oblique rotations are two kinds of rotation.

The results derived from an unrotated technique obtain factors in a downward order of importance, that is, the first factor is a generic one that influences all the others and records the highest variance. The following factors are determined with the remaining amount of variance, where every following factor represents a smaller share of the variance than its predecessor. The final objective of redistributing variation from early components to the subsequent is the main objective of matrix rotation, resulting in a simpler and theory-based array. Researchers rotate factors to ease the understanding of their findings by simplifying the structure and maximizing those loadings that are statistically significant. For this study, a Varimax rotation with Kaiser normalization was used, which allowed an inspection of the dimensionality and suggested items that needed to be deleted.

Finally, it is important to pay some significance to the pattern of factor loadings after obtaining an appropriate factor solution in which all variables have a substantial loading on a factor. According to Hair et al. (2003) “variables with higher loadings are seen as more significant and have a bigger impact on the name or label used to describe a factor”. The relevant variables for a particular factor are analyzed, and a term is issued to a factor that appropriately mirrors the variables loading on that factor, with a greater focus on those variables with larger loadings. Variables with substantial loadings that appear not exclusively in one factor, may signal that the variable should be removed because it lacks clear structure and complicates the naming process.

3.4 Phase 3: Scale evaluation

The third phase involved verifying the proposed measurement theory that was discovered in the previous stage. As a result, Study 5 used a new sample and Confirmatory Factor Analysis (CFA) was used to evaluate the factorial structure of the developed measurement scale.

The target subjects for the scale evaluation stage were individuals 18 years and older, who owned (at the time of the survey) a VR headset and resided (at the time of the survey) in the United States of America. A self-selection sampling method was employed using an online survey where participants were not asked their names or any other identifying information. Their responses were recorded anonymously with no possibility to link them to the subject's identity. Participants in this study were recruited with a self-administered survey that was developed on Qualtrics and distributed via Prolific.

Survey 4 was the instrument used for this study, where participants were asked if they engaged in any VR-simulated experiences in travel or tourism within the last year that appeared from a list including theme parks, hotels/resorts, museums, concerts, conferences, sex tourism, events, airports, historical sites, other or none. If a participant answered "other", a new question was displayed asking them to provide their answer. All participants were allowed to continue the survey. Later, participants were asked to think back to the most memorable of those VR travel/tourism experiences they had in the last year and describe it in a couple of sentences. It was suggested to include where they took it, what they did, what device they used, and any other comments they wanted to add. They were also asked to categorize their experience in terms of the industry segment they experienced. Subsequently, they were asked about the model, brand,

and ownership of the VR headset that they used, followed by some items that asked questions regarding their perceptions of the VR tourism experience.

Finally, participants were asked some demographic questions. At the beginning of the survey, participants saw the study information sheet where they were asked for consent and if they were 18 years or older. Later, they were asked to type their Prolific ID that needed to match with Prolific. At the end of the survey, participants who completed received a code for economic compensation ($2.00) set according to Prolific suggested as the minimum rate ($10.50 per hour).

3.4.1. Study 5: Confirmatory study (CFA)

Once PCA was done and results allowed to continue to the next step in building this new measure, it was time to confirm the proposed structure found in the PCA with the use of CFA. In this sense, the researcher must be able to describe the number of dimensions that exist and the precise items that should be associated with each of these constructs to do CFA properly. PCA, on the other hand, is carried out with none of these factors in mind.

According to Hair et al. (2003), CFA is a multivariate technique that uses equations relating to the theoretical structure to construct a theory-consistent estimated covariance matrix. The real, data-derived, or observed covariance matrix is paralleled to the estimated one. As these two matrices get more similar, models fit reasonably well. A bootstrapping technique in AMOS was used to obtain a standard error, a 95% confidence interval, and a significance test with 2,000 bootstrap samples The benefits of bootstrapping include the ease with which the estimates of standard errors and confidence intervals may be obtained, and the benefit of testing the model

with a high number of samples, which may not be feasible for a researcher to obtain (e.g., 2,000 samples) (Hair et al., 2003).

To determine a model fit, certain fit statistics should be presented. The χ^2 goodness-of-fit statistic and degrees of freedom, as well as one absolute fit index (e.g., GFI or RMSEA) and one incremental fit index (e.g., TLI or CFI), are among them. One of these indices, such as the SRMR or RMSEA, should also be included as a badness-of-fit measure. Fit indices of the model demonstrating acceptable fit differ one from another and are heavily influenced by sample size, the number of estimated factors, and factor communalities.

Convergent validity is the property that measurement items have when they indicate or converge into a certain construct and share a significant fraction of shared variance. The degree of convergent validity among measurement items may be estimated in several ways. According to Hair et al. (2003), one way to demonstrate convergent validity is by analyzing if factor loadings are 0.5 or higher. These authors also suggest analyzing if each factor has an Average Variance Extracted (AVE) of more than 0.5, indicating that on average less error remains in the items than variance extracted by the factor. Another indicator of convergent validity is assessed through reliability. Cronbach's alpha (α) is the most widely used estimate for reliability, as well as Construct Reliability (CR). The most common threshold for either reliability is 0.7 or higher, however a value between 0.6 and 0.7 may be acceptable providing other indicators of validity are good (Hair et al., 2003). However, Lam (2012) affirmed that if the AVE is less than 0.5 but the CR is more than the acceptable level of 0.6, convergent validity is demonstrated. Fornell and Larcker (1981) proposed the Fornell-Larcker criterion as a guideline to evaluate discriminant

validity by comparing the AVE and the squared correlations ϕ in the relevant rows and columns of each factor. This criterion states that the squared correlations should not be less than the AVE. However, if the difference is too small it can be ignored (Rahim & Magner, 1995).

For this dissertation, validity was assessed by analyzing if factor loadings and AVEs reached 0.5 or higher values; if Cronbach's alphas were above 0.6 and CR measures exceeded 0.6, and by assessing if the construct behaved as expected with related variables. When applying bootstrapping, the study looked for the aforementioned thresholds to be included in the confidence intervals or fall below the confidence intervals of the respective metrics. The correlations between this scale and other constructs (satisfaction, intention to visit, intention to use) should be positively related but not the same to suggest convergent, discriminant, and nomological validity.

CHAPTER IV

RESULTS

After describing the methodology, the results section of this study follows the same logic. In other words, the results will be presented study by study, starting with Study 1 and finishing with Study 5.

4.1 Phase 1: Item development phase

4.1.1 Study 1: Item pool creation study

More than 250 peer-reviewed articles published in different journals and books were reviewed and assessed to form the literature review that establishes the basis for the development of this proposed new measure and gives evidence of the importance and relevance of its creation. The literature was categorized into main subtopics as follows: Virtual Reality (VR), VR technology, VR and tourism, and perceived value. Study 1 identified items used by other scales on perceived value, user experience, perceived value of user experience, virtual reality, technology acceptance, immersion, presence, and virtual reality from the existing literature. This

research started by looking at these definitions on Google Scholar and the One Search tool of the University of Mississippi online library.

Once the comprehensive analysis of the literature was completed, a working definition was established. For this study, the perceived value derived from a VR experience in tourism is defined as reflected by consumer perceptions of generalized utility derived from an immersive (virtual) tourism encounter including elements of playfulness and/or usefulness. Examples of a VR experience in tourism might include VR apps used in historical sites, VR tours in museums, VR apps for destinations, VR tours of hotels, VR apps that customize hotel rooms, VR conferences, VR apps for airports, VR concerts, VR apps for navigation, etc. Some of these may be for pay, others may not.

As previously stated, more than 250 journal articles and books matched the search, but about half of them were discharged because they didn't match the construct domain, were not relevant to the topic or did not include measurement items. As a result, 120 items were generated from the initial search (see section 6.1 in the appendix). Later, this number was reduced to a total of 62 items, after deleting items that were irrelevant, double-barreled, included complicated wording, did not match the construct definition, or had any other issues (see section 6.2 in the appendix).

4.1.2 Study 2: Expert validation study

Mainstream quantitative procedures for scale development suggest that 62 items are too many to initiate the procedure (Hair et al., 2003), therefore this step intends to reduce this

number. Of the 14 experts that received the survey, six experts answered it. These six experts, who work in marketing and/or hospitality management fields, appraised how appropriate these 62 items were (see section 6.2 in the appendix), grounding on the proposed definition of this study.

The sum scores from the expert survey provided a screening mechanism for eliminating and retaining the measurement items. Only those items that had a sum appropriateness of more than 13 were kept in the study, reducing the number of items to a total of 39. The sum appropriateness of 13 means that all expert judges should have given a certain item a score of (2) Matches Somewhat and at least one judge should have scored the same item as (3) Matches Very Well. Finally, no additional responses were added to the question: Do you suggest any other item that could match the definition? Therefore, no new items were added to the survey. The final list of 39 items was included in Survey 3 (please see section 6.4 in the appendix).

4.2 Phase 2: Scale development

4.2.1 Study 3: Pilot study

Once the list of items has been reduced to a number suitable to be administered in a survey to participants, the next step was to launch a pilot study of the survey that would be administered for the scale development phase. After obtaining 10 responses, the survey stopped recruiting participants to analyze collected responses. All respondents had different IP addresses; answered in a considerable time; had a different location; agreed to give their best responses; passed attention, synonym, and attention checks, and were not an outlier. All responses had a

significant variance and there were no additional comments to the question: Do you suggest any change or modification to this survey? This analysis suggested moving to the next step and therefore, no changes were made to the survey after the pilot study.

4.2.2 Study 4: Item reduction study (PCA)

One thousand responses in total were recorded in Qualtrics from Survey 2 that recruited the custom sample, from which 675 agreed to participate in the follow-up study. From those 675 participants who agreed to participate, 185 participants answered Survey 3 on Qualtrics through Prolific. Once the data collection stopped, the next step was to clean the data set to remove responses that are incorrect, corrupt, incomplete, or had any issues.

4.2.2.1 Data cleaning

The first step in the data cleaning process was to look for observations from the same IP address. If two or three responses came from the same IP address, looking at the demographics of respondents was the next step to analyze if the responses came from different individuals. In Study 4, all observations had a different IP address, suggesting moving to the next Low-Quality-Data method.

DeSimione & Harms (2018) recommended eliminating those responses that took less than 2 seconds per question. In this study, the survey included 58 questions and a 5-minute VR experience. Since there are no conventional rules for videos, it was established that consuming at least half of the VR experience was sufficient to get a valid response from respondents.

Therefore, this study established a threshold of 116 seconds for answering the questions and 150 seconds for watching the video, resulting in a total of 266 seconds as the minimum time that an individual could take answering the survey. Based on this method, 5 responses were below the threshold: participants 77, 47, 40, 111, and 41; and therefore were deleted.

The next step in cleaning this data set was to look for observations originating from the same location using latitude and longitude. If two or more responses came from the same location using latitude and longitude, looking at the demographics of those respondents was the next step to analyze if the responses came from different individuals. Nonetheless, all observations had different locations using latitude and longitude.

Another method used was direct assessment where participants were asked if they committed to providing thoughtful and honest answers to the questions in the survey. All participants agreed to give their best responses, so no response was suggested for deletion. Attention checks were another method used for detecting Low-Quality-Data, where detection of items usually embedded early in a survey with an obvious correct response expected. The purpose is to identify careless respondents and allow researchers to screen them out before conducting analyses (Maniaci & Rogge, 2014; Schmitt & Stults, 1985). All responses passed all three attention checks in the survey.

The following method to detect Low-Quality-Data used in this study was the Long String Test, where variances within 39 items for all 185 participants were computed to see if participants' responses varied while answering the survey. The threshold of 0.3 or below was

used, meaning that responses that did not pass this threshold did not vary significantly. Four responses were below this level: participants 77, 144, 8, and 6.

Subsequently, a failed synonym check method was applied to the data set where item 33: "Learning to navigate the VR tourism experience was easy for me" and item 35 "I found the VR tourism experience was easy to use" were used for testing if both responses were answered in the same way and to suggest responses to eliminate. On a 5-point Likert scale, if one participant had more than 3 points of difference between responses to these two items they were eliminated, meaning that respondents provided opposite answers to the same question. Three participants did not pass this test: participants 12, 150, and 157.

Lastly, the failed antonym check test for detecting Low-Quality-Data was applied to the data set. A test on item 9 "I accomplished just what I wanted to with this VR tourism experience" and item 32 "I couldn't accomplish what I really needed to during the VR tourism experience" was performed by testing if these questions were answered in the opposite way. Those responses with the same value in opposite-polarity questions were eliminated. Fourteen participants failed this check: participants 5, 52, 69, 74, 147, 83, 98, 35, 68, 8, 152, 12, 162, and 127.

The last step in this data cleaning process was outlier detection. The first test was the detection of univariate outliers with the explore function from SPSS where an examination of means, median, and box-whisker plots was used to identify individual outliers. No univariate outlier was detected. The second test was the detection of multivariate outliers with the calculation of the Mahalanobis's distance, where cases with a chi-squared probability less than

.001 were deleted. Only one respondent failed this test: participant 162. Once the data set was clean from incorrect, corrupt, and incomplete responses and outliers, 163 responses were left ready for PCA.

4.2.2.2 Respondent demographic profile

From the sample, 65% were male, 31.9% female, and 3.1% non-binary. The majority of ethnicity was White, accounting for 67.5%, followed by Hispanic (15%), African American (8.6%), and Asian (6.7%). A preponderance of college graduates (42.9%) answered the survey, followed by individuals with some college studies (21.5%), high school graduates (14.7%), and individuals with a graduate degree (13.5%). The majority of respondents (51.5 %) have never been married, 33.7% are married and 9.2% live with a partner. Regarding their income, 21.5 % earn between $50,000 and $69,999 per year, 20.9% earn between $30,000 and $49,999, 15.30% earn more than $110,000, 14.10% earn between $70,000 and $89,999. 12.3% earn between $90,000 and $109,999, 11.7% earn between $10,000 and $29,999, and 4.3% earn less than $10,000 per year. The main use of the sample respondents is for gaming (79.8%), followed by travel/tourism (9.2%) and video streaming (8.6%). The most popular VR headset used was Oculus Quest 2 (54%), followed by Oculus Quest (8%), Play Station VR (7.4%), and Oculus Rift (6.7%). Table 2 contains all percentages of the demographic characteristics of the sample.

Table 2. Study 4 respondent demographic profile

Variable	Percentage	Variable	Percentage
Gender		Main VR Use	
Male	65.00	Gaming	79.80
Female	31.90	Education	0.60
Binary	3.10	Travel/Tourism	9.20
Ethnicity		Social	1.20
White	67.50	Video Streaming	8.60
Hispanic	15.30	Other	0.60
African American	8.60	VR headset device	
Native American Indian	0.60	Oculus Go	1.80
Asian	6.70	Oculus Rift	6.70
Other	1.20	Oculus Rift S	2.50
Education		Oculus Quest	8.00
Less than high school	2.50	Oculus Quest 2	54.00
High school graduate	14.70	HTC Vive	4.90
Some college	21.50	HTC Vive Pro	0.60
College graduate	42.90	HTC Vive Pro 2	0.60
Some graduate school	4.90	HTC Vive Cosmos	0.60
Graduate degree	13.50	Samsung Gear VR	3.10
Marital Status		Valve Index	2.50
Married	33.70	Play Station VR	7.40
Divorced	4.90	Google Cardboard	3.10
Never married	51.50	Other	4.30
Separated	0.60	Age	
Living with a partner	9.20	18-24	18%
Income		25-34	36%
Less than $10,000	4.30	35-44	34%
$10,000 - $29,999	11.70	45-64	11%
$30,000 - $49,999	20.90	65+	1%
$50,000 - $69,999	21.50		
$70,000 - $89,999	14.10		
$90,000 - $109,999	12.30		
More than $110,000	15.30	N=163	

4.2.2.3 PCA results

Principal Component Analysis with Varimax rotation with Kaiser normalization (see Tables 2 and 3 below) was followed, allowing an inspection of dimensionality and suggesting items for deletion. The Kaiser-Meyer-Olkin (KMO) test of sampling adequacy of 0.87 and Bartlett's test of sphericity with a χ^2 of 1356.09 $p < .001$ indicated that the data is suitable for PCA. Based on several regularly used criteria, including an examination of the scree plot, interpretability, and eigenvalues greater than one, a four-factor solution was found to be the most suitable (Black et al., 2005). To improve and validate the factor structure, items with low factor loadings ($<|0.5|$), high cross-loadings ($>|0.45|$), and/or low communalities ($<|0.4|$) were deleted (Hair et al., 2003). The four-factor solution explains 72.53% of the total variance, which is higher than the 0.50 threshold. Alpha coefficients are above the established threshold of 0.60 for each dimension.

Using existing scales from the literature review of this study as a reference in naming, factor 1 is called Hedonic value; factor 2 is called Immersion and presence; factor 3 is called Ease of use, and factor 4 is called VR environment. The final solution included 20 measurement items in the scale assessing the value of VR tourism experiences. These 20 items were carried forward to the next step of the research.

Table 3. Principal Component Analysis

#	Item	F1	F2	F3	F4
IT12	The VR tourism experience entertained me	0.817			
IT1	I think the VR tourism experience was very entertaining	0.816			

IT2	I experienced tourism with VR for the pure enjoyment of it	0.795			
IT15	Experiencing tourism with VR was an easy way to entertain me	0.794			
IT18	This VR tourism experience is one that I enjoyed	0.784			
IT37	The VR tourism experience gave me pleasure	0.783			
IT28	The VR tourism experience was truly a joy	0.755			
IT30	I continued the VR tourism experience, not because I had to, but because I wanted to	0.713			
IT17	The VR tourism experience was a good value	0.695			
IT36	I enjoyed the VR tourism experience for its own sake, not because I learned something new	0.582			
IT27	I was involved in the VR tourism experience to the extent that I lost track of time		0.854		
IT21	I forgot my immediate environment when I experienced the VR tourism experience		0.846		
IT14	I got so involved during the VR tourism experience that I forgot everything else		0.841		
IT22	While experiencing the VR tourism experience, I felt like my body was in the room, but my mind was inside the world created by the VR tourism experience		0.641		
IT35	I found the VR tourism experience was easy to use			0.826	
IT33	Learning to navigate the VR tourism experience was easy for me			0.801	
IT34	I found it easy to get the VR tourism experience to do what I wanted it to do			0.733	
IT25	I could examine objects well from multiple viewpoints in the VR tourism experience				0.857
IT26	The mechanism which controlled movement through the VR tourism experience was natural				0.69
IT32	I couldn't accomplish what I really needed to during the VR tourism experience				0.573
	Cronbach's α	0.90	0.85	0.70	0.63

	% of variance explained	32.53 %	17%	12.23 %	10.78 %

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. Rotation converged in 6 iterations.

Table 4. Items per factor from PCA

F1 – Hedonic Value	
IT12	The VR tourism experience entertained me
IT1	I think the VR tourism experience was very entertaining
IT2	I experienced tourism with VR for the pure enjoyment of it
IT15	Experiencing tourism with VR was an easy way to entertain me
IT18	This VR tourism experience is one that I enjoyed
IT37	The VR tourism experience gave me pleasure
IT28	The VR tourism experience was truly a joy
IT30	I continued the VR tourism experience, not because I had to, but because I wanted to
IT17	The VR tourism experience was a good value
IT36	I enjoyed the VR tourism experience for its own sake, not because I learned something new
F2 – Immersion & Presence	
IT27	I was involved in the VR tourism experience to the extent that I lost track of time
IT21	I forgot my immediate environment when I experienced the VR tourism experience
IT14	I got so involved during the VR tourism experience that I forgot everything else
IT22	While experiencing the VR tourism experience, I felt like my body was in the room, but my mind was inside the world created by the VR tourism experience
F3 – Ease of Use	
IT35	I found the VR tourism experience was easy to use
IT33	Learning to navigate the VR tourism experience was easy for me
IT34	I found it easy to get the VR tourism experience to do what I wanted it to do
F4 - VR Environment	
IT25	I could examine objects well from multiple viewpoints in the VR tourism experience
IT26	The mechanism which controlled movement through the VR tourism experience was natural
IT32	I couldn’t accomplish what I really needed to during the VR tourism experience

4.2.3 Study 5: Confirmatory study (CFA)

While study 4 provides first insights into the underlying structure of the perceived value derived from a VR experience in tourism, study 5 validates this structure with a new sample. Three hundred responses in total were recorded in Qualtrics for Survey 4 distributed through Prolific. Once the data collection was completed, the next step was to clean the data set to remove responses that are incorrect, corrupt, incomplete, or had any issues.

4.2.3.1 Data cleaning

The data cleaning process followed the steps outlined in Study 4. The first step in the data cleaning process was to look for observations that answered that they had no previous VR experience in tourism and by reading descriptions of their experience. Eight participants failed this test: participants 9, 43, 53, 104, 169, 175, 238, and 274. The second step was to look for observations from the same IP address. All observations had a different IP address. Similarly, all observations had different locations using latitude and longitude. Also, all participants agreed to give their best responses, so no response was suggested for deletion.

DeSimione & Harms (2018) recommended eliminating those responses that took less than 2 seconds per question. 39 measurement items and 10 dependent variables were asked in the survey, for a total of 49 items to be measured. Therefore, for this study, a threshold of 98 seconds was established, indicating a minimum time required for an individual to answer the survey. Based on this method, all participants were above the threshold.

Attention checks were another method used for detecting Low-Quality-Data. This analysis looked for incorrect answers to survey questions with an obvious correct response. The purpose is to identify careless respondents and allow researchers to screen them out before conducting analyses (Maniaci & Rogge, 2014; Schmitt & Stults, 1985). All responses passed all two attention checks embedded in the survey.

The next method to detect Low-Quality-Data used in this study was the Long String Test, where variances within 20 items for all three-hundred participants were computed to see if respondents' responses varied while answering the survey. The threshold of variances below 0.30 was used, meaning that responses did not vary significantly, where twenty-five responses were below this level, including participants 15, 20, 29, 53, 85, 97, 175, 276, 104, 274, 222, 297, 46, 238, 43, 125, 148, 279, 138, 144, 156, 196, 223, 151, and 296.

Then, a failed synonym check method was applied to the data set where item 1: "I think the VR tourism experience was very entertaining" and item 15: "Experiencing tourism with VR was an easy way to entertain me" was done by testing if both responses were answered in the same way and to suggest responses to eliminate. If one response was more than 3 points of difference between both responses they were eliminated, meaning that respondents answered contrary to the same question. All participants passed this test.

The last step in this data cleaning process was outlier detection. The first test was the detection of univariate outliers with the explore function from SPSS where an examination of means, median, and box-whisker plots was used to identify individual outliers. No univariate outlier was detected. The second test was the detection of multivariate outliers with the

calculation of the Mahalanobis's distance, where cases with a chi-squared probability less than .001 were deleted. Thirteen respondents failed this test: participants 138, 60, 201, 32, 11, 109, 99, 212, 28, 97, 45, 115, and 266. Once the data set was clean from incorrect, corrupt, and incomplete responses and outliers, 261 responses were left ready for CFA.

4.2.3.2 CFA respondent demographic profile

From the sample, 67.4% were male, 28.7% female, and 3.8% non-binary. The majority of ethnicity was White, accounting for 69.7%, followed by Hispanic (12.3%), Asian (10.7%), and African American (6.5%). A preponderance of college graduates (42.1%) answered the survey, followed by individuals with some college studies (29.5%), high school graduates (13.4%), and individuals with a graduate degree (10.7%). About half of the respondents (46.7%) have never been married, 26.1% are married and 24.1% live with a partner. Regarding their income, 21.1% earn between $30,000 and $49,999 per year, 20.7% earn more than $110,000, 17.6% earn between $50,000 and $69,999, 11.5% earn between $10,000 and $29,999, 10.7% earn between $70,000 and $89,999, 10% earn between $90,000 and $109,999, and 8.4% earn less than $10,000 per year. The main type of the most memorable VR tourism experience they recalled from the last year was for historical sites (27.2%), followed by theme parks (20.7%), museums (16.5%), and concerts (10.3%). The most popular VR headset used was Oculus Quest 2 (39.5%), followed by Oculus Rift (15.3%), and Oculus Quest (12.3%), Table 5 contains the full demographic profile for study 5.

Table 5. Study 5 respondent demographic profile

Variable	Percentage	Type of VR tourism experience	
Gender		Theme Parks	20.7
Male	67.4	Hotel	6.1
Female	28.7	Museum	16.5
non Binary	3.8	Concert	10.3
Ethnicity		Conference	0.4
White	69.7	Sex tourism	1.1
Hispanic	12.3	Events	3.1
African American	6.5	Airport	0.8
Native American Indian	0.4	Historical Site	27.2
Asian	10.7	Other	12.6
Other	0.4	Unsure	1.1
Education		VR headset device	
Less than high school	1.1	Oculus Go	3.8
High school graduate	13.4	Oculus Rift	15.3
Some college	29.5	Oculus Rift S	4.2
College graduate	42.1	Oculus Quest	12.3
Some graduate school	3.1	Oculus Quest 2	39.5
Graduate degree	10.7	HTC Vive	3.8
Marital Status		HTC Vive Pro	2.3
Married	26.1	HTC Vive Pro 2	1.1
Divorced	2.3	HTC Vive Cosmos	0.8
Never married	46.7	Samsung Gear VR	3.1
Separated	0.8	Microsoft Hololens	0.4
Living with a partner	24.1	Valve Index	1.9
Income		Play Station VR	3.4
Less than $10,000	8.4	Google Cardboard	2.7
$10,000 - $29,999	11.5	I do not know / I do not remember	1.9
$30,000 - $49,999	21.1	Other	3.4
$50,000 - $69,999	17.6	Ownership	
$70,000 - $89,999	10.7	Myself	70.9
$90,000 - $109,999	10	Someone else	29.1
More than $110,000	20.7	Age	

18-24	27%
25-34	41%
35-44	23%
45-64	9%
65+	0%

N = 261

4.2.3.3 CFA results

Based on a sample of 261 questionnaires, a CFA was applied to the item covariance matrix (maximum likelihood estimation in SPSS AMOS 26), providing a tool for validation. A χ^2 value of 315.64 and df =164 was computed, and thus a normed χ^2 value of 1.92 was calculated to have an index that is less sensitive to sample size. The criterion for acceptance varies across researchers, ranging from less than 2 (Ullman, 2001) to less than 5 (Schumacker & Lomax, 2004). The resulting normed χ^2 value of 1.92 with model CFI of 0.93 (above 0.90), and RMSEA of .06 (less than .08) suggests that the model fit is adequate to move forward.

Figure 1 and Tables 6 and 7 below report the results of the measurement model testing. The factors were evaluated based on the factor loadings, Cronbach's alpha, composite reliability, and average variance extracted. Factors F2 Immersion & Presence and F3 Ease of Use met all recommended thresholds on these metrics. However, factor F1 Hedonic Value and factor F4 VR Environment revealed some low factor loadings and AVE values.

Figure 1. CFA graphical model

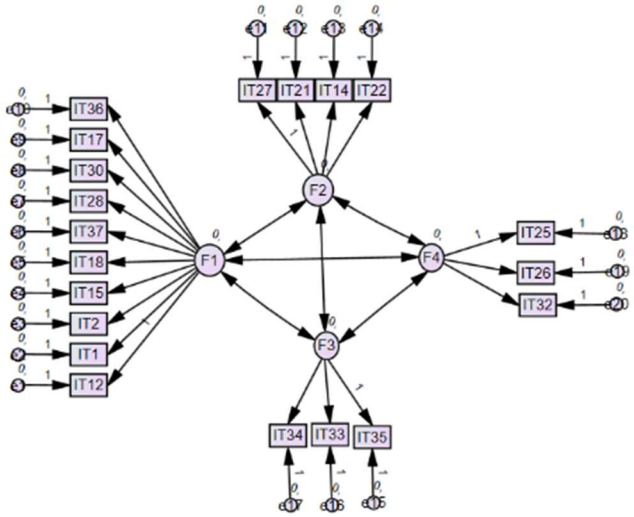


Table 6. CFA. Factor loadings, Cronbach's Alpha, CR and AVE.

#	Item	FL	α	CR	AVE
F1 – Hedonic Value					
IT12	The VR tourism experience entertained me	0.58	0.90	0.90	47.75%
IT1	I think the VR tourism experience was very entertaining	0.71			
IT2	I experienced tourism with VR for the pure enjoyment of it	0.65			
IT15	Experiencing tourism with VR was an easy way to entertain me	0.80			
IT18	This VR tourism experience is one that I enjoyed	0.81			
IT37	The VR tourism experience gave me pleasure	0.77			
IT28	The VR tourism experience was truly a joy	0.80			
IT30	I continued the VR tourism experience, not because I had to, but because I wanted to	0.50			
IT17	The VR tourism experience was a good value	0.74			

IT36	I enjoyed the VR tourism experience for its own sake, not because I learned something new	0.43			
F2 – Immersion & Presence					
IT27	I was involved in the VR tourism experience to the extent that I lost track of time	0.86	0.85	0.84	58.16%
IT21	I forgot my immediate environment when I experienced the VR tourism experience	0.73			
IT14	I got so involved during the VR tourism experience that I forgot everything else	0.84			
IT22	While experiencing the VR tourism experience, I felt like my body was in the room, but my mind was inside the world created by the VR tourism experience	0.59			
F3 – Ease of Use					
IT35	I found the VR tourism experience was easy to use	0.86	0.70	0.83	62.18%
IT33	Learning to navigate the VR tourism experience was easy for me	0.73			
IT34	I found it easy to get the VR tourism experience to do what I wanted it to do	0.77			
F4 – VR Environment					
IT25	I could examine objects well from multiple viewpoints in the VR tourism experience	0.63	0.63	0.56	31.40%
IT26	The mechanism which controlled movement through the VR tourism experience was natural	0.65			
IT32	I couldn't accomplish what I really needed to during the VR tourism experience	0.35			

* FL – Factor loading, α – Cronbach's alpha, CR – composite reliability, AVE – average variance extracted

When evaluating the Fornell-Larcker criteria, three squared ϕ elements (F1 & F3, F1 & F4, F3 & F4) are below the value of one of the AVE (see Table 7 below). If these squared correlations are below the AVE, it suggests discriminant validity. Therefore, the results provide full support for establishing discriminant validity for factor F2, and only partial support for factors F1, F3, and F4.

Table 7. Standardized correlation, AVEs, and squared correlations matrix

	F1 Hedonic Value	F2 Immersion & Presence	F3 Ease of Use	F4 VR Environment
F1	47.75%	.44	.52	.56
F2	.66	58.16%	.11	.20
F3	.72	.33	62.18%	.56
F4	.75	.45	.75	31.40%

Note: Values below the diagonal are standardized correlation estimates among constructs, diagonal elements are average variances extracted (AVE), and values above the diagonal are squared correlations ϕ.

To support the evaluation of the measurement properties of the developed scale, a bootstrapping procedure with 2,000 samples was used. Table 8 below reports the 95% confidence interval estimates for factor loadings, CRs, and AVEs. All confidence intervals for the factor loadings include or exceed the $|0.50|$ threshold and are statistically significant at a .001 level. However, two items are below (IT 32 and IT 36) and one item is equal (IT30) to this threshold as point estimates.

Evaluation of Composite Reliability reveals strong measures with CR confidence intervals for factors F1 through F3 being above 0.7. The CR confidence interval for factor F4 is below this threshold, however, does include the value of 0.6, a threshold that indicates acceptable reliability. The confidence intervals of AVE for factors F1 through F3 include the desired value of 0.5. However, the confidence interval of AVE for factor F4 does not include this value and the entire interval lies below this threshold.

Table 8. Confidence Interval estimates for Confirmatory Factor Analysis

ITEM	F1 Hedonic Value	F2 Immersion & Presence	F3 Ease of Use	F4 VR Environment
IT12	[0.47 - 0.67]			

IT1	[0.62 - 0.77]			
IT2	[0.54 - 0.73]			
IT15	[0.73 - 0.86]			
IT18	[0.74 - 0.86]			
IT37	[0.70 - 0.83]			
IT28	[0.74 - 0.85]			
IT30	[0.34 - 0.63]			
IT17	[0.63 - 0.80]			
IT36	[0.31 - 0.53]			
IT22		[0.48 - 0.69]		
IT14		[0.78 - 0.89]		
IT21		[0.63 - 0.81]		
IT27		[0.80 - 0.90]		
IT35			[0.78 - 0.92]	
IT33			[0.60 - 0.81]	
IT34			[0.66 - 0.85]	
IT32				[0.19 – 0.51]
IT26				[0.51 - 0.77]
IT25				[0.50 - 0.73]
AVE	[36.93% - 57.83%]	[46.89% - 68.36%]	[46.80% - 74.17%]	[25.67% - 38.73%]
CR	[0.85 - 0.93]	[0.77 - 90]	[0.72 - 90]	[0.51 - 0.61]

Note: All are 95% Confidence Intervals. 2000 bootstrap samples used to perform bootstrapping.

Examination of the Fornell-Larcker criteria shows that results provide partial support for establishing discriminant validity. The confidence intervals for squared correlations between factors F1 and F2, F1 and F3, F1 and F4, as well as factors F3 and F4, are included in the value of one of the confidence intervals of AVE (see Table 9 below).

Table 9. Confidence Interval standardized correlation, AVEs, and squared correlations matrix

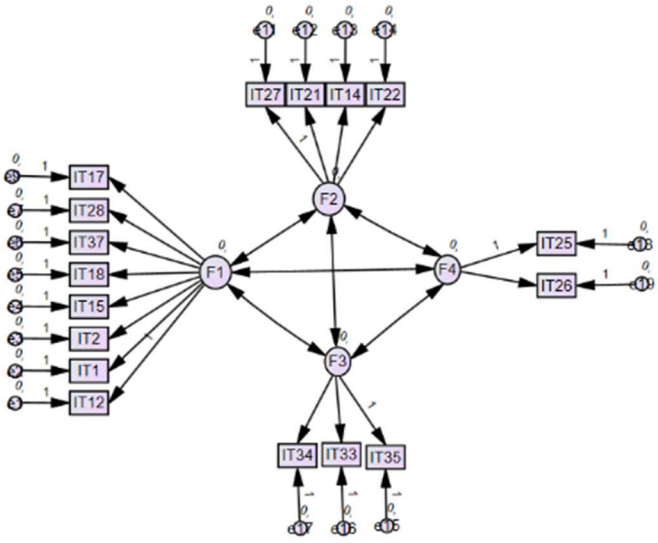
	F1 Hedonic Value	F2 Immersion & Presence	F3 Ease of Use	F4 VR Environment

F1	[36.93% - 57.83]	[.32 - .54]	[.37 - .65]	[.37 - .73]
F2	[.57 - .74]	[46.89% - 68.36%]	[.03 - .22]	[.07 - .36]
F3	[.61 - .81]	[.16 - .47]	[46.80% - 74.17%]	[.36 - .79]
F4	[.61 - .85]	[.27 - .60]	[.60 - .89]	[25.67% - 38.73%]

Note: Values below the diagonal are standardized correlation estimates among constructs, diagonal elements are average variances extracted (AVE), and values above the diagonal are squared correlations ϕ.

Taken all together, these results revealed some issues with the individual factor loadings, construct reliability, and discriminant validity at both point estimates and confidence intervals measures. Therefore, it was decided to eliminate IT30, IT36, and IT32 from the model. After respecification, the model was rerun and the results are presented below.

Figure 2. Revised CFA graphical model



The new model (Figure 2) with normed χ^2 value of 2.05, model CFI of 0.95 (above 0.90), and RMSEA of .06 (less than .08) suggests that the model fit is adequate to move forward. Table 10 below reports the results of the revised measurement model testing. The factors were evaluated based on the factor loadings, Cronbach's alpha, composite reliability, and average variance extracted. Factors F1 Hedonic Value, F2 Immersion & Presence, and F3 Ease of Use met all recommended thresholds on these metrics. However, factor F4 VR Environment revealed a CR just below the threshold and a low AVE. However, Lam (2012) affirmed that if the AVE is less than 0.5 but the CR is more than the acceptable level of 0.6, convergent validity is demonstrated.

Figure 10. Revised CFA. Factor loadings, Cronbach's Alpha, CR and AVE.

#	Item	FL	α	CR	AVE
F1 – Hedonic Value					
IT12	The VR tourism experience entertained me	0.59	0.90	0.90	54.10%
IT1	I think the VR tourism experience was very entertaining	0.71			
IT2	I experienced tourism with VR for the pure enjoyment of it	0.65			
IT15	Experiencing tourism with VR was an easy way to entertain me	0.80			
IT18	This VR tourism experience is one that I enjoyed	0.82			
IT37	The VR tourism experience gave me pleasure	0.77			
IT28	The VR tourism experience was truly a joy	0.80			
IT17	The VR tourism experience was a good value	0.72			
F2 – Immersion & Presence					

IT27	I was involved in the VR tourism experience to the extent that I lost track of time	0.86	0.84	0.85	58.20%
IT21	I forgot my immediate environment when I experienced the VR tourism experience	0.73			
IT14	I got so involved during the VR tourism experience that I forgot everything else	0.84			
IT22	While experiencing the VR tourism experience, I felt like my body was in the room, but my mind was inside the world created by the VR tourism experience	0.59			
F3 – Ease of Use					
IT35	I found the VR tourism experience was easy to use	0.87	0.83	0.83	62.80%
IT33	Learning to navigate the VR tourism experience was easy for me	0.73			
IT34	I found it easy to get the VR tourism experience to do what I wanted it to do	0.77			
F4 – VR Environment					
IT25	I could examine objects well from multiple viewpoints in the VR tourism experience	0.62	0.60	0.59	42.30%
IT26	The mechanism which controlled movement through the VR tourism experience was natural	0.68			

* FL – Factor loading, α – Cronbach's alpha, CR – composite reliability, AVE – average variance extracted

When evaluating the Fornell-Larcker criteria, all of the squared ϕ elements are below the value of AVE except squared correlations for factors F1 and F4 and factors F3 and F4 (see Table 11 below). As the majority of the squared correlations are below the AVE, the results do suggest discriminant validity for factors F1 through F3 and only partial support for the discriminant validity of factor F4.

Table 11. Revised standardized correlation, AVEs, and squared correlations matrix

	F1 Hedonic Value	F2 Immersion & Presence	F3 Ease of Use	F4 VR Environment
F1	54.23%	.44	.50	.51
F2	.66	58.16%	.11	.22
F3	.71	.33	62.76%	.54
F4	.72	.47	.74	42.34%

Note: Values below the diagonal are standardized correlation estimates among constructs, diagonal elements are average variances extracted (AVE), and values above the diagonal are squared correlations ϕ.

To support the evaluation of the measurement properties of the developed scale, a bootstrapping procedure with 2,000 samples was used. Table 12 below reports the 95% confidence interval estimates for factor loadings, CRs, and AVEs. All confidence intervals for the factor loadings include or exceed the $|0.50|$ threshold and are statistically significant at a .001 level.

Evaluation of Composite Reliability reveals strong measures with CR confidence intervals for all factors F1 through F4 including the 0.6 threshold. The confidence intervals of AVE for all factors F1 through F4 include the desired value of 0.5. However, the lower value of the confidence interval of the AVE of F4 is 27.69%, a value that lies below the commonly used threshold.

Table 12: Confidence Interval estimates for Revised Confirmatory Factor Analysis

ITEM	F1 Hedonic Value	F2 Immersion & Presence	F3 Ease of Use	F4 VR Environment
IT12	[0.48 - 0.68]			
IT1	[0.63 - 0.78]			
IT2	[0.55 - 0.73]			
IT15	[0.73 - 0.87]			

IT18	[0.75 - 0.87]			
IT37	[0.70 - 0.83]			
IT28	[0.74 - 0.80]			
IT17	[0.63 - 0.80]			
IT22		[0.49 - 0.69]		
IT14		[0.79 - 0.90]		
IT21		[0.63 - 0.81]		
IT27		[0.80 - 0.90]		
IT35			[0.79 - 0.93]	
IT33			[0.62 - 0.81]	
IT34			[0.66 - 0.85]	
IT26				[0.56 - 0.81]
IT25				[0.49 - 0.73]
Average Variance Extracted	[43.25% - 64.81%]	[47.53% - 68.81%]	[48.14% - 74.78%]	[27.69% - 59.45%]
Composite Reliability	[0.86 - 0.94]	[0.78 - 90]	[0.73 - 90]	[0.43 - 0.75]

Note: All are 95% Confidence Intervals. 2000 bootstrap samples used to perform bootstrapping.

Discriminant validity was assessed by comparing the AVE and the squared correlations ϕ in the relevant rows and columns of each factor. If a squared correlation is below the AVE it suggests the discriminant validity of the construct. Results provide further partial support for the proposed factor structure. The confidence intervals of the squared ϕ element between F1 & F4 and F3 & F4 exceed the higher value of the AVE confidence interval (see Table 13 below).

Table 13. Revised Confidence Interval standardized correlation, AVEs, and squared correlations matrix

	F1 Hedonic Value	F2 Immersion & Presence	F3 Ease of Use	F4 VR Environment
F1	[43.25% - 64.81]	[.33 - .56]	[.36 - .64]	[.33 - .71]
F2	[.58- .75]	[47.53% - 68.81%]	[.03 - .22]	[.09 - .38]

F3	[.60 - .80]	[.17 - .47]	[48.14% - 74.78%]	[.35 - .79]
F4	[.57 - .84]	[.30 - .62]	[.59 - .89]	[27.69% - 59.45%]

Note: Values below the diagonal are standardized correlation estimates among constructs, diagonal elements are average variances extracted (AVE), and values above the diagonal are squared correlations ϕ.

Additionally, nomological validity establishes if a construct behaves as expected in a network of related variables. To assess it, the correlations between the means of this proposed scale and other variables were analyzed (see Table 14). The results support the prediction that this scale is positively and significantly related to the constructs of satisfaction, intention to visit, and intention to use. The correlation between the means of this scale and the construct of intention to visit was smaller compared to satisfaction and intention to use, suggesting discriminant validity and helping the previous step.

Table 14. Nomological validity

Correlations	Satisfaction	Intention to visit	Intention to use
Scale	.668	.207	.613

All correlations are significant at $p<0.001$ level.

Results of the five studies of this dissertation suggest that the data collected have a good fit to the measurement, where four dimensions were suggested and theoretically supported. It is important to note that factor F4 met the minimum thresholds for factor loadings, reliability, and validity evaluation on the point estimate model, however, demonstrated some instability in the

confidence interval measures obtained through bootstrapping. Below are the four factors and seventeen items of this scale.

Table 15. Final measurement items for the value of VR tourism experience scale

F1 – Hedonic Value	
IT12	The VR tourism experience entertained me
IT1	I think the VR tourism experience was very entertaining
IT2	I experienced tourism with VR for the pure enjoyment of it
IT15	Experiencing tourism with VR was an easy way to entertain me
IT18	This VR tourism experience is one that I enjoyed
IT37	The VR tourism experience gave me pleasure
IT28	The VR tourism experience was truly a joy
IT17	The VR tourism experience was a good value
F2 – Immersion & Presence	
IT27	I was involved in the VR tourism experience to the extent that I lost track of time
IT21	I forgot my immediate environment when I experienced the VR tourism experience
IT14	I got so involved during the VR tourism experience that I forgot everything else
IT22	While experiencing the VR tourism experience, I felt like my body was in the room, but my mind was inside the world created by the VR tourism experience
F3 – Ease of Use	
IT35	I found the VR tourism experience was easy to use
IT33	Learning to navigate the VR tourism experience was easy for me
IT34	I found it easy to get the VR tourism experience to do what I wanted it to do
F4 - VR Environment	
IT25	I could examine objects well from multiple viewpoints in the VR tourism experience
IT26	The mechanism which controlled movement through the VR tourism experience was natural

CHAPTER V

DISCUSSION

The perceived value derived from a Virtual Reality (VR) experience in tourism represents an important strategic effort in today's travel. This research provides a key step in developing measurement theory related to the perceived value derived from a VR experience in tourism and identifies four value dimensions: 1) hedonic value, 2) immersion and presence, 3) ease of use, and 4) virtual environment. These results are similar to the ones obtained from other studies (Beck et al., 2019; Yung & Khoo-Lattimore, 2019) about VR in tourism, producing theoretical and managerial contributions.

5.1 Theoretical contributions

5.1.1. Scale structure

For this study, the customer's perceived value (PV) derived from a Virtual Reality (VR) tourism experience is defined as reflected by consumer perceptions of generalized utility derived from an immersive (virtual) tourism encounter including elements of playfulness and/or usefulness. The scale dimensions obtained in this study align with the forwarded definition of value derived from VR tourism experiences. The results of this dissertation demonstrated that

hedonic value, immersion and presence, ease of use, and virtual environment represent the four dimensions of the factor structure that emerged.

The hedonic value describes the perceived value "a customer receives based on the subject experience of fun and playfulness" (Babin et al. 1994). This scale includes items that measure entertainment, enjoyment, pleasure, and joy; and therefore correspond to the playfulness element included in the definition of VR tourism value.

Any experience in virtual reality can be valued through the ability to give physical submersion or "immersion", and the mental presence or "presence" to its users (Gutierrez et al., 2008; Burdea & Coiffet, 2017). In this scale, immersion denotes how much a consumer is separated from the current reality and is submerged into the virtual environment; and presence is represented as the feeling of actually sensing oneself in the virtual environment instead of the real physical space where the user's body is physically located (Sanchez-Vives & Slater, 2005; M. Slater & Wilbur, 1997). This scale included items that very well represented this dimension, and therefore correspond to the part of the definition that describes an immersive (virtual) tourism encounter.

Ease of use represents, in this study, the facility with which a particular technology can be used (Davis, 1989); and VR Environment is defined in this study as a computer-generated world with realistic-looking objects and situations that gives the user a sense of immersion (Burdea & Coiffet, 2017). These two dimensions share theoretically similar characteristics that could be considered as a broader dimension defined by a utilitarian dimension. Utilitarian value is defined as "the value that a customer receives based on a task-related and rational

consumption behavior" (Babin et al. 1994). This scale includes items that measure ease of use, utilitarian value, and how well the VR was built; and, therefore, corresponds to the usefulness element included in the definition of VR tourism value. It is suggested that future studies should analyze a second-order factor solution that might capture together the factors of ease of use and virtual environment. By doing this, the structure of the scale might improve by combining these two factors into one utilitarian value factor.

It is important to note that different types of VR tourism experiences and additional factors may be needed to describe the value of different types of tourism. Tourists have different motivations, attitudes, reactions, and roles (Cohen, 1984). Just like in real life people travel for different purposes, VR tourism experiences may also have different goals (Cohen 2019; Guttentang 2010). There might be the case in which certain experiences will be more educational (e.g. a virtual tour of the city center of a major city), others more hedonic (e.g. parachute in Dubai), others more utilitarian (e.g. sneak peek of a hotel room), and others more immersive and interactive (e.g. virtual conference). Therefore, additional factors may be needed to describe different types of tourism according to the specific experience.

5.1.2. Scale dimensions

The first factor of this scale represents one of the most studied concepts in marketing research (Babin et al., 1994), and thus it contributes to the literature on hedonic value, perceived value, and virtual reality. It has been demonstrated that hedonic motivation plays a key impact in the continuous use of VR technology (Kim & Hall, 2019). Hedonic experiences and emotional

arousal that people believe they will receive are two of the most influential and significant factors in determining behavioral intentions to travel to a particular location and to become a traveler in physical reality, creating great potential for virtual reality technology (Jung & Diek, 2017).

Additionally, since the tourism industry is in a volatile and uncertain situation after the COVID-19 pandemic, the increase of digital processes, such as VR tourism experiences, is essential for the sector's recovery, and hedonic value can explain a great deal of the value customers perceive they get from consuming this type of tourism. It has been demonstrated that hedonic motivation plays a key impact in the continuous use of information technology.

The second factor is related to the concepts of immersion and presence, two of the most relevant factors when producing high-quality virtual environments, and therefore delivering value to customers. Once consumers perceive a great sense of presence, they can therefore perceive higher levels of immersion and escapism as a consequence. Immersion and escapism have a significant part in modern culture since technology has created new methods for either fleeing reality or envisioning a better future. And, since VR is here to stay, it is a great first step in contributing to the understanding of what customers value in VR experiences in tourism. It is important to note that as technology evolves and VR becomes a mainstream technology, it will allow increasing the sense of presence and immersion of new tourist VR experiences.

The third factor is related to a theoretical model that is frequently used in VR research: the Technology Acceptance Model (TAM) and its concept of ease of use (Davis, 1989). One deciding factor when consuming VR experiences in tourism is the simplicity of usage. It has

been recommended that VR experiences should be created in such a manner that they are simple for users to operate and don't demand a lot of their cognitive abilities. The enjoyment level may increase as a result, and as a consequence, affecting the hedonic value previously mentioned. Additionally, users are more likely to employ VR technology for trip planning and/or behavioral intents to visit the place if the virtual tourism environment is seen as beneficial, highlighting the importance of creating easy-to-use virtual environments in the tourism industry.

Finally, the fourth factor is related to the virtual environment itself. It is also critical to provide high-quality visuals to prevent motion sickness, which might influence users to favor conventional media like trip brochures or guides, to further boost the acceptability of VR, particularly in the tourism industry. When creating a VR experience, other media qualities like an odd viewpoint should be taken into account. The nature of the VR experience must also be considered, according to Guttentag (2010), since constructing a virtual environment in which the virtual traveler is an observer may be simpler to realize than one in which a tourist. A heightened level of presence within the VE can be attributed to involvement and interaction, and as a consequence could influence the perceived value that customers receive from a VR experience in tourism.

5.2 Managerial contributions

Practically speaking, the findings may aid experts in comprehending how VR affects the creation of experiences with higher added value, which may support behavioral objectives. These findings could help the tourist sector rebound following this vulnerable time (after the COVID-

19 pandemic). VR as a marketing tool can lead to stronger interest and can be related to a positive attitude toward the destination. The perception and adoption of companies, investors, and clients towards virtual reality in tourism continue to increase, as a consequence of the developments and innovations in technology (Wei, 2019). Therefore, virtual reality should fulfill the potential necessities of future travelers that are vast, and this is where research should take advantage in distinguishing the significant patterns in the travel industry concerning the future (Nayyar et al., 2018).

Several obstacles need to be addressed and overcome to offer more genuine tourist experiences and enhance presence and immersion, and escapism as a consequence. First, VR systems should strive to fully stimulate all five senses, which are now mostly restricted to vision and hearing. VR systems should allow for real-time full facial capture, eye tracking, and real-time rendering of subtle emotional changes. Potentially, a sense of physical contact may be developed with technological advancements.

Managers should know that travel allows for social and cultural exchanges that are not possible with current technologies. However, it has been discovered that the feeling of presence on a virtual tour is diminished by a lack of social experience, thus special emphasis on social interactions should be made for VR experiences in tourism. The metaverse market size in the travel and tourism industry is expected to be valued at $188.24 billion in 2026 with a progressing annual growth rate of 26.01% (Technavio, 2022).

At the same time, as previous literature stated (Tussyadiah et al., 2017, 2018; Guttentag, 2010; Sussmann & Vanhegan, 2000), VR in the tourism industry will have a great deal when

testing a service or product. Specifically, it has been proved that VR has magnificent and exclusive testing capacities that allow the formation of different kinds of systems that allow travelers to try a touristic experience before they experience it in the real world. Thus, understanding that hedonic value, immersion and presence, ease of use, and VR environment are abstract concepts that consumers perceive to value from these experiences, may also help practitioners to build experiences that enhance those values. For example, VR experiences should aim to arouse the five senses, to induce the level of presence an thus increase immersion. Similarly, these experiences should be easy to use for all types of users, and build VR environments with high-quality graphics, just to mention some examples.

As evident from the scale, customers value the immersion and presence attributes of VR tourism experiences. If VR experiences allow users to immerse and felt present in a virtual place, they may thus provide the benefits of escapism. Kim (2014) defined escapism as the tendency of the majority of individuals to emotionally and perceptually flee from their present reality as a result of uncomfortable or dissatisfied living circumstances. As tourism in real life provides travelers the benefit of escaping and disconnecting from reality to forget the stress of everyday life, so could potentially do virtual tourism experiences. Therefore, virtual tourism experiences may be used as on-demand virtual trips that are easy to set up and hop on compared to actual travel.

On the other hand, if customers may be receiving doses of escapism from virtual travel experiences, there may be circumstances when customers will be less likely to turn to actual travel for this benefit. Therefore, the travel and tourism industry might be affected by the

creation of a substitution effect. It should be further explored if some consumers will increase its usage, and will prefer VR tourism to real-world travel.

Similarly, escapism could also be a threat to society. As Fernandes et al. (2020) concluded in their study, gaming addiction provoked a negative influence on the psychological well-being of adolescents due to the high rates of depression, loneliness, escapism, poor sleep quality, and anxiety were reported by those adolescents who extraordinarily used social media, gaming, and the internet compulsively. Not to mention economic losses, and/or changes in the economic structure (Guttentag, 2010; Kardong-Edgren et al., 2019). Similarly, it should be monitored if overusing VR tourism experiences may trigger loneliness, anxiety, and other negative consequences associated with the heavy use of other technologies.

5.3 Scale use

This scale was developed to assess the value of VR experiences in tourism. Therefore, the scale is suitable for assessing the perceived value of different tourism and hospitality experiences in VR. Industry players or vendors developing such VR experiences may benefit from using this scale for measuring the value perceived by the users, and as virtual reality improvements keep evolving, the opportunities for exploiting VR in the travel and tourism industry will progress. The uses of this scale impact mainly the stage of the decision making process (Kim et al., 2020), specifically the planning and management areas (Sussmann & Vanhegan, 2000). For example, this scale could measure the value customers perceive when visiting a VR museum or airport; when users immerse in VR experiences that allow them to know ahead of their travel the routes

required to take to do what they want to achieve (Tussyadiah et al., 2017, 2018); or when users want to get a VR sneak peeks of sites, destinations, and attractions; or when they use VR as a piece of a touristic marketing tool (Guttentag, 2010). Not to mention the applicability of all other

This scale may also be used to build and create public travel and tourist regulations (Cheong, 1995, Orru et al., 2019). VR might assist move this problem from areas with high utilization to those with lower usage in management plans by helping practitioners understand the visitor's range of time, place, and space (Lew & McKercher, 2006). There are clear trends in the travel sector that may be used to effectively plan and handle virtual travel (Tussyadiah et al., 2017). As an illustration, consider the straightforward and careful routes created in virtual reality that are immediately available for tourists by assisting them with their journey itinerary and organizing operations (Tussyadiah et al., 2018). Not to mention all its actual potential use in all different types of virtual travel that was mentioned in the literature review section of this dissertation.

Also, the scale may be used to further explore theoretical relationships that exist between the dimensions of the perceived value of tourism VR experiences and potential behavioral outcomes, e.g., satisfaction with the experience, willingness to use the same or similar experiences again, willingness to pay for VR experiences, and willingness to visit a destination/venue after experiencing it in VR. Even though this scale was developed for VR experiences, it also may prove to be useful when studying other immersive technologies, e.g., AR (Nayyar et al., 2018; Wei, 2019) and Metaverse (Buhalis et al., 2022; Gursoy et al., 2022a; Koo et al., 2022).

While these technologies are not identical to VR, there are certain similarities that may make the scale of the perceived value of VR experiences in tourism serve as a starting point in exploring the perceived value of experiences in AR and Metaverse. For example, AR adds a digital layer on top of the actual reality where a user exists, which may make the world around the user more interesting, fun, and entertaining, therefore, providing a hedonic value (Shin & Jeong, 2021). AR could also enhance the feeling of presence and therefore increase the immersion level of its users if the experience is well-designed to enhance those capabilities (Irimiás et al., 2021). This scale could also capture the ease of use of an AR experience and AR environment of the touristic experiences offered to customers that are needed to actually produce value for customers (Nayyar et al., 2018; Shin & Jeong, 2021).

In the metaverse, users merge the real and virtual worlds, revolutionizing how the travel and tourism industry supports the co-creation of transformative experiences and values for their customers (Buhalis et al., 2022; Gursoy et al., 2022b; Koo et al., 2022). The hospitality and tourism sectors face both enormous opportunities and challenges as a result of the metaverse (Gursoy et al., 2022). To create hybrid virtual and physical experiences that let consumers engage with them as well as other guests before, during, and after their stay, tourism and hospitality organizations must purposefully use the Metaverse. According to Koo et al.'s (2022) study, metaverse tourists can have more realistic expectations before their trips, and thus researchers should take into account the multi-identification profiles of metaverse tourists, offering a fresh take on the creative economy business model.

This scale could be used in similar contexts or any other immersive experience, but modifying the context of Item 22. For the rest of the measurement items, changing the word VR to another type of technology could also work. However, since AR is a similar technology that is an example of VR, this scale could adapt easily specifically to AR. It is very important to highlight this benefit because in the travel and tourism industry several examples of AR technology can be found. For example, the Titanic VR experience is an immersive touristic and educational interactive experience with over six hours of game-play that allows users a greater understanding of its history. Even though in the Metaverse, users are present as avatars and may have to use computer controls to navigate the metaverse environment (as opposed to using their bodies to look and walk around in VR); it is a very similar experience compared to VR. Actual uses of AR in tourism and the Metaverse are virtual conferences and concerts that are already been held throughout the world. Therefore, more studies on different settings of the travel and tourism industry and the applicability of the developed scale to those contexts should be researched.

5.4 Limitations and future studies

This study presented the first attempt to measure the value of VR tourism experiences. Further research needs to be conducted to extend these initial efforts to measure the perceived value derived from a VR experience in tourism. Also, no study comes without limitations. This section reflects on the potential weaknesses of this research and calls for future studies building on both methodological and theoretical considerations.

From the method perspective, the sample for this research was recruited from owners of VR headsets residing in the United States. While owning a VR headset makes it more likely for an individual to experience VR travel, prior experience with VR may also alter their perceptions of VR tourism and the value that they derive from it. The value of VR tourism experiences may be further investigated with the traveling public who do not own VR headsets, e.g., such a sample may be recruited in the researcher's locale for a lab study, or at the office of a travel agency that uses VR as a tool for previewing different travel products.

Another limitation of the results from this study is related to the characteristics of the sample. Most respondents were white, young, male, never married with high income, and therefore not generalizable to the general population. To increase generalizability, the scale should be administered to a broader sample. Also, cross-cultural studies are encouraged to detect any potential differences with other nationalities since the sample used for this study comes from US residents.

Furthermore, the self-selection approach to sampling could introduce potential bias. Self-selection bias occurs when participants choose whether or not to participate in the study, and the group that chooses to participate is not equivalent to the group that opts out (in terms of the research criteria). People that had a favorable experience with VR, for instance, may self-select themselves into the research sample to answer the survey. As a result, the statistics may be skewed and the experiences of other customers and clients won't be accurately presented. Even though self-selection bias cannot be completely eradicated, it should be avoided to the greatest

extent feasible to help us comprehend the situation. Further studies should aim to reduce self-selection bias as possible.

At the same time results from this study did not include measurement items that were related to the educational aspects of tourism and future studies should target to include some of these measurement items since some travelers might associate them with high perceived value. At the same time, future studies should aim to explore a second-order analysis of the structure of F3 and F4, since validity showed mixed results and their correlation is high. The underlying similarities of F3 an F4 might create a utilitarian value factor that probably will complement this study.

From the theoretical standpoint, to get more insights into how hedonic value plays a role in the perceived value of VR experiences in tourism, more studies on differentiating entertainment from enjoyment should be conducted, as well as to relate it with different emotions and reactions that consumers can get from interacting in the virtual world. Further research should also investigate the impact of the scale dimensions on various behavioral outcomes of the users, e.g., an intention to use VR for travel planning and an intention to purchase travel products in VR.

This study aimed to create the first attempt to understand the perceived value that consumers get from VR experiences in tourism. The results of five studies suggest that the data collected have a partial good fit to the measurement, where four dimensions were suggested and theoretically supported. Fit, convergent, and nomological validity were demonstrated with the

data collected, as previously reported. To end, it is aimed to call for future research to further validate the scale and increase the literature on this important and near new reality.

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APPENDIX

6.1 Initial measurement items (120 items)

1) The AR/VR tourism environment is attractive
2) The AR/VR tourism environment is aesthetically appealing
3) I like the way the AR/VR tourism environment looks
4) I think the AR/VR tourism experience was very entertaining
5) The enthusiasm of the AR/VR tourism experience was catching me, picked me up
6) The AR/VR tourism experience has entertained me
7) The AR/VR experience made me feel if I was in another world
8) The AR/VR tourism experience "got me away from it all"
9) I got so involved during the AR/VR tourism experience that I forgot everything else
10) I experienced tourism with AR/VR for the pure enjoyment of it
11) I enjoyed the AR/VR tourism experience for its own sake, not just to spend time
12) Experiencing tourism with AR/VR fit with my schedule
13) Experiencing tourism with AR/VR was an easy way to manage my time
14) Experiencing tourism with AR/VR has been an easy way to entertain me
15) The AR/VR tourism experience had a good economic value
16) Overall, I am happy with the prices charged by the AR/VR tourism experience
17) The AR/VR tourism experience's prices are too high given the quality of the visit
18) When I think of AR/VR tourism experience, I think of excellence
19) I think of AR/VR tourism experience as an expert
20) The AR/VR tourism experience is well made, well organized
21) The AR/VR tourism experience has consistent quality
22) The AR/VR tourism experience has an acceptable standard of quality
23) The AR/VR tourism experience performed consistently
24) The AR/VR tourism experience has poor workmanship
25) The AR/VR tourism experience has not lasted a long time
26) This AR/VR tourism experience is one that I enjoyed
27) This AR/VR tourism experience made me want to use it
28) The AR/VR tourism experience is one that I would feel relaxed about using
29) The AR/VR tourism experience would make me feel good
30) The AR/VR tourism experience would give me pleasure
31) The AR/VR tourism experience is reasonably priced
32) The AR/VR tourism experience offers value for money
33) The AR/VR tourism experience is a good product for the price
34) The AR/VR tourism experience would be economical
35) The AR/VR tourism experience would help me to feel acceptable
36) The AR/VR tourism experience would improve the way I am perceived

37) The AR/VR tourism experience would make a good impression on other people

38) The AR/VR tourism experience would give its owner social approval
39) While experiencing the AR/VR tourism experience, the AR/VR tourism experience came to me and created a new world for me, and this world suddenly disappeared when I stop the experience.

40) While experiencing the AR/VR tourism experience, I felt I was in the world the AR/VR tourism experience created.

41) I forgot my immediate environment when I experienced the AR/VR tourism experience.

42) Having experienced the AR/VR tourism experience, I felt like I came back to the “real world” after a journey.
43) While experiencing the AR/VR tourism experience, I feel like my body is in the room, but my mind is inside the world created by the AR/VR tourism experience.

44) The AR/VR tourism experience-generated world seems to me “somewhere I visit” rather than “something I see.”

45) When I finished the AR/VR tourism experience, I felt like I came back to the "real world" after a journey

46) Experiencing the AR/VR tourism experience provides a good test of my skills.

47) Experiencing the AR/VR tourism experience challenges me to perform to the best of my ability.

48) I feel like the body action in the AR/VR tourism experience is my actual body.

49) I feel like I am trying on and the AR/VR tourism experience is my actual hand.

50) The body in the AR/VR tourism experience is similar to my body.

51) This AR/VR tourism experience would improve my travel productivity.

52) This AR/VR tourism experience would improve my travel ability.

53) This AR/VR tourism experience would be useful in traveling where I want.

54) The AR/VR tourism experience would make me feel good.

55) The AR/VR tourism experience would be enjoyable.

56) The AR/VR tourism experience would be exciting.

57) The AR/VR tourism experience would be fun for its own sake.

58) The AR/VR tourism experience would involve me in the traveling process.

59) The AR/VR tourism experience would be interesting.

60) All my senses were engaged with the AR/VR tourism experience

61) The visual aspects of the AR/VR tourism environment involved me

62) The auditory aspects of the AR/VR tourism environment involved me

63) The sense of objects moving through space were compelling

64) My sense of moving around inside the AR/VR tourism environment was compelling

65) I was able to closely examine objects in the AR/VR tourism environment

66) I could examine objects well from multiple viewpoints in the AR/VR tourism environment

67) I was able to control the AR/VR tourism experience

68) The AR/VR tourism environment was responsive to actions that I initiated or performed

69) The integrations with the AR/VR tourism environment seemed natural

70) The mechanism which controlled movement through the AR/VR tourism experience was natural

71) I was able to anticipate what would happen next in response to the actions that I performed while in the AR/VR tourism experience

72) I could manipulate well objects in the AR/VR tourism environment

73) I experienced a lot of delay between my actions and expected outcomes in the AR/VR tourism experience

74) I quickly adjusted to the AR/VR tourism environment experience

75) I was proficient in moving and interacting with the AR/VR tourism environment at the end of my experience

76) I learn new techniques that enabled me to improve new performance with the AR/VR tourism experience

77) I was aware of events occurring in the real world around me while in the AR/VR tourism experience

78) I was aware of my display and control devices while in the AR/VR tourism experience

79) The control mechanism of the AR/VR tourism experience was distracting

80) The visual display quality interfered or distracted me from performing assigned tasks or required activities in the AR/VR tourism experience

81) The control devices interfered with the performance of assigned tasks or with other activities in the AR/VR tourism experience

82) I could concentrate on the assigned tasks or required activities rather than on the mechanisms used to perform those task or activities in the AR/VR tourism experience

83) The information coming from my various senses were inconsistent or disconnected while in the AR/VR tourism experience

84) The AR/VR tourism environment seem consistent with my real-life experiences

85) I was able to actively survey or search the AR/VR tourism environment using vision

86) I could identify well sounds in the AR/VR tourism experience

87) I could localize well sounds in the AR/VR tourism experience

88) I was able to actively survey or search the AR/VR tourism environment using touch

89) I felt confused or disoriented at the beginning of breaks or at the end of the AR/VR tourism experience

90) I was involved in the AR/VR tourism environment experience

91) I was involved in the AR/VR tourism experience to the extent that I lost track of time

92) The AR/VR tourism experience was truly a joy

93) Compared to other things I could have done, the time spent in the AR/VR tourism experience was truly enjoyable

94) During the AR/VR tourism experience, I felt the excitement of the hunt

95) The AR/VR tourism experience truly felt like an escape

96) I enjoyed being immersed in exciting new products

97) I enjoyed the AR/VR tourism experience for its own sake

98) I continued the AR/VR tourism experience, not because I had to, but because I wanted to

99) I had a good time because I was able to act on the "spur of the moment"

100) While in the AR/VR tourism experience, I was able to forget my problems

101) While at the AR/VR tourism experience, I felt a sense of adventure

102) This AR/VR tourism experience was not a very nice time spent

103) I felt really unlucky during this experience

104) I was able to do a lot of fantasizing during this experience

105) I accomplished just what I wanted to on this experience

106) I couldn’t experience what I really needed

107) I feel this experience was successful

108) I feel really smart about this experience

109) This was a good experience because it was over very quickly

110) Using the AR/VR tourism experience enabled me to accomplish tasks more quickly

111) Using the AR/VR tourism experience would improve my travel performance

112) Using the AR/VR tourism experience would enhance my effectiveness on my travel

113) Using the AR/VR tourism experience would make it easier to do my travel

114) I would find the AR/VR tourism experience useful in my travel

115) Learning to operate the AR/VR tourism experience was easy for me

116) I found it easy to get the AR/VR tourism experience to do what I want it to do

117) My interaction with the AR/VR tourism experience was clear and understandable

118) I found the AR/VR tourism experience to be clear and understandable

119) It was easy for me to become skillful at using the AR/VR tourism experience

120) I found the AR/VR tourism experience easy to use

121)

6.2 Survey 1

Default Question Block

VR (Virtual Reality) User Experience

Investigator	Advisor
Fernando Arroyo Lopez, MiM	Katerina Berezina, Ph.D.
Department of Nutrition and Hospitality Management	Department of Nutrition and Hospitality Management
216 Lenoir Hall	216 Lenoir Hall
The University of Mississippi	The University of Mississippi
(662) 915-7658	(662) 915-3073

Description
You will help us in purifying our measure of the perceived value derived from a VR experience in tourism. From a list, you will need to judge how well every measurement item "matches" the definition that appears below. You will be given a 3 point likert scale where you need to choose from (1) Does Not Match / (2) Matches Somewhat / (3) Matches Very Well

Cost and Payments
It will take you approximately 15 minutes or less to complete this survey. You will not receive money for completing the questionnaire.

Risks and Benefits
We do not think that there are risks. A lot of people enjoy taking questionnaires.

Confidentiality
No identifiable information will be recorded, therefore we do not think you can be identified from this study.

Right to Withdraw
You do not have to take part in this study and you may stop participation at any time. If you start the study and decide that you do not want to finish, all you have to do is to close this page.

IRB Approval
This study has been reviewed by The University of Mississippi's Institutional Review Board (IRB). If you have any questions, concerns, or reports regarding your rights as a participant of research, please contact the IRB at (662) 915-7482 or irb@olemiss.edu.

Statement of Consent
I have read and understood the above information. By completing the survey, I consent to participate in the study.

Yes	No
○	○

Instructions
You will help us in purifying our measure of the perceived value derived from a VR experience in tourism. Thus, from the following list, you will need to judge how well every measurement item "matches" the definition that appears below.

You will be given a 3 point likert scale where you need to choose from (1) Does Not Match / (2) Matches Somewhat / (3) Matches Very Well

Definition
The perceived value derived from a Virtual Reality (VR) experience in tourism as reflected by consumer perceptions of generalized utility derived from an immersive (virtual) tourism encounter including elements of playfulness and/or usefulness. Examples of a VR experience in tourism might include: VR used in historical sites, VR tours in museums, VR travel to different destinations, VR tours of hotels, VR apps that customize hotel rooms, VR conferences, VR for airports, VR concerts, VR for navigation, etc. Some of these may be for pay, others may not.

Respondents would be responding on a disagree-agree scale based on a VR experience.

The perceived value derived from a Virtual Reality (VR) experience in tourism as reflected by consumer perceptions of generalized utility derived from an immersive (virtual) tourism encounter including elements of playfulness and/or usefulness.

	Does Not Match	Matches Somewhat	Matches Very Well
Experiencing tourism with VR was an easy way to save my time	○	○	○
I experienced tourism with VR for the pure enjoyment of it	○	○	○
All my senses were engaged with the VR tourism experience	○	○	○
The VR tourism experience truly felt like an escape	○	○	○
I would replace an actual travel experience with the VR tourism experienced	○	○	○
I think the VR tourism experience was very entertaining	○	○	○

The perceived value derived from a Virtual Reality (VR) experience in tourism as reflected by consumer perceptions of generalized utility derived from an immersive (virtual) tourism encounter including elements of playfulness and/or usefulness.

	Does Not Match	Matches Somewhat	Matches Very Well
The VR experience would enhance a real travel experience to that place	○	○	○
I accomplished just what I wanted to with this VR tourism experience	○	○	○
I was able to do a lot of fantasizing during this VR tourism experience	○	○	○
During the VR tourism experience, I was able to forget my problems	○	○	○
I feel this VR tourism experience was successful	○	○	○

During the VR tourism experience, I felt a sense of adventure	○	○	○

The perceived value derived from a Virtual Reality (VR) experience in tourism as reflected by consumer perceptions of generalized utility derived from an immersive (virtual) tourism encounter including elements of playfulness and/or usefulness.

	Does Not Match	Matches Somewhat	Matches Very Well
Using the VR tourism experience enabled me to accomplish tasks more quickly	○	○	○
The VR tourism experience entertained me	○	○	○
The VR tourism experience made me feel as if I was in another world	○	○	○
The VR tourism experience "got me away from it all"	○	○	○
I got so involved during the VR tourism experience that I forgot everything else	○	○	○
Experiencing tourism with VR was an easy way to entertain me	○	○	○
After experiencing tourism in VR I would substitute an actual travel	○	○	○

The perceived value derived from a Virtual Reality (VR) experience in tourism as reflected by consumer perceptions of generalized utility derived from an immersive (virtual) tourism encounter including elements of playfulness and/or usefulness.

	Does Not Match	Matches Somewhat	Matches Very Well
The VR tourism experience was reasonably priced based on what I got out of it	○	○	○
The VR tourism experience was a good value	○	○	○
The VR tourism experience made me feel good	○	○	○
The VR tourism experience offered value for the money	○	○	○
The VR tourism experience displayed poor workmanship	○	○	○
This VR tourism experience is one that I enjoyed	○	○	○

The perceived value derived from a Virtual Reality (VR) experience in tourism as reflected by consumer perceptions of generalized utility derived from an immersive (virtual) tourism encounter including elements of playfulness and/or usefulness.

	Does Not Match	Matches Somewhat	Matches Very Well
I forgot my immediate environment when I experienced the VR tourism experience	○	○	○
The VR tourism experience gave its user social approval	○	○	○
The VR tourism experience was economical	○	○	○
I felt I was in the world the VR tourism experience created	○	○	○
The VR tourism experience was a good product for the price	○	○	○
The VR tourism experience triggered on me a desired enhancement of reality	○	○	○
The VR tourism experience would make a good impression on other people	○	○	○

The perceived value derived from a Virtual Reality (VR) experience in tourism as reflected by consumer perceptions of generalized utility derived from an immersive (virtual) tourism encounter including elements of playfulness and/or usefulness.

	Does Not Match	Matches Somewhat	Matches Very Well
The VR tourism experience was responsive to actions that I initiated or performed	○	○	○
I could examine objects well from multiple viewpoints in the VR tourism experience	○	○	○
The sense of objects moving through space were compelling in the VR tourism experience	○	○	○
The mechanism which controlled movement through the VR tourism experience was natural	○	○	○
While experiencing the VR tourism experience, I felt like my body was in the room, but my mind was inside the world created by the the AR/VR tourism experience	○	○	○
The visual aspects of the VR tourism experience involved me	○	○	○

The perceived value derived from a Virtual Reality (VR) experience in tourism as reflected by consumer perceptions of generalized utility derived from an immersive (virtual) tourism encounter including elements of playfulness and/or usefulness.

	Does Not Match	Matches Somewhat	Matches Very Well

I was involved in the VR tourism environment experience	○	○	○
I felt confused or disoriented at the beginning and at the end of the VR tourism experience	○	○	○
The VR tourism environment seemed consistent with my real-life experiences	○	○	○
I was aware of events occurring in the real world around me while in the VR tourism experience	○	○	○
I was involved in the VR tourism experience to the extent that I lost track of time	○	○	○
The control mechanism of the VR tourism experience was distracting	○	○	○

The perceived value derived from a Virtual Reality (VR) experience in tourism as reflected by consumer perceptions of generalized utility derived from an immersive (virtual) tourism encounter including elements of playfulness and/or usefulness.

	Does Not Match	Matches Somewhat	Matches Very Well
I felt smart about engaging in this VR tourism experience	○	○	○
The VR tourism experience was truly a joy	○	○	○
This VR tourism experience was not a very nice time spent	○	○	○
I continued the VR tourism experience, not because I had to, but because I wanted to	○	○	○
Compared to other things I could have done, the time spent in the VR tourism experience was truly enjoyable	○	○	○
I couldn't accomplish what I really needed to during the VR tourism experience	○	○	○

The perceived value derived from a Virtual Reality (VR) experience in tourism as reflected by consumer perceptions of generalized utility derived from an immersive (virtual) tourism encounter including elements of playfulness and/or usefulness.

	Does Not Match	Matches Somewhat	Matches Very Well
This was a good experience because it was over very quickly	○	○	○
I found it easy to get the VR tourism experience to do what I wanted it to do	○	○	○

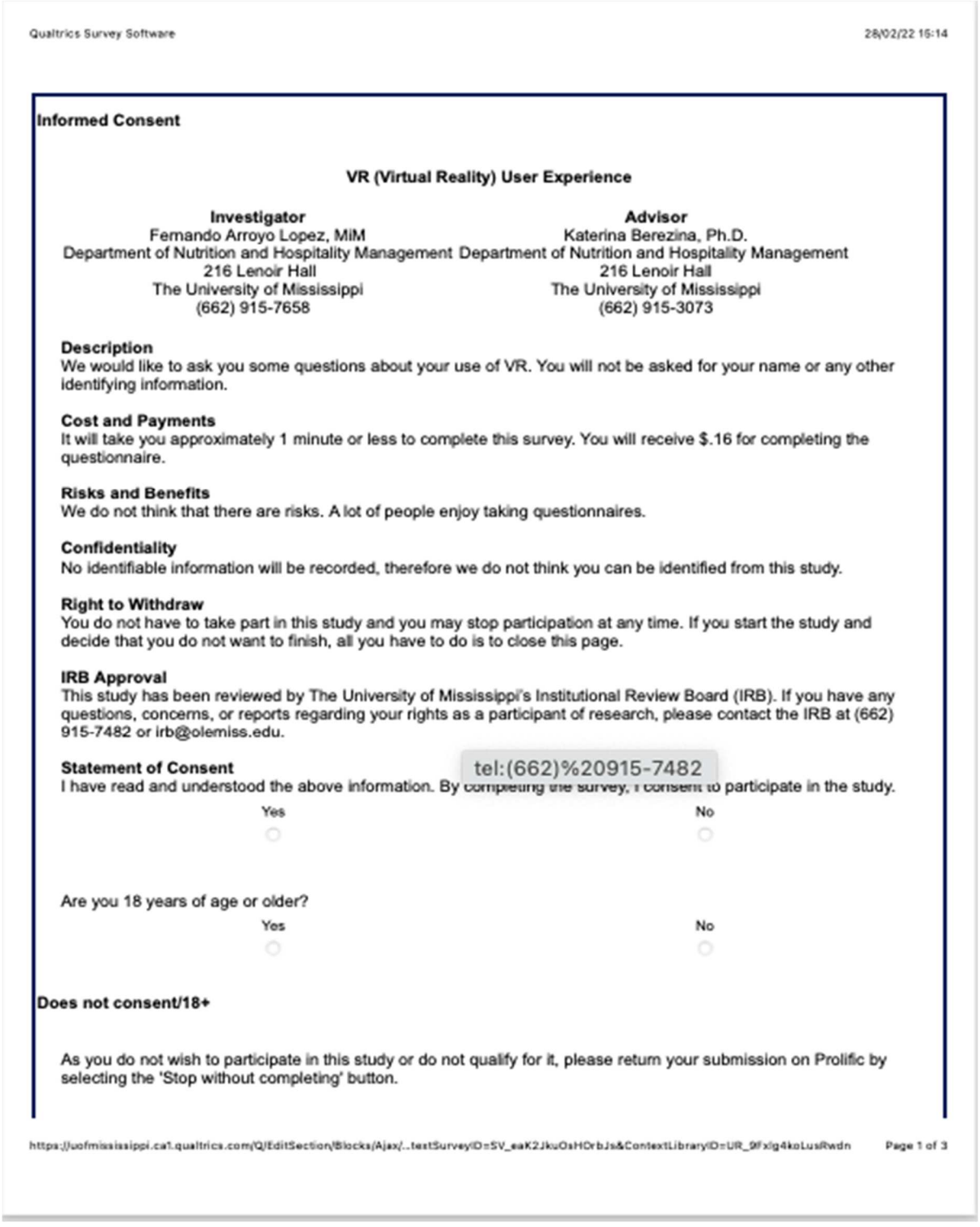
I enjoyed the VR tourism experience for its own sake, not because I learned something new	○	○	○
I found the VR tourism experience was easy to use	○	○	○
Learning to navigate the VR tourism experience was easy for me	○	○	○
This VR tourism experience made me want to use it again anytime soon	○	○	○

The perceived value derived from a Virtual Reality (VR) experience in tourism as reflected by consumer perceptions of generalized utility derived from an immersive (virtual) tourism encounter including elements of playfulness and/or usefulness.

	Does Not Match	Matches Somewhat	Matches Very Well
The VR tourism experience gave me pleasure	○	○	○
I felt like I came back to the "real world" when I finished the VR tourism experience	○	○	○
I was able to anticipate what would happen next in the VR tourism experience	○	○	○
The VR tourism experience would enhance my effectiveness on my future trips	○	○	○
My future trips would be easier by using the VR tourism experience	○	○	○
It was easy for me to become skillful at the VR tourism experience	○	○	○

Do you suggest any other item that could match the definition?

6.3 Survey 2



Qualtrics Survey Software 28/02/22 15:14

Informed Consent

VR (Virtual Reality) User Experience

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(662) 915-7658

Advisor
Katerina Berezina, Ph.D.
Department of Nutrition and Hospitality Management
216 Lenoir Hall
The University of Mississippi
(662) 915-3073

Description
We would like to ask you some questions about your use of VR. You will not be asked for your name or any other identifying information.

Cost and Payments
It will take you approximately 1 minute or less to complete this survey. You will receive $.16 for completing the questionnaire.

Risks and Benefits
We do not think that there are risks. A lot of people enjoy taking questionnaires.

Confidentiality
No identifiable information will be recorded, therefore we do not think you can be identified from this study.

Right to Withdraw
You do not have to take part in this study and you may stop participation at any time. If you start the study and decide that you do not want to finish, all you have to do is to close this page.

IRB Approval
This study has been reviewed by The University of Mississippi's Institutional Review Board (IRB). If you have any questions, concerns, or reports regarding your rights as a participant of research, please contact the IRB at (662) 915-7482 or irb@olemiss.edu.

Statement of Consent
tel:(662)%20915-7482
I have read and understood the above information. By completing the survey, I consent to participate in the study.

Yes ○ No ○

Are you 18 years of age or older?

Yes ○ No ○

Does not consent/18+

As you do not wish to participate in this study or do not qualify for it, please return your submission on Prolific by selecting the 'Stop without completing' button.

https://uofmississippi.ca1.qualtrics.com/Q/EditSection/Blocks/Ajax/...testSurveyID=SV_eaK2JkuOsHOrbJs&ContextLibraryID=UR_9Fxig4koLusRwdn Page 1 of 3

prolific ID

Before you start, please switch off phone/e-mail/music/ so you can focus on this study.

Thank you!

Please entere your Prolific ID here:

${e://Field/PROLIFIC_PID}

Screener validation - VR ownership

Do you own a VR (Virtual Reality) headset?

Yes ○ No ○

Are you an American resident?

Yes ○ No ○

Inconsistent screening validation

You are ineligible for this study, as you have provided information which is inconsistent with your Prolific prescreening responses. Please return your submission on Prolific by selecting the 'Stop without completing' button.

VR headset model

Please select the model and brand of your VR headset

If other, please type the model and brand of your VR headset

Main uses

What are the main uses of your VR headset? (You can select multiple answers)

Gaming	Sports	Education	Travel/Tourism	Social	Shopping	Work	Video Streaming	Other
☐	☐	☐	☐	☐	☐	☐	☐	☐

If other, please type your main use

VR tourism

Are you willing to participate in a follow-up study where you will be asked to watch a 2-minute video in your VR headset, and then answer a survey? It will take about 15 minutes in total, and compensation will be set accordingly.

Yes ○ No ○

6.4 Survey 3

Informed Consent

Consumer perceptions of VR (Virtual Reality) experiences in travel/tourism

Investigator	Advisor
Fernando Arroyo Lopez, MiM	Katerina Berezina, Ph.D.
Department of Nutrition and Hospitality Management	Department of Nutrition and Hospitality Management
216 Lenoir Hall	216 Lenoir Hall
The University of Mississippi	The University of Mississippi
(662) 915-7658	(662) 915-3073

Description
The purpose of this research project is to analyze the consumer perceptions of VR (Virtual Reality) experiences in travel and tourism. We would like to ask a few questions about your perceptions of a VR travel experience, and some demographic information. You will not be asked for your name or any other identifying information.

Cost and Payments
It will take you approximately 15 minutes or less to complete this survey. You will receive $X for completing the questionnaire.

Risks and Benefits
We do not think that there are risks. A lot of people enjoy taking questionnaires.

Confidentiality
No identifiable information will be recorded, therefore we do not think you can be identified from this study.

Right to Withdraw
You do not have to take part in this study and you may stop participation at any time. If you start the study and decide that you do not want to finish, all you have to do is to close this page.

IRB Approval
This study has been reviewed by The University of Mississippi's Institutional Review Board (IRB). If you have any questions, concerns, or reports regarding your rights as a participant of research, please contact the IRB at (662) 915-7482 or irb@olemiss.edu.

Statement of Consent
I have read and understood the above information. By completing the survey, I consent to participate in the study.

Yes	No
○	○

Are you 18 years of age or older?

Yes	No
○	○

Block 11

As you do not wish to participate in this study or do not qualify for it, please return your submission on Prolific by selecting the 'Stop without completing' button.

Block 9

Before you start, please switch off phone/e-mail/music/ so you can focus on this study.

Thank you!
Please entere your Prolific ID here:

${e://Field/PROLIFIC_PID}

Data Quality

We care about the quality of our survey data and hope to receive the most accurate measures of your opinions, so it is important to us that you thoughtfully provide your best answer to each question in the survey.

Do you commit to providing thoughtful and honest answers to the questions in this survey?

- I will provide my best answers
- I will not provide my best answers
- I can't promise either way

Block 11

As you do not wish to provide your best answers, please return your submission on Prolific by selecting the "Stop without completing" button.

Screener validation

Do you own a VR (Virtual Reality) headset?

Yes	No
○	○

Are you a USA resident?

Yes	No
○	○

Block 12

You are ineligible for this study, as you have provided information which is inconsistent with your Prolific prescreening responses. Please return your submission on Prolific by selecting the "Stop without completing" button.

Block 10

Please select the model and brand of your VR headset

If other, please type the model and brand of your VR headset

Block 11

What are the main uses of your VR headset? (You can select multiple answers)

Gaming	Sports	Education	Travel/Tourism	Social	Shopping	Work	Video Streaming	Other
○	○	○	○	○	○	○	○	○

If other, please type your main use

Details of Experience

Please, play the following VR tourism experience on you VR device.

Dependent Variables

Thinking about yourself and how you felt during the "travel" experience you just described; to what extent did you generally feel (during the "travel" experience):

	Did not feel at all 1	2	3	4	Felt very much 5
Upset	○	○	○	○	○
Hostile	○	○	○	○	○
Alert	○	○	○	○	○
Ashamed	○	○	○	○	○
Inspired	○	○	○	○	○
Nervous	○	○	○	○	○
Determined	○	○	○	○	○
Attentive	○	○	○	○	○
Afraid	○	○	○	○	○
Active	○	○	○	○	○

Please indicate the level of agreement that you would assign to the following statements to describe the "travel" experience you described.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
The VR travel experience was better than I expected	○	○	○	○	○	○	○
I was pleased with the VR travel experience	○	○	○	○	○	○	○
Overall, I was satisfied with the VR travel experience	○	○	○	○	○	○	○
I was completely delighted with the VR travel experience	○	○	○	○	○	○	○

Please indicate the level of agreement that you would assign to the following statements.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
I am planning to visit the destination that I observed in the tourism-related VR activity.	○	○	○	○	○	○	○
I intend to visit the destination that I saw in the tourism-related VR activity in near future.	○	○	○	○	○	○	○
I am willing to visit the destination that I saw in the tourism-related VR activity soon.	○	○	○	○	○	○	○
I intend to invest money and time to visit the destination that I observed in the VR tourism experience.	○	○	○	○	○	○	○

Please indicate the level of agreement that you would assign to the following statements.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
I will continue to use tourism-related VR activities in the future.	○	○	○	○	○	○	○
I will update tourism-related VR activities in the future.	○	○	○	○	○	○	○
I will search for tourism-related VR activities in the future.	○	○	○	○	○	○	○
I will continue to use tourism-related VR activities in the future.	○	○	○	○	○	○	○

How much would you be willing to spend (all-inclusive) to visit the destination you experienced (in USD)?

Survey

Please indicate the level of agreement that you would assign to the following statements to describe the "travel" experience you described.

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I think the VR tourism experience was very entertaining	○	○	○	○	○
I experienced tourism with VR for the pure enjoyment of it	○	○	○	○	○
Experiencing tourism with VR was an easy way to save my time	○	○	○	○	○
All my senses were engaged with the VR tourism experience	○	○	○	○	○
The VR tourism experience truly felt like an escape	○	○	○	○	○
I would replace an actual travel experience with the VR tourism experienced	○	○	○	○	○
During the VR tourism experience, I felt a sense of adventure	○	○	○	○	○

Please indicate the level of agreement that you would assign to the following statements to describe the "travel" experience you described.

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I was able to do a lot of fantasizing during this AR/VR tourism experience	○	○	○	○	○
I accomplished just what I wanted to with this AR/VR tourism experience	○	○	○	○	○
The AR/VR tourism experience would enhance a real travel experience to that destination	○	○	○	○	○
Using the AR/VR tourism experience enabled me to accomplish tasks more quickly	○	○	○	○	○
The AR/VR tourism experience entertained me	○	○	○	○	○
Select strongly disagree	○	○	○	○	○
The AR/VR tourism experience made me feel as if I was in another world	○	○	○	○	○

Please indicate the level of agreement that you would assign to the following statements to describe the "travel"

experience you described.

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I got so involved during the AR/VR tourism experience that I forgot everything else	○	○	○	○	○
Experiencing tourism with AR/VR was an easy way to entertain me	○	○	○	○	○
After experiencing travel in AR/VR, I would substitute it for actual travel	○	○	○	○	○
The AR/VR tourism experience was a good value	○	○	○	○	○
This AR/VR tourism experience is one that I enjoyed	○	○	○	○	○
The AR/VR tourism experience offered value for the money	○	○	○	○	○
I felt I was in the world the AR/VR tourism experience created	○	○	○	○	○

Please indicate the level of agreement that you would assign to the following statements to describe the "travel" experience you described.

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I forgot my immediate environment when I experienced the AR/VR tourism experience	○	○	○	○	○
While experiencing the AR/VR tourism experience, I felt like my body was in the room, but my mind was inside the world created by the the AR/VR tourism experience	○	○	○	○	○
The visual aspects of the AR/VR tourism experience involved me	○	○	○	○	○
The sense of objects moving through space were compelling in the AR/VR tourism experience	○	○	○	○	○
Select strongly disagree	○	○	○	○	○
I could examine objects well from multiple viewpoints in the AR/VR tourism experience	○	○	○	○	○
The mechanism which controlled movement through the AR/VR tourism experience was natural	○	○	○	○	○

Please indicate the level of agreement that you would assign to the following statements to describe the "travel" experience you described.

	Somewhat	Neither agree nor

	Strongly disagree	disagree	disagree	Somewhat agree	Strongly agree
I was involved in the AR/VR tourism experience to the extent that I lost track of time	○	○	○	○	○
The AR/VR tourism experience was truly a joy	○	○	○	○	○
Compared to other things I could have done, the time spent in the AR/VR tourism experience was truly enjoyable	○	○	○	○	○
I continued the AR/VR tourism experience, not because I had to, but because I wanted to	○	○	○	○	○
This AR/VR tourism experience was not a very nice time spent	○	○	○	○	○
I couldn't accomplish what I really needed to during the AR/VR tourism experience	○	○	○	○	○
Learning to navigate the AR/VR tourism experience was easy for me	○	○	○	○	○

Please indicate the level of agreement that you would assign to the following statements to describe the "travel" experience you described.

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I found it easy to get the AR/VR tourism experience to do what I wanted it to do	○	○	○	○	○
I found the AR/VR tourism experience was easy to use	○	○	○	○	○
I enjoyed the AR/VR tourism experience for its own sake, not because I learned something new	○	○	○	○	○
The AR/VR tourism experience gave me pleasure	○	○	○	○	○
The AR/VR tourism experience would enhance my effectiveness on my future trips	○	○	○	○	○
Select strongly disagree	○	○	○	○	○
My future trips would be easier by using the AR/VR tourism experience	○	○	○	○	○

Block 13

As one of the answers you provided did not match with the instructions, please return your submission on Prolific by selecting the 'Stop without completing' button.

Survey 4.

Informed Consent

Consumer perceptions of VR (Virtual Reality) experiences in travel/tourism

Investigator
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Advisor
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(662) 915-3073

Description
The purpose of this research project is to analyze the consumer perceptions of VR (Virtual Reality) experiences in travel and tourism. We would like to ask a few questions about your perceptions of a VR travel experience, and some demographic information. You will not be asked for your name or any other identifying information. You will need to recall your latest tourism experience in VR and then you will be asked questions in this survey about your perceptions of it.

You should have experienced travel or tourism in Virtual Reality for this study. You should be a US resident, and 18 years of age or older.

Examples of a VR experience in tourism might include: VR apps used in historical sites, VR tours in museums, VR apps for destinations, VR tours of hotels, VR apps that customize hotel rooms, VR conferences, VR apps for airports, VR concerts, VR apps for navigation, etc. Some of these may be for pay, others may not.

Cost and Payments
It will take you approximately 10 minutes or less to complete this survey. You will receive $2.00 for completing the questionnaire.

Risks and Benefits
We do not think that there are risks. A lot of people enjoy taking questionnaires.

Confidentiality
No identifiable information will be recorded, therefore we do not think you can be identified from this study.

Right to Withdraw
You do not have to take part in this study and you may stop participation at any time. If you start the study and decide that you do not want to finish, all you have to do is to close this page.

IRB Approval
This study has been reviewed by The University of Mississippi's Institutional Review Board (IRB). If you have any questions, concerns, or reports regarding your rights as a participant of research, please contact the IRB at (662) 915-7482 or irb@olemiss.edu.

Statement of Consent
I have read and understood the above information. By completing the survey, I consent to participate in the study.

Yes ○ No ○

Are you 18 years of age or older?

Yes ○ No ○

Block 11

As you do not wish to participate in this study or do not qualify for it, please return your submission on Prolific by selecting the 'Stop without completing' button.

Block 9

Before you start, please switch off phone/e-mail/music/ so you can focus on this study.

Thank you!
Please entere your Prolific ID here:

${e://Field/PROLIFIC_PID}

Data Quality

We care about the quality of our survey data and hope to receive the most accurate measures of your opinions, so it is important to us that you thoughtfully provide your best answer to each question in the survey.

Do you commit to providing thoughtful and honest answers to the questions in this survey?

- ○ I will provide my best answers
- ○ I will not provide my best answers
- ○ I can't promise either way

Block 11

As you do not wish to provide your best answers, please return your submission on Prolific by selecting the 'Stop without completing' button.

Screener validation

Do you live in the USA?

Yes	No
○	○

Block 14

Have you engaged in any of the following simulated VR experiences in travel or tourism within the last year? Choose all that apply:

Theme Parks	Hotel / Resort	Museum	Concert	Conference	Sex tourism	Events	Airport	Historical Site	Other	None
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

If other, please type your answer

Think back to the most memorable of those VR travel/tourism experiences you had in the last year, and describe it here in a couple of sentences (where did it take you, what did you do, what device did you use, etc.):

How would you categorize this experience, in terms of industry?

Theme Parks	Hotel	Museum	Concert	Conference	Sex tourism	Events	Airport	Historical Site	Other	None
○	○	○	○	○	○	○	○	○	○	○

If other, please type your answer:

Block 10

Please select the model and brand of the VR headset that you used:

If other, please type the model and brand of the VR headset that you used:

Who owned the VR headset that you used for that VR tourism experience?

- ○ Myself
- ○ Someone else

If someone else, please type who owned VR headset that you used:

Dependent Variables

Thinking about yourself and how you felt during the "travel" experience; to what extent did you generally feel (during the "travel" experience):

	Did not feel at all 1	2	3	4	Felt very much 5
Upset	○	○	○	○	○
Hostile	○	○	○	○	○
Alert	○	○	○	○	○

	Did not feel at all 1	2	3	4	Felt very much 5
Ashamed	○	○	○	○	○
Inspired	○	○	○	○	○
Nervous	○	○	○	○	○
Determined	○	○	○	○	○
Attentive	○	○	○	○	○
Afraid	○	○	○	○	○
Active	○	○	○	○	○

Please indicate the level of agreement that you would assign to the following statements to describe the "travel" experience:

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
The VR travel experience was better than I expected	○	○	○	○	○	○	○
I was pleased with the VR travel experience	○	○	○	○	○	○	○
Overall, I was satisfied with the VR travel experience	○	○	○	○	○	○	○
I was completely delighted with the VR travel experience	○	○	○	○	○	○	○

Please indicate the level of agreement that you would assign to the following statements.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
I am planning to visit the destination that I observed in the tourism-related VR activity.	○	○	○	○	○	○	○
I intend to visit the destination that I saw in the tourism-related VR activity in near future.	○	○	○	○	○	○	○
I am willing to visit the destination that I saw in the tourism-related VR activity soon.	○	○	○	○	○	○	○
I intend to invest money and time to visit the destination that I observed in the VR tourism experience.	○	○	○	○	○	○	○

Please indicate the level of agreement that you would assign to the following statements.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
I will continue to use tourism-related VR activities in the future.	○	○	○	○	○	○	○
I will update tourism-related VR activities in the future.	○	○	○	○	○	○	○
I will search for tourism-related VR activities in the future.	○	○	○	○	○	○	○
I will continue to use tourism-related VR activities in the future.	○	○	○	○	○	○	○

Please indicate the level of agreement that you would assign to the following statements to describe the "travel" experience. In thinking about your response to each item, compare the experience to other things you could've been doing.

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I think the VR tourism experience was very entertaining	○	○	○	○	○
I experienced tourism with VR for the pure enjoyment of it	○	○	○	○	○
The VR tourism experience truly felt like an escape	○	○	○	○	○
I would replace an actual travel experience with the VR tourism experienced	○	○	○	○	○
During the VR tourism experience, I felt a sense of adventure	○	○	○	○	○

Please indicate the level of agreement that you would assign to the following statements to describe the "travel" experience. In thinking about your response to each item, compare the experience to other things you could've been doing.

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I got so involved during the VR tourism experience that I forgot everything else	○	○	○	○	○
Experiencing tourism with VR was an easy way to entertain me	○	○	○	○	○
The VR tourism experience was a good value	○	○	○	○	○
This VR tourism experience is one that I enjoyed	○	○	○	○	○

Please indicate the level of agreement that you would assign to the following statements to describe your "travel" experience. In thinking about your response to each item, compare the experience to other things you could've been doing.

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I forgot my immediate environment when I experienced the VR tourism experience	○	○	○	○	○
While experiencing the VR tourism experience, I felt like my body was in the room, but my mind was inside the world created by the the VR tourism experience	○	○	○	○	○
Select strongly disagree	○	○	○	○	○
I could examine objects well from multiple viewpoints in the VR tourism experience	○	○	○	○	○

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
The mechanism which controlled movement through the VR tourism experience was natural	○	○	○	○	○

Please indicate the level of agreement that you would assign to the following statements to describe the "travel" experience. In thinking about your response to each item, compare the experience to other things you could've been doing.

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I was involved in the VR tourism experience to the extent that I lost track of time	○	○	○	○	○
The VR tourism experience was truly a joy	○	○	○	○	○
I continued the VR tourism experience, not because I had to, but because I wanted to	○	○	○	○	○
I couldn't accomplish what I really needed to during the VR tourism experience	○	○	○	○	○
Learning to navigate the VR tourism experience was easy for me	○	○	○	○	○

Please indicate the level of agreement that you would assign to the following statements to describe the "travel" experience. In thinking about your response to each item, compare the experience to other things you could've been doing.

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I found it easy to get the VR tourism experience to do what I wanted it to do	○	○	○	○	○
I found the VR tourism experience was easy to use	○	○	○	○	○
Select strongly disagree	○	○	○	○	○
I enjoyed the VR tourism experience for its own sake, not because I learned something new	○	○	○	○	○
The VR tourism experience gave me pleasure	○	○	○	○	○

Demographics

What is your gender?

Male	Female	Non-binary
○	○	○

What is your year of birth?

What is your ethnicity?

- ◯ White
- ◯ Hispanic
- ◯ African American
- ◯ Native American Indian
- ◯ Asian
- ◯ Other

What is your highest level of education?

- ◯ Less than high school
- ◯ High school graduate
- ◯ Some college
- ◯ College graduate
- ◯ Some graduate school
- ◯ Graduate degree

What is your marital status?

Married	Widowed	Divorced	Never married	Separated	Living with a partner
◯	◯	◯	◯	◯	◯

What is your household annual income?

- ◯ Less than $10,000
- ◯ $10,000 - $29,999
- ◯ $30,000 - $49,999
- ◯ $50,000 - $69,999
- ◯ $70,000 - $89,999
- ◯ $90,000 - $109,999
- ◯ More than $110,000

How many times did you make leisure travels on average per year (before the pandemic)?

Have you traveled after the pandemic started?

- ◯ Yes
- ◯ No

If so, how many times per year have you traveled since the pandemic started?

How many surveys do you take per month?

VITA

Fernando Arroyo Lopez is a Ph.D. candidate in the Department of Nutrition and Hospitality Management at the University of Mississippi. His professional experiences motivated his research to focus on topics regarding perceived value and virtual reality in the hospitality industry.